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Water Resource Issues in the 119th Congress

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Water Resource Issues in the 119th Congress

Congress has long demonstrated interest in water resource issues. It has passed hundreds of water-related federal laws and authorized thousands of water-related projects with purposes such as navigation, flood control, and water storage. Congress also has directed federal agencies to perform various scientific activities to improve understanding and forecasts of inland and coastal water resources and water-related hazards. Federal activities in these areas include monitoring and forecasting water flows, quality, and availability; forecasting and responding to extreme weather events, such as droughts and floods; designing and constructing inland and coastal water resource infrastructure; restoring aquatic ecosystems; and conducting oversight of federal water resource activities. The 119th Congress may consider existing challenges related to overlaps and gaps in federal water resource infrastructure and science activities. It also may consider issues regarding coordination and consistency among federal programs. In addition, Congress may consider funding levels and priorities for federal water resource projects and water-resource-related science.

Development and economic pressures, hydrologic events (e.g., droughts, floods), and other concerns—such as aquatic invasive species, land-use change, and climate change—have increased stakeholder interest in water science and water resource development. Many stakeholders have expressed interest in federal financial assistance (including grants, loans, and cost sharing) and technical assistance for constructing new water resource infrastructure (e.g., storm-surge gates, water storage, water reuse and desalination facilities). In addition, some stakeholders and Members of Congress have called for improved management of available freshwater supplies through advances in water science (e.g., monitoring and modeling) and operational changes. Operation and maintenance needs of the nation's vast water resource infrastructure and rehabilitation and repair of aging projects also draw congressional attention and encompass a sizable portion of some water resource agency budgets.

The 119th Congress may be interested in the authorization, funding, and activities of the water resource development and science agencies. Congress directs the U.S. Army Corps of Engineers and the Bureau of Reclamation to undertake various water resource project and assistance activities, including the planning, construction, operation, and maintenance of most federally owned water resource projects. Other federal agencies (e.g., the Tennessee Valley Authority) also own and operate water resource projects. Congress has tasked various federal agencies—including the U.S. Geological Survey and the National Oceanic and Atmospheric Administration—with water resource research, monitoring, and forecasting activities.

The 119th Congress also may focus on crosscutting water resource and related science topics, including the following:

- The federal role in water management in water-stressed regions like California and the Colorado River Basin
- Oversight of agency implementation of authorities and funding for tribal water resource issues, dam safety, and maintenance of existing water infrastructure enacted in the 117th and 118th Congresses
- Advances in water science and technologies to observe, model, and forecast droughts, floods, and other climate events (e.g., leveraging the use of improved sensors, advanced computing, and private sector developments)
- The expansion of water supply development, including through new technologies, alternative supply adoption (e.g., municipal water reuse), updated operations, and new construction
- Improvements in ecosystem resilience by restoring aquatic ecosystems and using natural and nature-based infrastructure

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Introduction

Congress has long demonstrated interest in water resource issues. It has passed hundreds of water-related federal laws and authorized thousands of inland and coastal water-related projects with purposes such as navigation, flood control, and water storage. Congress also has directed several federal agencies to perform various scientific activities to improve understanding and forecasts of water resources and water-related hazards. Members of Congress may introduce legislation related to water resource issues, and congressional committees may be involved in legislating, funding, and overseeing the water-related activities of federal agencies. Several federal agencies may contribute to researching, monitoring, and forecasting water flows, quality, and availability; responding to extreme events, such as droughts and floods; designing and constructing water resource infrastructure; restoring aquatic ecosystems; and conducting oversight of federal management of water resources and water science activities (**Table 1**).

Federal involvement in water resource development and management, and related water science, entails multiple agencies and authorities working both independently and cooperatively, sharing information and expertise. The 119th Congress may consider existing challenges related to both overlaps and gaps in federal water resource infrastructure and related science activities. Congress also may consider coordination and consistency among federal water-related programs.

Development pressures, hydrologic events (e.g., droughts, floods), and other concerns—such as aquatic invasive species, land-use change, and climate change—have increased stakeholder interest in water science and water resource development. Many stakeholders have expressed interest in federal financial and technical assistance for constructing new water resource infrastructure (e.g., storm-surge gates, water storage, water reuse and desalination facilities) at various locations across the United States and its territories. In addition, some stakeholders and Members of Congress have called for improved management of available freshwater supplies through advances in water science (e.g., monitoring, modeling) and operational changes (e.g., changes to when water is stored or released by federal reservoirs). Operation and maintenance needs of the nation’s vast water resource infrastructure, including rehabilitation and repair of aging projects, also draw congressional attention and encompass a sizable portion of some water resource agency budgets.

Water resource policy deliberations in the 119th Congress may include the following:

- Certain authorization issues (e.g., biennial consideration of a Water Resources Development Act [WRDA])
- Oversight of agency implementation of authorities and funding enacted in the 117th and 118th Congresses, including those for tribal water resource issues, dam safety, and maintenance of existing and aging infrastructure
- Advances in water science and technologies to observe, forecast, and respond to droughts, floods, other weather and climate events, and water use demands
- Expansion of water supplies and ecosystem resilience through new technologies, natural and nature-based features, updated operations, new construction, and other means

This report addresses broad categories of water resource topics that the 119th Congress may consider. Responsibility for the development, management, protection, and allocation of the nation’s water resources is spread among federal, state, local, and tribal governments, as well as private interests. This report primarily focuses on federal activities related to inland and coastal water resource science, development, and management by the U.S. Army Corps of Engineers

(USACE) in the Department of Defense (DOD), the Bureau of Reclamation (Reclamation) and the U.S. Geological Survey (USGS) in the Department of the Interior (DOI), and the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce.¹ The report also references other agencies with responsibilities related to water resources, such as the Bureau of Indian Affairs (BIA) in DOI and the National Aeronautics and Space Administration (NASA), as part of a discussion of specific crosscutting topics.

Agencies Involved in Water Resources

Congress has passed legislation to authorize and appropriate funding for multiple agencies to undertake water resource projects and activities. Congress also has directed federal agencies to conduct various water science and technology activities to inform federal and nonfederal water resource management. The following are some primary examples:

- **Federal Water Resource Projects.** Congress directs USACE and Reclamation to undertake the planning, construction, operation, and maintenance of most federally owned water resource projects. Other federal agencies, such as the Tennessee Valley Authority, also may own and operate water resource projects.²
- **Assistance for Nonfederal Water Projects and Activities.** Congress has directed federal agencies to provide technical and financial support for nonfederal entities on selected water topics and projects, including through programs administered by Reclamation, USACE, and other agencies.³
- **Water Science.** Congress has tasked various federal agencies, such as the USGS, and NOAA, with water resource research, monitoring, and forecasting activities.

Table 1 shows selected agencies and their congressionally directed roles in relation to water resources. The first part of the table reflects the four agencies (USACE, Reclamation, the USGS, and NOAA) whose water resource activities are discussed in more detail in this section of the report. The second part of the table identifies selected other agencies involved in water resources, including some mentioned in the report's later discussion of crosscutting topics. As **Table 1** highlights, some agencies have significant water resource responsibilities central to their missions, whereas numerous other agencies have less significant involvement in this area.

¹ This report is not exhaustive or comprehensive. For example, it does not address ocean waters and associated science; federal support for municipal water systems; municipal wastewater infrastructure; or environmental protections, such as water quality and wetlands regulations (e.g., U.S. Army Corps of Engineers' [USACE's] role in administering various water-related permits. Such topics are addressed in other CRS products, such as CRS Report R47021, *Federal Involvement in Ocean-Based Research and Development*, by Caitlin Keating-Bitonti; and CRS Testimony TE10079, *The Clean Water Act at Fifty: Highlights and Lessons Learned from a Half Century of Transformative Legislation*, by Laura Gatz.

² Other agencies, such as the Tennessee Valley Authority, Natural Resources Conservation Service, and International Boundary and Water Commission, also have constructed and operate water resource facilities. These agencies are not the primary focus of this report.

³ For example, USACE may provide assistance for certain nonfederal, publicly owned water-related facilities, and loans for nonfederal dam safety and levee projects. Reclamation supports water and energy efficiency grants through the WaterSMART Program, selected rural water projects, and Indian water rights settlements. Federal agencies also have certain authorities for providing technical assistance to nonfederal entities regarding water resource issues.

Table 1. Selected Federal Agencies Involved in Water Resources and Principal Committees of Jurisdiction

Agency (Department)	Selected Principal Water Resource Roles	Principal House and Senate Authorization Committees	House and Senate Appropriations Subcommittees
Agencies Addressed in Detail in This Report			
U.S. Army Corps of Engineers (Dept. of Defense)	Plan and construct projects for navigation, flood risk reduction, and aquatic ecosystem restoration. Maintain navigation channels and operate multipurpose dams.	House Transportation and Infrastructure Senate Environment and Public Works	Energy and Water Development
Bureau of Reclamation (Dept. of the Interior)	Plan, construct, and assist with projects to augment and deliver water supplies, principally in the western United States. Fund the implementation of certain Indian water rights settlements, as directed by Congress.	House Natural Resources Senate Energy and Natural Resources	Energy and Water Development
U.S. Geological Survey (Dept. of the Interior)	Collect, assess, and disseminate hydrological data and analysis. Inform water availability and use and ecosystem impacts. Research hydrological systems.	House Natural Resources House Science, Space, and Technology Senate Energy and Natural Resources Senate Environment and Public Works	Interior-Environment
National Oceanic and Atmospheric Administration (Dept. of Commerce)	Research, observe, model, predict, warn, and disseminate climate and weather data, with a focus on water-related atmospheric and oceanic phenomena.	House Natural Resources House Science, Space, and Technology Senate Commerce, Science, and Transportation	Commerce-Justice-Science
Selected Other Agencies Involved in Water Resources			
Bureau of Indian Affairs (Dept. of the Interior)	Manage various irrigation projects on tribal reservation lands. Fund the implementation of certain Indian water rights settlements, as directed by Congress.	House Natural Resources Senate Energy and Natural Resources Senate Indian Affairs	Interior-Environment
International Boundary and Water Commission	Construct and maintain U.S.-Mexico border water infrastructure as part of its role in implementing transboundary water treaties.	House Foreign Affairs House Natural Resources Senate Energy and Natural Resources Senate Foreign Relations	State-Foreign Operations ^a

Agency (Department)	Selected Principal Water Resource Roles	Principal House and Senate Authorization Committees	House and Senate Appropriations Subcommittees
International Joint Commission	Resolve and prevent disputes concerning U.S.-Canada transboundary or boundary waters.	House Foreign Affairs Senate Foreign Relations	State-Foreign Operations ^a
National Aeronautics and Space Administration	Develop and launch space observations that advance understanding of Earth's water processes and management of water resources.	House Science, Space, and Technology Senate Commerce, Science, and Transportation	Commerce-Justice- Science
Natural Resources Conservation Service (Dept. of Agriculture)	Assist with rural water resource projects and watershed management.	House Agriculture House Transportation and Infrastructure Senate Agriculture Senate Energy and Natural Resources	Agriculture
Tennessee Valley Authority	Maintain water resource projects for regional development.	House Transportation and Infrastructure Senate Environment and Public Works	Not applicable (Agency is self- supporting since FY1999 using funds from electric power sales.)

Source: Congressional Research Service (CRS), based principally on CRS Report R42653, *Selected Federal Water Activities: Agencies, Authorities, and Congressional Committees*, for authorization jurisdiction.

Notes: This table does not cover every aspect of House and Senate committee jurisdiction affecting water resource issues or list every agency conducting water resource activities (e.g., the Environmental Protection Agency, over which numerous committees have jurisdiction). The House and Senate Parliamentarian Offices evaluate committee jurisdictions related to water.

- a. In the 119th Congress, this Appropriations Subcommittee's name in the House of Representatives is National Security, Department of State, and Related Programs (or National Security-State for short). U.S. House of Representatives Committee on Appropriations, "National Security, Department of State, and Related Programs," <https://appropriations.house.gov/subcommittees/national-security-department-state-and-related-programs>.

U.S. Army Corps of Engineers

Congress directs and funds USACE to undertake civil works projects across the nation primarily to improve navigation, reduce flood damage, and restore aquatic ecosystems.⁴ In addition to studying and constructing projects, USACE operates more than 700 federally owned dams;

⁴ While undertaking projects, USACE also may pursue additional project benefits related to water supply, hydropower, recreation, fish and wildlife enhancement, and other purposes. Congress also directs USACE to assist with certain municipal water and wastewater investments (referred to as *environmental infrastructure* assistance). In addition to supporting emergency response (e.g., flood fighting) through the agency's own authorities, at times USACE has been tasked with significant engineering assignments as part of broader federal emergency response activities. For more on USACE, see CRS Insight IN11810, *U.S. Army Corps of Engineers Civil Works: Primer and Resources*, by Anna E. Normand and Nicole T. Carter; and CRS Report R47946, *Process for U.S. Army Corps of Engineers (USACE) Projects*, by Nicole T. Carter and Anna E. Normand.

25,000 miles of navigable waterways, channels, and harbors; and 12 million acres of land and associated recreational assets.⁵

Congress generally authorizes USACE water resource activities and makes changes to the agency's policies through omnibus WRDAs. Congress provides annual appropriations to fund USACE activities (e.g., \$8.7 billion in FY2024) and has provided supplemental or advance appropriations to USACE (see "Water Resource Project Funding and Oversight").

The 119th Congress may consider a WRDA; each of the 113th-118th Congresses enacted an omnibus water resources authorization act. The 119th Congress also may continue oversight of the agency's implementation of enacted WRDAs and agency actions associated with specific projects or specific events, like floods or droughts.

The 119th Congress may consider topics related to the efficacy and efficiency of the agency as an organization. USACE employs nearly 37,000 employees, 98% of whom are civilian and 2% of whom are military, with divisions and districts throughout the country and internationally.⁶ The agency is under the direction of the Chief of Engineers (who is also the USACE Commanding General). The Chief of Engineers is responsible for executing civil works policies established by the Assistant Secretary of the Army for Civil Works (ASACW), consistent with federal law and congressional direction. In 2018, the Trump Administration proposed moving USACE's civil works activities from DOD to DOI and the Department of Transportation.⁷ If policymakers during the 119th Congress consider transferring USACE authorities, implementation could require legislation, depending on the proposed actions.

The 119th Congress may consider options for advancing USACE projects, managing the agency's assets, and altering its programs that support nonfederal water resource projects.

- For decades, Congress has consistently authorized USACE to construct and assist with more water projects than can be accomplished with appropriated funds. Congress may consider options for funding or financing the federal and nonfederal costs associated with USACE projects. Congress may consider how trends in annual and supplemental appropriations influence the effective, efficient, and accountable use of USACE funding in delivering projects.
- In 2018, the Trump Administration's infrastructure-related legislative outline included proposals to deauthorize projects at the end of their service lives and authorize new nonfederal roles associated with USACE's civil works assets.⁸ If

⁵ USACE, *Strategic Asset Management Plan*, August 2022, pp. 10-11, <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll6/id/2358>. According to the report, USACE is responsible for the nearly \$250 billion dollars (in replacement value) of multi-benefit water resources infrastructure developed since 1824.

⁶ Many domestic USACE districts support both military and civil works activities. For more on USACE organization, see CRS Report R48322, *U.S. Army Corps of Engineers Civil Works: FAQs on Organization and Efficiency Reviews*, by Nicole T. Carter.

⁷ U.S. Executive Office of the President, Office of Management and Budget, *Delivering Government Solutions in the 21st Century: Reform Plan and Reorganization Recommendations*, June 21, 2018. The 2018 Trump Administration proposal indicated that all USACE civil works activities other than navigation would be transferred to the Department of the Interior (DOI). No principal law or organic act establishes and defines USACE's suite of civil works responsibilities. A lengthy set of statutory provisions, which typically reference the Secretary of the Army, authorizes general or project-specific water resource activities. The Secretary of the Army has typically delegated the civil works responsibilities to the Assistant Secretary of the Army for Civil Works (ASACW), which is a position established in law (10 U.S.C. §7016).

⁸ The legislative outline included proposals to authorize commercial operation of hydropower operations and nonfederal roles in inland waterway improvements, to allow USACE to enter into longer-term contracts, and to (continued...)

similar proposals are put forth during the 119th Congress, Congress may evaluate how such changes may alter not only the cost and efficiency of USACE project delivery but also Congress's role in USACE activities and in the federal use and retention of USACE-related funds.

- In 2023, USACE completed a rulemaking for its credit assistance program for certain nonfederal water resource projects, and in 2024, it invited selected applicants to complete their loan applications.⁹ Congress may oversee USACE's new role in offering federal loans under the Corps Water Infrastructure Financing Program and the scope of projects covered by the program's lending.

Congress also may evaluate the efficiency of the agency in performing disaster response.¹⁰ The 119th Congress also may oversee actions related to updating USACE's policies and procedures, including a final rulemaking on agency-specific planning procedures published on December 19, 2024.¹¹ When President Trump took office on January 20, 2025, USACE had various rulemakings under way, including a rule to update its procedures for natural disaster preparedness, response, and recovery activities.¹²

Bureau of Reclamation

Pursuant to the Reclamation Act of 1902, as amended,¹³ Reclamation is responsible for the management and development of many of the large federal dams and water diversion structures in the 17 conterminous states west of the Mississippi River.¹⁴ In addition to water supplies for agricultural and municipal users, Reclamation facilities provide flood control, recreation, and fish and wildlife benefits in many parts of the West. Some Reclamation facilities' operations can be controversial because of their effects on habitat and species. Reclamation's annual budget (e.g.,

authorize user fee collection and retention as part of a USACE public-private partnership program (White House, *Legislative Outline for Rebuilding Infrastructure in America*, February 2018, pp. 28-31).

⁹ For more information, see CRS Insight IN12021, *Corps Water Infrastructure Financing Program (CWIFP)*, by Nicole T. Carter.

¹⁰ USACE is regularly tasked with emergency response mission assignments by the Federal Emergency Management Agency pursuant to the Stafford Act (42 U.S.C. §§5121 et seq.). Under the National Response Framework, which guides the nation's response to all types of disasters, USACE is the lead for public works and engineering. In this role, USACE provides technical assistance and engineering, construction management, and emergency contracting and emergency power and repair for critical facilities. The agency also assists in monitoring, stabilizing, or demolishing damaged structures; provides technical assistance in debris clearing, removal, and disposal; and contributes to the establishment of ground and water routes into affected areas. Additionally, USACE has its own authority to perform emergency flood fighting and to provide emergency water supplies in certain circumstances (33 U.S.C. §701n).

¹¹ Department of the Army, Corps of Engineers, "Corps of Engineers Agency Specific Procedures to Implement the Principles, Requirements, and Guidelines for Federal Investments in Water Resources," 89 *Federal Register* 103992, December 19, 2024. For more on federal project planning guidance, see CRS In Focus IF10221, *Principles, Requirements, and Guidelines (PR&G) for Federal Investments in Water Resources*, by Nicole T. Carter and Charles V. Stern. Other actions also could alter USACE implementation. For example, in 2024, the ASACW released an updated USACE Tribal Consultation Policy on December 5, 2023, replacing an earlier policy from 2012. For more information on this policy and tribal consultation generally, see CRS Report R48093, *Federal-Tribal Consultation: Background and Issues for Congress*, coordinated by Mariel J. Murray.

¹² Department of the Army, Corps of Engineers, "Natural Disaster Procedures: Preparedness, Response, and Recovery Activities of the Corps of Engineers," 88 *Federal Register* 1340, January 10, 2023.

¹³ 32 Stat. 388 (43 U.S.C. §391).

¹⁴ Texas was originally not included as a Reclamation state because it did not have federal lands, but Congress subsequently added it in 1906 (34 Stat. 259). Legislation enacted in 1986 (P.L. 99-396) extended the Reclamation Act's provisions to the territories of American Samoa, Guam, the Northern Mariana Islands, and the U.S. Virgin Islands, although no Reclamation projects have been constructed in those territories.

\$1.9 billion in FY2024) has recently been supplemented with historically larger funding amounts (see “Water Resource Project Funding and Oversight”).

Over the agency’s history, Congress has authorized more than 180 individual Reclamation projects throughout the West. The first projects, developed in the early 20th century, were single purpose and focused on irrigation development. Subsequent projects have been larger and more complex. Congress has authorized Reclamation to operate these projects for multiple purposes. Reclamation projects such as the Central Valley Project (CVP), as well as projects and facilities in the Colorado River Basin (e.g., Hoover and Glen Canyon Dams) and in the Pacific Northwest, have large bases of interested stakeholders. Such projects regularly generate congressional attention.

At Congress’s direction, Reclamation has been increasingly involved in western water projects whose primary purpose differs from Reclamation’s historical aim of reclaiming land for irrigation purposes. Some of Reclamation’s newer authorities include financial support for water reuse and recycling projects (i.e., the Title XVI Program); desalination projects; grants for water and energy conservation efforts (i.e., WaterSMART Grants); and funding for rural water projects and water infrastructure associated with congressionally authorized Indian water rights settlements. How to balance these new priorities with the maintenance of existing federal projects, and whether to facilitate new surface water storage development—and, if so, how—are among the major water resource issues before Congress. These questions are particularly significant given Reclamation’s nexus with state and local water resource development.

Reclamation water project and management issues likely to receive attention in the 119th Congress include the status of new and proposed surface water storage projects under Section 4007 of the Water Infrastructure Improvements for the Nation Act (WIIN Act; P.L. 114-322) and whether to extend and/or amend authority under that section.¹⁵ Another ongoing issue of congressional interest involves Reclamation pumping operations in the San Francisco Bay and San Joaquin-Sacramento Delta, including effects on water users and on threatened and endangered species.¹⁶ The 119th Congress may oversee ongoing CVP operations and any related proposals by the Trump Administration. Other river basins where Reclamation has a prominent role in water management issues—including the Colorado River Basin,¹⁷ the Columbia River Basin, and the Klamath River Basin—also are likely to generate congressional interest. In addition to geographically specific issues, Congress may consider broader changes to and direction for Reclamation’s programmatic authorities, such as those related to grant programs for ecosystem restoration and water efficiency.

U.S. Geological Survey

The USGS, within DOI, provides scientific information to the nation to mitigate risks from natural hazards and to support the management of water, energy, mineral, ecosystem, and land resources.¹⁸ The USGS has conducted water resource science and surveys since 1888, and it

¹⁵ For additional information on these projects, see CRS In Focus IF10626, *Reclamation Water Storage Projects: Section 4007 of the Water Infrastructure Improvements for the Nation (WIIN) Act*, by Charles V. Stern.

¹⁶ For additional information on Central Valley Project operations, see CRS Report R45342, *Central Valley Project: Issues and Legislation*, by Charles V. Stern, Pervaze A. Sheikh, and Erin H. Ward.

¹⁷ See “Spotlight: Colorado River Basin.”

¹⁸ Initially established under the Organic Act of 1879 (43 U.S.C. §31), the U.S. Geological Survey (USGS) is a scientific agency within DOI. USGS, *Budget Justifications and Performance Information Fiscal Year 2025: U.S. Geological Survey*, p. 1, <https://www.doi.gov/media/document/fy-2025-u-s-geological-survey-greenbook> (hereinafter USGS, *FY2025 Budget*).

continues to do so through its Water Resources Mission Area (hereinafter referred to as *Water Resources*).¹⁹

USGS Water Resources covers scientific activities that involve collecting and assessing hydrological data, and disseminating this data and analysis. It also provides information on water availability and use as well as research on hydrological systems. Water Resources collects real-time water monitoring data from approximately 20,200 groundwater wells, 11,800 streamgages, and 2,500 water quality sampling stations across the nation and makes it publicly available.²⁰ These data are collected in partnership with more than 1,500 federal, state, tribal, and local agencies. The USGS Water Resources Research Act Program supports state and regional water science research and workforce development at state water resources research institutes.²¹

Starting in 2018, Water Resources began targeted activities at selected Integrated Water Science (IWS) basins—medium-sized watersheds (10,000-20,000 square miles) and underlying aquifers.²² As of January 2025, the USGS had initiated 5 IWS basins (**Figure 1**), with the goal of establishing 10 IWS basins.²³ At these basins, the USGS is using high-density monitoring and new research techniques through the Next Generation Water Observing System (NGWOS) to test new technology that may be incorporated into routine water monitoring. The NGWOS activities are also to inform advanced water-availability models that are to extrapolate water dynamics in larger regions represented by the IWS basins.²⁴ Ultimately, the USGS aims to produce a centralized website and data delivery system, the National Water Availability Assessment Data Companion, with the goal of providing routinely updated and nationally consistent modeled water quantity, water quality, and water use information, along with long-term trends in observational data.²⁵

¹⁹ USGS, *FY2025 Budget*, p. 97. The Water Resources Mission Area is one of five mission areas in the USGS. Other USGS mission areas, such as the Ecosystems Mission Area and the Core Science Systems Mission Area, also may conduct activities related to water science. USGS, “Water Resources,” <https://www.usgs.gov/mission-areas/water-resources>.

²⁰ USGS, *FY2025 Budget*, p. 100.

²¹ Authorized by §104 of the Water Resources Research Act of 1984 (P.L. 98-242), as amended (42 U.S.C. §§10301 et seq.). USGS, “Water Resources Research Act Program,” <https://water.usgs.gov/wrri/>.

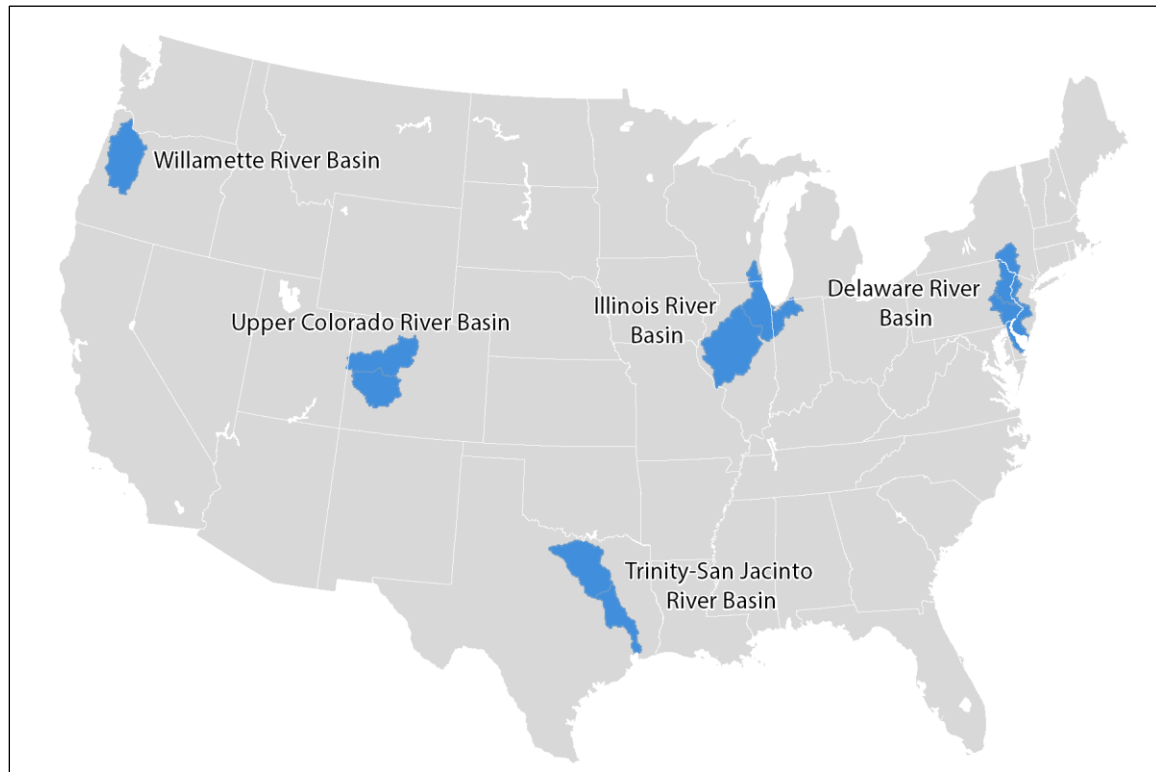
²² The USGS developed a regional framework to select basins from different hydrologic regions that collectively represent a range of major drivers of the hydrologic cycle across the contiguous United States, with a particular focus on human stressors of water resources. USGS, *FY2025 Budget*, pp. 98-99.

²³ USGS, “Integrated Water Science Basins,” March 1, 2023, <https://www.usgs.gov/media/images/integrated-water-science-basins>.

²⁴ USGS, *FY2025 Budget*, pp. 98-99.

²⁵ USGS, “National Water Availability Assessment Data Companion,” January 12, 2024, <https://www.usgs.gov/mission-areas/water-resources/science/national-water-availability-assessment-data-companion>.

Figure 1. USGS Integrated Water Science (IWS) Basins
(as of January 2025)



Source: CRS using U.S. Geological Survey (USGS), “Integrated Water Science Basins,” March 1, 2023, <https://www.usgs.gov/media/images/integrated-water-science-basins>.

The 119th Congress may consider the amount of funding it provides to the USGS for its routine monitoring networks and agency initiatives to advance monitoring technologies and modeling, including through machine learning. Past Trump Administration budget requests sought to cut the Water Resources budget by around 20%, which would have affected activities across the mission area.²⁶ Conversely, for those fiscal years, Congress provided greater appropriations (in nominal dollars) for the mission area than in previous fiscal years, as well as supported the new NGWOS and other IWS activities. The 119th Congress also may consider the future of USGS water science activities through oversight of the agency’s IWS and related initiatives or through legislation directing the USGS how to conduct its monitoring and modeling activities.

National Oceanic and Atmospheric Administration

Congress has assigned NOAA, within the Department of Commerce, responsibilities for atmospheric and oceanic observations, modeling, forecasting, warning systems, information dissemination, and research.²⁷ NOAA works independently and with other agencies to understand atmospheric (e.g., precipitation) and oceanic (e.g., storm surge) phenomena, surface waters (e.g., rivers and lakes), and their interactions with land (e.g., drought). NOAA water resource activities

²⁶ See USGS Budget Justifications and Performance Information for relevant fiscal years at USGS, “Budget Archives,” <https://www.usgs.gov/bfa/budget-archives>.

²⁷ For more about the National Oceanic and Atmospheric Administration (NOAA), see CRS Report R47636, *National Oceanic and Atmospheric Administration (NOAA): Overview and Issues for Congress*, by Eva Lipiec.

include collecting atmospheric and oceanic data; modeling the extent and depths of flood inundation; forecasting precipitation and drought, river levels, streamflows, hurricanes, and storm surges; and predicting potential changes to future atmospheric and oceanic conditions that affect the availability and quality of water resources, among other activities.

The National Water Center (NWC) conducts some of NOAA's water resource activities.²⁸ The NWC's National Water Model (NWM) combines the USGS and USACE water resource information with NOAA's atmospheric weather models to provide streamflow and flood forecasts, as well as information about soil moisture, evapotranspiration, runoff, snow, and other water resources parameters.²⁹ In FY2023, NWM 3.0 was expanded to include the continental United States, Hawaii, Puerto Rico, the U.S. Virgin Islands, and parts of Alaska. NWM also includes operational guidance for most of the U.S. coastal zone, providing water-level forecasts that account for the combined effects of streamflows, storm surges, tides, and waves.³⁰

Water-resource-related activities are conducted in other parts of NOAA as well, including the Hurricane Forecast Improvement Program (HFIP) and National Integrated Drought Information System (NIDIS).³¹ HFIP activities occur across the agency, and proposals have been made to improve tracking, intensity, and precipitation monitoring through the use of high-performance computing and uncrewed aerial systems and via upgrades to research and operational prediction systems.³² In addition, NOAA leads the interagency NIDIS. NIDIS provides drought information through improved drought monitoring (e.g., U.S. Drought Monitor) and forecasting capabilities.³³

Congress has augmented NOAA's water-resource-related responsibilities, primarily through explanatory language accompanying annual appropriations laws. For example, Congress provided funding for the agency's research, equipment, and decision support services related to precipitation, hurricane, and drought forecasting and longer term prediction for FY2023 and FY2024.³⁴ The National Defense Authorization Act for Fiscal Year 2024 (2024 NDAA; P.L. 118-31, §1090) also codified NOAA's and the U.S. Air Force's activities to conduct observations of extreme precipitation events, such as atmospheric rivers and hurricanes.³⁵

The 119th Congress may oversee NOAA's progress in implementing the appropriations laws' directives, 2024 NDAA, and additional funding previously provided under the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58) and P.L. 117-169, commonly known as the Inflation Reduction Act (IRA), for research, forecasting, computing capacity, and equipment, among other things. Congress also may consider additional directives for NOAA regarding water-resource-related observations, modeling, forecasting, and research.

²⁸ The National Weather Center is administered by NOAA's National Weather Service and collaborates with other federal agencies, academic institutions, commercial partners, and other entities to improve the National Water Model.

²⁹ NOAA, *Budget Estimates Fiscal Year 2025, Congressional Submission*, March 2023, p. NWS-36 (hereinafter NOAA, *Budget Estimates FY2025*).

³⁰ Ibid.

³¹ National Integrated Drought Information System (NIDIS), "What Is NIDIS?," <https://www.drought.gov/about>; and NOAA, Office of Science and Technology Integration, "Hurricane Forecast Improvement Program: Overview," <https://vlab.noaa.gov/web/osti-modeling/hfip/about>.

³² NOAA, *Budget Estimates FY2025*.

³³ NOAA, *Budget Estimates FY2025*, p. OAR-17.

³⁴ Sen. Patrick Leahy, "Explanatory Statement Regarding H.R. 2617, Consolidated Appropriations Act, 2023," *Congressional Record*, vol. 168 (December 20, 2022); and S.Rept. 118-62 (as referred to in Sen. Patty Murray, "Unanimous Consent Agreement - H.R. 4366," *Congressional Record*, vol. 170 (March 4, 2024).

³⁵ *Atmospheric rivers* are corridors of concentrated water vapor in the atmosphere. For more information, see CRS In Focus IF12872, *Atmospheric Rivers: Background and Forecasting*, by Eva Lipiec and Nicole T. Carter.

Selected Crosscutting Topics

Congress has authorized and appropriated funding to various federal agencies to address crosscutting water resource and water science issues facing the nation. The 119th Congress may consider legislation, appropriations, and oversight to address a number of crosscutting topics, including those discussed below.

Water Resource Project Funding and Oversight

Congress provides funding for federal water resource agencies (USACE and Reclamation) through annual appropriations acts and sometimes through supplemental appropriations acts. The majority of this funding is for planning, constructing, operating, and maintaining federal water resource projects. Some funding may be for other agency activities (e.g., grants administered by Reclamation, appropriations to cover credit subsidy costs for USACE's nonfederal Corps Water Infrastructure Financing Program loans, USACE environmental infrastructure assistance, and research and development).

Annual Appropriations

In FY2024 annual appropriations, USACE and Reclamation received \$8.7 billion and \$1.9 billion, respectively.³⁶ For these agencies, annual appropriations generally funded projects and activities at least at the Administration-requested level while providing more funding to some projects and activities.³⁷

In the annual appropriations process for the 117th and 118th Congresses, Members were able to request funding for individual USACE and Reclamation studies and projects and certain USACE and Reclamation activities as Community Project Funding (CPF) in the House and as Congressionally Directed Spending (CDS) in the Senate. In total, the 117th Congress funded 343 CPF/CDS items for USACE, totaling \$1.6 billion, and 27 CPF/CDS items for Reclamation, totaling \$112 million.³⁸ While Reclamation had obligated nearly all of its CPF/CDS funding by the end of FY2023, USACE had obligated around a third of its CPF/CDS funding, according to a U.S. Government Accountability Office analysis of the funds.³⁹ In FY2024, Congress increased CPF/CDS funding for USACE (217 items totaling \$1.5 billion in FY2024) compared to the previous two fiscal years, while Reclamation CPF/CDS funding decreased (8 items totaling \$41 million in FY2024).

Congress may consider what level of funding to provide to USACE and Reclamation through annual appropriations, given repeated requests from past Administrations to decrease funding, and how many new studies and projects, if any, to require the agencies to initiate.⁴⁰ The 119th

³⁶ Division D of P.L. 117-103 and Division D of P.L. 117-328.

³⁷ In some cases, this additional funding was provided for projects and activities not included in the budget request; in other cases, additional funding was provided above the requested level for projects and activities. See CRS Report R47553, *Energy and Water Development: FY2024 Appropriations*, by Mark Holt and Anna E. Normand.

³⁸ See FY2022 and FY2023 lists for Energy and Water Development, and Related Agencies at House Committee on Appropriations, "Archived Community Project Funding," <https://appropriations.house.gov/committee-activity/archived-community-project-funding>.

³⁹ U.S. Government Accountability Office, "Tracking the Funds: Update on Community Project Funding/Congressionally Directed Spending," accessed December 2024, <https://files.gao.gov/multimedia/gao-25-107274/interactive/index.html>.

⁴⁰ These considerations may take into account the amount of funding provided by, and new studies and projects initiated through, recent supplemental appropriations, as well as new authorizations enacted in recent congresses.

Congress also may consider the process for requesting and evaluating CPF/CDS requests, and the level of funding to provide to water resource development projects through the CPF/CDS process and through funding for certain categories of projects.⁴¹

Supplemental Appropriations

Congress has provided supplemental appropriations to USACE and Reclamation for disaster response and mitigation (e.g., drought, flood); study, construction, maintenance, and repair of projects; new authorities that expand the agencies' activities; and COVID-19 precautions, among other purposes.⁴² **Table 2** details, in nominal dollars, supplemental appropriations from 2018 through 2024 based on the fiscal year when funds were (or will be) first available (in some cases, FY2024-FY2026). All of these funds are available until expended, except for Reclamation funds from the IRA, which are available through FY2026 or FY2031.⁴³

Table 2. Enacted Supplemental Appropriations for the U.S. Army Corps of Engineers and Bureau of Reclamation

(FY2018-FY2026 nominal dollars in millions)

FY Funds First Available	Act	U.S. Army Corps of Engineers	Bureau of Reclamation
FY2018	P.L. 115-123	\$17,398	—
FY2019	P.L. 116-20	\$3,258	\$16
FY2020	P.L. 116-136	\$70	\$21
FY2021	—	—	—
FY2022	P.L. 117-43	\$5,711	\$210
	P.L. 117-58	\$14,969	\$1,660
	P.L. 117-169	—	\$4,588
FY2023	P.L. 117-58	\$1,080	\$1,660
	P.L. 117-180	\$20	—
	P.L. 117-328	\$1,480	—
FY2024	P.L. 117-58	\$1,050	\$1,660
FY2025	P.L. 117-58	—	\$1,660
	P.L. 118-158	\$1,515	
FY2026	P.L. 117-58	—	\$1,660

⁴¹ For additional funding, Congress directs the agencies to allocate the funding to eligible projects in subsequent work plans.

⁴² For CRS water resource products on these acts, see CRS In Focus IF11945, *U.S. Army Corps of Engineers: Supplemental Appropriations*, by Nicole T. Carter and Anna E. Normand; CRS Insight IN11723, *Infrastructure Investment and Jobs Act Funding for U.S. Army Corps of Engineers (USACE) Civil Works*, by Anna E. Normand and Nicole T. Carter; CRS Report R47032, *Bureau of Reclamation Provisions in the Infrastructure Investment and Jobs Act (P.L. 117-58)*, by Charles V. Stern and Anna E. Normand; CRS In Focus IF12437, *Bureau of Reclamation Funding in the Inflation Reduction Act (P.L. 117-169)*, by Charles V. Stern and Anna E. Normand; and CRS Report R47262, *Inflation Reduction Act of 2022 (IRA): Provisions Related to Climate Change*, coordinated by Jane A. Leggett and Jonathan L. Ramseur.

⁴³ P.L. 117-169, §§50233 and 80004, appropriations are to remain available through FY2026. P.L. 117-169, §§50231 and 50232, appropriations are to remain available through FY2031.

Source: CRS using public laws enacted in 2018-2024.

Notes: Fiscal year shown is when funds were or will be first available. All funds are available until expended, except for Reclamation funds from P.L. 117-169, which are available through FY2026 or FY2031.

Challenges for oversight and evaluation of supplemental appropriations may include tracking output measures (such as obligations to projects or contracts completed), as well as assessing economic impacts and flood risk reduction of these investments. Other topics raised by these appropriations include (a) the outlook for completing work on projects and activities that received supplemental appropriations and (b) the effectiveness of supplemental appropriations in realizing Congress's intent for such funding.⁴⁴

Oversight

Congress may oversee USACE's and Reclamation's use of appropriated funds. Potential oversight issues include staffs' capacity to administer the awards, contracts, and procurements required by the level of funding and authorizations and staff's capacity to perform project management and oversight.⁴⁵ For example, some Members of Congress have expressed concerns about continued challenges for USACE in terms of project execution, cost overruns, and significant delays for completion. Another consideration is the amount of unallocated or unobligated funding that an Administration or Congress may wish to repurpose for other activities or rescind altogether. For example, P.L. 118-42 directed \$1.5 billion of unallocated and unobligated Construction account funding from prior appropriations, principally from the IJA, to fund FY2024 construction activities.

In addition, the 119th Congress may consider the following in regard to USACE and Reclamation appropriations:

- How inflation and cost overruns affect what can be accomplished with federal funding for water resource projects
- Whether nonfederal sponsors of water resource projects are capable of fulfilling their cost-share responsibilities
- How effective these federal investments are at addressing the purposes for which they were provided (e.g., navigation, flood risk reduction, drought mitigation, repair and rehabilitation of aging infrastructure)

Federal Drought Response and Planning⁴⁶

Multiple federal agencies contribute to efforts to predict, plan for, and respond to drought. The federal government, through agencies such as NOAA, the U.S. Department of Agriculture (USDA), and the USGS, plays a key role in researching and monitoring drought through NIDIS and the U.S. Drought Monitor. USDA also distributes the primary federal financial aid intended

⁴⁴ For example, see the Congressional Budget Office's (CBO's) analysis of supplemental funding in CBO, *Army Corps of Engineers: Budgetary History and Projections*, November, 2022, <https://www.cbo.gov/publication/58415>.

⁴⁵ For example, in December 2022, DOI described challenges related to increasing staffing at Reclamation to implement Infrastructure Investment and Jobs Act (IIJA) activities (e.g., hiring staff with necessary engineering and hydrology expertise). Testimony from Deputy Secretary of the U.S. DOI the Honorable Tommy P. Beaudreau, in U.S. Congress, Senate Committee on Energy and Natural Resources, *Full Committee Hearing to Examine the Department of the Interior's Implementation of the Infrastructure Investment and Jobs Act*, hearings, 117th Cong., 2nd sess., December 13, 2022, <https://www.energy.senate.gov/hearings/2022/12/full-committee-oversight-hearing-to-examine-the-department-of-the-interior-s-implementation-of-the-infrastructure-investment-and-jobs-act>.

⁴⁶ For more on federal drought authorities, see CRS Report R46911, *Drought in the United States: Science, Policy, and Selected Federal Authorities*, coordinated by Charles V. Stern and Eva Lipiec.

to lessen the impacts of drought on agriculture and compensate for agricultural production loss after drought onset. Several agencies, including Reclamation, USACE, and the U.S. Environmental Protection Agency (EPA), operate programs that support nonfederal efforts to lessen demands on water supplies, such as those supporting water conservation, water reuse and recycling, and increased water efficiency. Although not all of these programs focus exclusively on drought, they often prioritize projects that lessen drought impacts. In localities or watersheds with projects managed by Reclamation and/or USACE, the federal role in water management can be especially controversial during times of drought. In these areas, the federal government faces difficult decisions and trade-offs in allocating limited water supplies.

Questions remain about whether the existing suite of federal drought monitoring, planning, and response authorities is adequate, given the nation's current and predicted hydrological supply and demand trends. Congress has enacted various pieces of legislation relevant to drought, such as WRDAs and the IRA (for more information, see "Spotlight: Colorado River Basin"). Some of these bills would have directed several federal departments to work together on aspects of water data and management that could affect drought preparedness and response.

Proposed drought resiliency efforts in the 119th Congress may include new Reclamation funding for water storage infrastructure, water reuse and recycling, and desalination, as well as investments in improved technology and data. Congress also may consider establishing a U.S. Drought Monitor Interagency Working Group or other observation, forecast, and modeling efforts that could improve drought planning and response.

Spotlight: Colorado River Basin

Severe drought in the Colorado River Basin may continue to receive attention in the 119th Congress. A long-term drought dating to 2000 has exacerbated the basin's water supply-demand imbalance, resulting in major reductions in the water stored at Lake Mead and Lake Powell, two of the country's largest reservoirs (**Figure 2**). These trends have received widespread attention because of the prominent role that basin waters and hydropower energy play for numerous agricultural and municipal customers throughout the Southwest.⁴⁷

⁴⁷ For information on drought in the Colorado River Basin, see CRS Report R45546, *Management of the Colorado River: Water Allocations, Drought, and the Federal Role*, by Charles V. Stern and Pervaze A. Sheikh; and CRS Insight IN11982, *Responding to Drought in the Colorado River Basin*, by Charles V. Stern.

Figure 2. Lake Mead Water Levels in August 2022

Source: Bureau of Reclamation Flickr website, Hoover Dam and Lake Mead Drought Photos album, <https://www.flickr.com/photos/usbr/>.

DOI, through Reclamation, has a prominent role in managing Colorado River Basin waters. The federal government has led multiple efforts to improve the basin's water supply outlook. Most recently, such efforts resulted in the 2019 drought contingency plans (DCPs) for the Upper and Lower Colorado River Basins,⁴⁸ which Congress authorized in the Colorado River Drought Contingency Plan Authorization Act (P.L. 116-14). The DCPs required reduced Lower Basin water deliveries to states in proportion to specified storage levels at Lake Mead, committed Reclamation to additional water conservation efforts, and outlined options to coordinate Upper Basin operations to enhance Lake Powell storage levels and prevent the loss of hydropower generation.

Widespread concern remains about the Colorado River Basin's hydrological outlook and long-term water availability for users. Reclamation and basin states have previously committed to conserving additional Colorado River Basin waters to shore up storage levels in the near term. Reclamation is also leading a process through which it plans to revise federal operations and conserve basin waters over the long term. The latter process could lead to new water delivery curtailments throughout the basin.

Congress has enacted authorizations and funding to support efforts to shore up Colorado River Basin water supplies. In Section 50233 of the IRA, for example, Congress provided approximately \$4.0 billion for drought mitigation in the West (with priority given to Colorado River Basin activities).⁴⁹ Reclamation has obligated some of this funding on efforts that have paid water users to forgo deliveries.⁵⁰ The 119th Congress may oversee and provide direction for these and other basin water conservation efforts and may consider their potential extension or elimination. It also may consider whether other aid or authority may be necessary to mitigate drought in the basin.

⁴⁸ Under the Colorado River Compact of 1922, the dividing line between the Upper and Lower Colorado River Basins is Lees Ferry, AZ (i.e., Northern Arizona).

⁴⁹ See CRS In Focus IF12437, *Bureau of Reclamation Funding in the Inflation Reduction Act (P.L. 117-169)*, by Charles V. Stern and Anna E. Normand.

⁵⁰ For more information, see Bureau of Reclamation, "Lower Colorado River Basin System Conservation and Efficiency Program," <https://www.usbr.gov/lc/LCBCConservation.html>.

Science and Technology for Water Management

Federal and nonfederal water managers generally use data, including those from the federal government, on water conditions, weather, and climate to inform water resource management decisions in the short and long terms (e.g., infrastructure design and investment decisions, the release of water to support navigation flows). These data may include estimates of the quantity of water stored in reservoirs and snowpacks; streamflows; aquifer storage and recharge characteristics; forecasts about when, where, and how much precipitation may occur; and long-term projections for precipitation, temperature, droughts, and floods with a warming climate. Water managers also may incorporate modeled changes of societal and ecological water demands, including under a warming climate, in their efforts to prepare water resource infrastructure and communities for the future. The quality, accessibility, and extent of available data may affect water management decisions, operating efficiencies of existing infrastructure, and the planning and designing of new water infrastructure. The 119th Congress may support advances in science and technology as part of the nation's efforts to inform responses to local, regional, and national water resource challenges.

Congress may consider improving the science and technology informing water management decisions. Federal agencies such as the USGS, NOAA, and NASA are pursuing advancements in observation technologies and advanced computing, such as machine learning and artificial intelligence, to process observations from new and existing satellite-based platforms, ultrasound sensors and radars, and autonomous in situ measurements, among other things.⁵¹ The 119th Congress may be interested in leveraging these technologies to improve estimates of water availability and quality and understanding of snow, soil moisture, and groundwater dynamics. Congress, federal agencies, and other water stakeholders may evaluate investing in new sensors, in situ network expansions, or other technologies. They also may consider interagency efforts to integrate in situ information with remotely collected data and tools for forecasting and modeling. Related water resource topics that may be of interest during the 119th Congress include the following:

- Progress in NOAA's implementation of the 2020 Precipitation Prediction Grand Challenge Strategy from the NOAA Weather, Water, and Climate Board, which recommended improvements to precipitation prediction systems, observations, and modeling⁵²
- The need to create legislation to direct the federal agencies to continue to implement recommendations in the congressionally required 2021 report, *A Strategy for the National Coordinated Soil Moisture Monitoring Network*⁵³

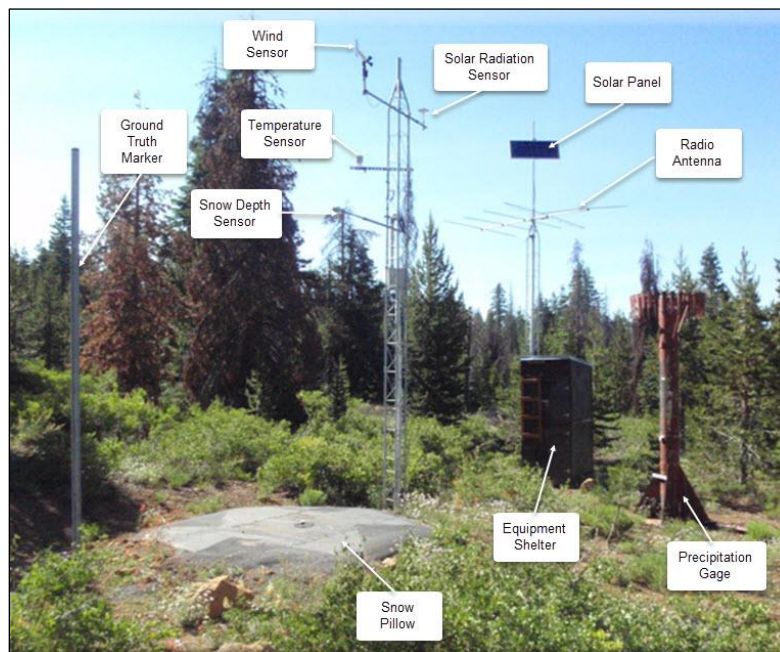
⁵¹ USGS, "USGS Seeks Input on AI/ML Methods for Improving Landsat Flight Operations," December 5, 2024, <https://www.usgs.gov/landsat-missions/news/usgs-seeks-input-aiml-methods-improving-landsat-flight-operations>; NOAA, "NOAA Center for Artificial Intelligence (NCAI)," November 6, 2024, <https://www.noaa.gov/ai>; and NASA, "Earth Observation Data and Artificial Intelligence," <https://www.earthdata.nasa.gov/learn/earth-observation-data-basics/artificial-intelligence>.

⁵² NOAA Weather, Water, and Climate Board, *Precipitation Prediction Grand Challenge Strategy*, October 2020, https://www.noaa.gov/sites/default/files/2022-01/PPGC-Strategy_FINAL_2020-1030.pdf. Extreme precipitation events, such as the multiple atmospheric rivers that come ashore on the West Coast each year, may draw attention to existing and future federal activities on the topic. Improvements in forecasting atmospheric rivers, especially large ones, may be particularly helpful in preparing for flooding, as well as in understanding some droughts.

⁵³ NIDIS, *A Strategy for the National Coordinated Soil Moisture Monitoring Network*, May 2021, <https://www.drought.gov/sites/default/files/2021-06/NCSMMN-Strategy-Final-May-2021.pdf>. For more about the accomplishments so far at NIDIS, see NIDIS, "NCSMMN Goals and Accomplishments," <https://www.drought.gov/> (continued...)

- The need for a long-term strategy for snowpack information investments and coordination of research, in light of work under way by USDA (see **Figure 3** for an example USDA Snow Telemetry network station), the USGS, NOAA, NASA, the Department of Energy, USACE, Reclamation, state and local entities, researchers, and private entities
- The extent of federal support for the development, operation, and application of *Open ET*, a public-private collaboration to generate daily, monthly, and annual satellite-based evapotranspiration, and associated water consumption, data at the field scale⁵⁴

Figure 3. USDA Snow Telemetry (SNOTEL) Network Station



Source: U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), "Automated Snow Monitoring," <https://www.nrcs.usda.gov/wps/portal/wcc/home/aboutUs/monitoringPrograms/automatedSnowMonitoring/>.

Notes: USDA's SNOTEL network includes over 900 automated data collection stations located in remote, high-elevation mountain watersheds in the western United States. SNOTEL network stations monitor snowpack, precipitation, temperature, and other climatic conditions.

The 119th Congress also may consider ways in which federal agencies share and use water data across the federal government and with nonfederal stakeholders. A topic for consideration could be agency responsibilities to coordinate federal water information. For example, various dashboards that federal agencies use (such as the USGS National Water Dashboard, NOAA's NWC products)⁵⁵ are not explicitly coordinated to provide one definitive source of federal water

drought-in-action/national-coordinated-soil-moisture-monitoring-network#goals. Soil moisture monitoring is a component of efforts to monitor and predict drought and flood conditions and to inform water resource management in snow-dominated and rainfall-dominated watersheds, with significance for agricultural and forestry planning and fire danger.

⁵⁴ For more information on OpenET, see <https://etdata.org/>.

⁵⁵ USGS, "National Water Dashboard," <https://dashboard.waterdata.usgs.gov/app/nwd/en/>; and NOAA, National Weather Service, "National Water Center Products and Services, Operational and Experimental," <https://www.weather.gov/owp/operations>.

information. Federal agencies also are modernizing some information platforms and increasingly hosting data through cloud computing, which can allow more users to perform research and analysis without obtaining high performance computing power themselves.⁵⁶ Congress may evaluate these approaches and the resources necessary to help users, such as nonfederal water managers, to utilize and generate water data and analysis for their specific needs. Additionally, Congress may review current approaches and possible alternatives to support the acquisition of nonfederal water data that complement and enhance federal data, such as through commercial data purchases or the National Mesonet Program.⁵⁷

Expansion of Water Supplies

Construction of Storage

Many stakeholders are interested in expanding available water supplies by constructing new or improving existing surface water storage projects. Some of these water storage projects are federally led and owned, while others are state or locally led projects being built with federal funding assistance. Congressional efforts to facilitate new surface water storage have included enactment and funding of new Reclamation authorities under Section 4007 of the WIIN Act, as well as additional Reclamation funding for Section 4007 and other water storage projects under the IIJA.⁵⁸ At least 16 new or expanded Reclamation water storage projects were ongoing as of the beginning of the 119th Congress. More projects and funding needs are anticipated in coming years. Some Members have expressed an interest in adding other authorities, such as federal credit assistance, to support and leverage funding for these projects.⁵⁹

Alternative Water Supplies

Some states and communities have also invested in or are looking into alternative water supplies (e.g., wastewater reuse and recycling, desalination, and aquifer recharge and management), as well as other nontraditional ways to reduce water demand (e.g., water banks and markets for water transfers). These investments may be motivated by recent or anticipated droughts and reductions in traditional water supplies, as well as by plans for meeting increasing water demand in some locations (e.g., managing floodwaters or reservoir releases for groundwater recharge). Some of these investments are made with federal funding or credit assistance. Examples of such assistance include EPA's Water Infrastructure Finance and Innovation Act (WIFIA) program, which promotes development of and private investment in water infrastructure projects by providing federal credit assistance through secured or direct loans. WIFIA-eligible projects include desalination; aquifer recharge or development of alternative water supplies to reduce aquifer depletion; water recycling and reuse; and mitigation, prevention, or reduction of the effects of drought.⁶⁰

⁵⁶ For example, the NOAA Big Data Program was created to explore the potential benefits of storing copies of key observations and model outputs in the cloud to allow computing directly on the data without requiring further distribution. NOAA, "NOAA Open Data Dissemination (NODD)," December 19, 2024, <https://www.noaa.gov/organization/information-technology/big-data-program>.

⁵⁷ For more information on the National Mesonet Program, see <https://nationalmesonet.us/>.

⁵⁸ See CRS Report R47987, *Bureau of Reclamation Support for Water Storage Projects*, by Charles V. Stern.

⁵⁹ See, for example, H.R. 5664 in the 118th Congress.

⁶⁰ For more information, see CRS In Focus IF11193, *WIFIA Program: Background and Recent Developments*, by Elena H. Humphreys.

Reclamation's WaterSMART programs are another example of projects that receive federal funding assistance.⁶¹ These programs support alternative water supplies, increased efficiency, and/or water resource conservation. For example, the Title XVI Program provides cost-shared financial assistance for authorized nonfederal studies and construction projects that provide supplemental water supplies by recycling or reusing agricultural drainage water, wastewater, brackish surface and groundwater, and other sources of contaminated water. Another WaterSMART program is Reclamation's Desalination Program, which promotes alternative water supplies by supporting nonfederal desalination construction projects for seawater or brackish water.

Congress also has provided agencies with new authorities related to groundwater recharge. For example, Congress has expanded USACE's authorities to evaluate and implement projects for water supply and conservation purposes and to engage in aquifer recharge projects.⁶² As another example, Congress has added new authority for Reclamation to support nonfederal groundwater recharge projects.⁶³ Actions on these authorities are generally subject to congressional appropriations. The 119th Congress may assess how agencies are implementing these authorities and consider whether it wants to support other means of financial assistance for expanding water supplies.

Numerous federal entities support research and development of technologies that may improve the performance and cost competitiveness of alternative water supply treatments and associated technologies and infrastructure. For example, Reclamation, the Department of Energy, the U.S. Navy, and other federal entities perform or support desalination-related research and development.⁶⁴ The 119th Congress may consider both the authorizations and the appropriations for these and other programs, as well as the regulatory environment that shapes how alternative water supply technologies are deployed (e.g., requirements for brine disposal from desalination and some reuse projects).

Project Operations to Enhance Water Supplies

Congress has supported expanding water supplies by changing dam operations (both federal dams and nonfederal dams with federal engagement in their flood control operations). Specifically, projects involving numerous federal and state agencies and academic researchers have

⁶¹ For more information, see CRS In Focus IF12414, *Bureau of Reclamation WaterSMART Program*, by Charles V. Stern and Anna E. Normand.

⁶² In 2016, in P.L. 114-322, §1116, Congress authorized USACE to consider water conservation (including downstream aquifer recharge opportunities) as part of its updates to operating manuals for certain projects. For a discussion of this and other groundwater-related authorities and activities, see CRS Report R45259, *The Federal Role in Groundwater Supply*, by Peter Folger et al. In 2020, in P.L. 116-260, §155, Division AA, Congress authorized USACE to carry out certain water storage projects, including those for water supply and water conservation. In 2022, in P.L. 117-263, §8106, Division H, Title LXXXI, Congress provided USACE with additional authorities to study water supply and water conservation activities as part of its feasibility studies for new or modified water resource projects. In P.L. 117-263, §8108, Congress also authorized the Secretary of the Army to (1) conduct a national assessment of carrying out managed aquifer recharge projects at authorized water resource development projects and (2) assess and identify opportunities to support nonfederal interests in carrying out managed recharge projects. Also in §8108, Congress authorized USACE to perform up to 10 feasibility studies (at 90% federal cost and 10% nonfederal cost) on managed aquifer recharge projects in drought-prone or water-scarce areas.

⁶³ In P.L. 117-58, §40910, Congress authorized the Secretary of the Interior to provide technical or financial assistance for, participate in, and enter into agreements—including agreements with irrigation entities—for groundwater recharge, aquifer storage and recovery projects, and water source substitution for aquifer protection projects. This authority is in addition to several existing authorities for Reclamation to support groundwater recharge projects.

⁶⁴ For more information, see CRS Insight IN12378, *Desalination: Converting Saline Water into a Municipal Water Source*, by Nicole T. Carter.

demonstrated the viability of incorporating weather and water forecasts into operations decisions for certain USACE and Reclamation dams. These projects have demonstrated enhanced water supply storage in drier periods. This reservoir management approach is referred to as *forecast-informed reservoir operations* (FIRO). A July 2022 memorandum by the ASACW states, “FIRO and related initiatives are among the most cost-effective ways to increase water availability in drought-impacted regions. In some cases, water availability may be significantly increased on an annual basis for less than 5% of the cost of new infrastructure investments on a dollar per [acre-foot] basis.”⁶⁵ Also, in Subtitle B of Title I of the Water Resources Development Act of 2024 (Division A of P.L. 118-272), Congress encourages USACE to support water supply, water conservation, and drought resiliency at its projects, and directs USACE to incorporate FIRO into its reservoir operations to the maximum extent practicable.⁶⁶

How widely and quickly the benefits of FIRO may assist in drought preparedness through expanded water supplies remains an area of active interest and ongoing research. The 119th Congress may oversee the opportunities and limitations of FIRO as it deliberates on authorization and appropriations legislation related to water resource science and infrastructure.

Aquatic Ecosystem Restoration and Natural and Nature-Based Infrastructure

Congressional interest in aquatic ecosystem restoration has focused on federal activities for ecosystems in certain geographic regions, such as the Chesapeake Bay, Platte River in Nebraska, and Great Lakes; federal restoration initiatives such as the Comprehensive Everglades Restoration Program; and federal programs that address specific issues, such as fish passage and aquatic invasive species. Congress has passed laws authorizing the structure, purpose, and governance of ecosystem restoration initiatives. Congress also has appropriated funding for aquatic ecosystem restoration activities and initiatives in annual and supplemental appropriations laws. For example, Congress enacted numerous provisions related to aquatic ecosystem restoration in the IJA and IRA, in addition to other legislation.⁶⁷ Many of the ecosystem-related provisions in the IJA and IRA appropriated funding that supplemented and surpassed recent annual appropriations for federal restoration activities, initiatives, and programs.⁶⁸ Some provisions authorized and funded new restoration activities.

The 119th Congress may oversee the various departments’ (e.g., DOI) and agencies’ (e.g., EPA) implementation of and funding for aquatic ecosystem restoration activities. Specific oversight issues may include the following:

- What is the progress of restoration and project implementation; how effective are these restoration activities, including agency efforts to monitor implementation and measure performance; and how should constraints on realizing restoration goals be addressed?

⁶⁵ ASACW, “Army Civil Works Supporting Drought Resilience in America’s Communities,” memorandum, July 28, 2022, p. 4, <https://api.army.mil/e2/c/downloads/2022/07/28/3f0183ec/asacw-guidance-on-drought-28jul2022.pdf>.

⁶⁶ Ongoing research by federal and nonfederal researchers has advanced efforts to develop a screening process to identify those reservoirs where forecast-informed reservoir operations (FIRO) may be possible and those reservoirs where FIRO may not be appropriate or where barriers to FIRO exist.

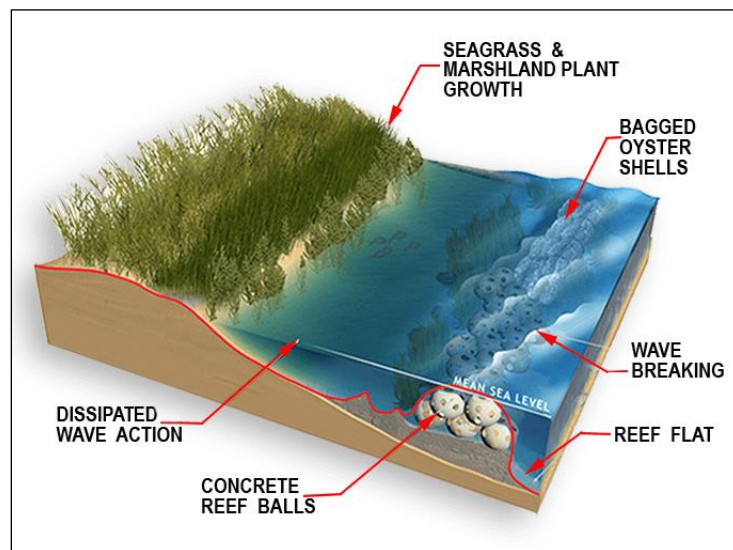
⁶⁷ For more information, see CRS Report R47263, *Ecosystem Restoration in the Infrastructure Investment and Jobs Act: Overview and Issues for Congress*, coordinated by Anna E. Normand and Pervaze A. Sheikh.

⁶⁸ See Table 1, “Ecosystem Restoration Activity Provisions in the IJA,” and shaded box, “Inflation Reduction Act of 2022,” in CRS Report R47263, *Ecosystem Restoration in the Infrastructure Investment and Jobs Act: Overview and Issues for Congress*, coordinated by Anna E. Normand and Pervaze A. Sheikh.

- What appropriations are needed for aquatic ecosystem restoration initiatives, programs, and activities in the 119th Congress, considering IJA and IRA funds and annual appropriations from the 118th Congress?
- What is the federal role in various ecosystem restoration activities compared to the role of nonfederal entities that may offer more local restoration expertise and may chiefly benefit from such activities?
- Should new restoration initiatives be undertaken in distinct ecosystems such as the Great Salt Lake and Rio Grande River, or should the multiple ecosystem restoration initiatives and activities in the United States be organized through an overarching national strategy or plan?

In some cases, stakeholders encourage the use of natural or nature-based features (NNBFs) as part of ecosystem restoration activities or as part of other types of water resource projects, such as coastal and riverine flood control projects.⁶⁹ NNBFs can include the creation of new landscapes or restoration of existing landscapes to a more natural state, for example, through wetland, floodplain, river, or forest restoration or expansion. They also can combine these natural features with engineered components, such as rock gabions (i.e., baskets or other containers filled with rocks or other hard materials), stone toes (i.e., stones placed on the lower portion of an eroding streambank), and concrete reef balls (used to create artificial reefs). See **Figure 4** for an illustration of NNBF uses in a coastal environment. In some cases, management practices, such as agricultural, ranching, forestry, and aquifer activities, can help to improve a nature-based feature (e.g., human-made hydrological processes increasing the level of natural water storage).

Figure 4. Illustration of Coastal Natural and Nature-Based Features



Source: CRS adapted from U.S. Army Corps of Engineers, Engineering with Nature, “Natural & Nature-Based Features,” <https://ewn.erdc.dren.mil/natural-nature-based-features>.

The concept of NNBFs has appeared in both authorization and funding provisions or accompanying language. For example, Congress provided USACE with funding to support ongoing research, development, and design of “natural infrastructure solutions for the nation’s

⁶⁹ Some stakeholders refer to “natural or nature-based features” and use other terms (e.g., “nature-based solutions”) to describe features or infrastructure that use or mimic natural processes to accomplish certain goals that benefit humans, such as flood risk reduction, erosion management, and drought resilience.

bays and estuaries” in FY2024.⁷⁰ The 119th Congress may consider whether to address issues associated with NNBFs. Such issues may include knowledge gaps in measuring the performance of NNBFs and federal agencies’ estimation of or accounting for benefits, costs, and performance of NNBFs used in common settings, like the coast, as well as in other locations, like arid landscapes.

Tribal Water Resources

Congress regulates tribal affairs, including tribal access to water resources, pursuant to its constitutional authority.⁷¹ In addition, the federal government has a *federal trust responsibility* to protect tribal treaty rights, lands, assets, and water resources on behalf of federally recognized Tribes (hereinafter *Tribes*) and tribal citizens.⁷² DOI supports water projects and activities for Tribes through multiple departmental agencies and programs, including BIA and Reclamation.

The history of federal support for tribal water projects is complex. Starting in the late 1800s, Congress appropriated funding for tribal water (irrigation) projects on tribal lands.⁷³ In 1900, Congress provided funding for two BIA superintendents of irrigation, which grew into a BIA division that became known as the Indian Irrigation Service.⁷⁴ In addition, the Snyder Act of 1921 directed BIA to spend funds for the extension, improvement, operation, and maintenance of existing tribal irrigation systems, as well as to develop tribal water supplies.⁷⁵ Most construction of tribal irrigation projects ended in the 1940s.⁷⁶ BIA currently helps maintain 17 Indian irrigation projects delivering water to over 800,000 acres.⁷⁷ BIA and other federal agencies are also responsible for dams on tribal lands, including 141 high-hazard dams on 42 tribal reservations.⁷⁸

The 119th Congress may continue to legislate on and oversee BIA’s water resources, irrigation, and dam programs, and authorize and appropriate funding for these tribal water programs. Congress also may consider proposals to increase tribal participation in water infrastructure

⁷⁰ “Unanimous Consent Agreement - H.R. 4366,” Remarks from Sen. Patty Murray, *Congressional Record*, daily edition, vol. 170 (March 5, 2024), p. S1562.

⁷¹ *United States v. Lara*, 541 U.S. 193, 200 (2004) (the Indian Commerce and Treaty Clauses and the structure of the Constitution are the basis for “plenary and exclusive” power of Congress); see also Nell Jessup Newton, ed., *Cohen’s Handbook of Federal Indian Law*, 2019, §5.01.

⁷² A *federally recognized Tribe* (hereinafter *Tribe*) is an entity recognized as having a government-to-government relationship with the United States, which makes the entity eligible for certain federal programs and services (25 C.F.R. §83.1). See also *Seminole Nation v. United States*, 316 U.S. 286, 296-297 (1942).

⁷³ U.S. Congress, Senate Committee on Indian Affairs, *The Irrigation Rehabilitation and Renovation for Indian Tribal Governments and Their Economies Act (The Irrigate Act)*, report to accompany S. 438, 114th Cong., 2nd sess., S.Rept. 114-245, April 27, 2016, p. 2 (hereinafter S.Rept. 114-245). For the early legislative history of appropriations for tribal irrigation projects, see Lawrence F. Schmeckebier, *The Office of Indian Affairs: Its History, Activities and Organization*, Institute for Government Research (Baltimore, MD: Johns Hopkins Press, 1927), pp. 237-242 (hereinafter Schmeckebier, *The Office of Indian Affairs*).

⁷⁴ Schmeckebier, *The Office of Indian Affairs*, pp. 238-239.

⁷⁵ 25 U.S.C. §13.

⁷⁶ S.Rept. 114-245.

⁷⁷ Bureau of Indian Affairs (BIA), *Budget Justifications and Performance Information, Fiscal Year 2025*, p. IA-CONSUM-10, https://www.bia.gov/sites/default/files/media_document/fy2025-508-bia-greenbook.pdf.

⁷⁸ Indian Dams Safety Act of 1994, as amended (25 U.S.C. §§3801 et seq.). See also CRS Report R45981, *Dam Safety Overview and the Federal Role*, by Anna E. Normand. Tribes also are able to operate and maintain dams on tribal lands using contracts or compacts under the Indian Self-Determination and Education Assistance Act (P.L. 93-638, as amended). For more information on this authority, see CRS Report R48256, *Tribal Self-Determination Authorities: Overview and Issues for Congress*, coordinated by Mariel J. Murray.

financial assistance programs. Tribal representatives have asserted that the high cost-share requirements of several tribal water infrastructure programs create a barrier to entry.⁷⁹ The 119th Congress may consider altering the cost-share requirements for Tribes for water resources grant programs, such as Reclamation's WaterSMART program.⁸⁰

Indian Water Rights Settlements⁸¹

Tribal (or "Indian") water rights are vested property rights and resources that the United States must protect as part of its federal trust responsibility. The specifics of Indian water rights claims vary depending on the history of a given Tribe. Dating to a 1908 Supreme Court ruling, courts generally have held that many Tribes have a *reserved* right to water sufficient to fulfill the purpose of their reservations and that this right took effect when the reservations were established.⁸² In addition to reserved water rights, courts have recognized *aboriginal* water rights. In this circumstance, a Tribe may have *time immemorial* rights to water resources based on tribal water uses that preceded the establishment of reservations.⁸³

In the context of a state water law system of *prior appropriations*, which is common in many western U.S. states, many Tribes have water rights senior to those of non-Indian users with water rights and access established subsequent to the tribal reservations' creation.⁸⁴ Litigation of Indian water rights is a costly process that may take several decades to complete. To avoid this process, DOI's policy since 1990 has been that Indian water rights should be resolved through negotiated settlements rather than litigation.⁸⁵ *Indian water rights settlements* are a means of resolving ongoing disputes related to Indian water rights among Tribes, federal and state governments, and other parties (e.g., water rights holders). In addition to Tribes and federal government representatives, settlement negotiations may involve states, water districts, and private water users, among others. These agreements allow Tribes to quantify their water rights on paper while also procuring access to water through infrastructure and other related expenses.

Indian water rights settlements typically require federal action to enact and implement. Congress has authorized and funded Indian water rights settlements for individual Tribes in their specific locations. As of January 2025, 39 Indian water rights settlements had been federally approved, with total estimated costs in excess of \$8.5 billion (nominal dollars). Of these, 35 settlements were approved and passed by Congress, and 4 were administratively approved by the U.S. Departments of Justice and the Interior.⁸⁶ Some Members of Congress have proposed new and amended settlements, as well as legislation to authorize additional mandatory funding for

⁷⁹ U.S. Congress, House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment, *Proposals for a Water Resources Development Act of 2022: Stakeholder Priorities*, 117th Cong., 2nd sess., February 8, 2022, Testimony of Chairman Peter Yucopicio, Pascua Yaqui Tribe, pp. 3-4, <https://docs.house.gov/meetings/PW/PW02/20220208/114380/HHRG-117-PW02-Wstate-YucopicioP-20220208.pdf>.

⁸⁰ For example, Congress has provided full federal funding for some USACE projects conducted under its Tribal Partnership Program (33 U.S.C. §2269).

⁸¹ For more background information on this topic, see CRS Report R44148, *Indian Water Rights Settlements*, by Charles V. Stern and Mariel J. Murray.

⁸² *Winters v. United States*, 207 U.S. 564, 575-77 (1908).

⁸³ *United States v. Adair*, 723 F.2d 1394, 1414 (9th Cir. 1984). See also Treaty Between the United States of America and the Klamath and Moadoc Tribes and Yahooskin Band of Snake Indians: Concluded, October 14, 1864.

⁸⁴ *Prior appropriation* refers to a legal system in which water is allocated to users based on the order in which water rights were acquired.

⁸⁵ DOI, "Criteria and Procedures for the Participation of the Federal Government in Negotiations for the Settlement of Indian Water Rights Groups," 55 *Federal Register* 9223, March 12, 1990.

⁸⁶ One of these was approved in the 117th Congress (P.L. 117-349).

settlements in general.⁸⁷ Once enacted, settlements are usually implemented by one or more federal agencies (typically Reclamation, BIA, or the Bureau of Trust Funds Administration, based on the terms of the agreement or enacted settlement).⁸⁸

The 119th Congress may continue to consider the cost and scope of federally authorized efforts to settle Indian water rights claims. In addition, congressional consideration of future settlements may include the extent of federal involvement in implementing settlements, including policy options related to funding types (i.e., mandatory or discretionary), nonfederal cost shares, cost indexing, and whether the federal government or Tribes should take the lead in developing and constructing projects (including any related cost overruns).

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⁸⁷ In addition, H.R. 8937 from the 118th Congress would have established new subaccounts in the Indian Water Rights Settlement Completion Fund, which was authorized by the IJIA (P.L. 117-58).

⁸⁸ See DOI, *FY2022 Allocation of Funding for Indian Water Rights Settlements*, <https://www.doi.gov/sites/doi.gov/files/fy-2022-bil-iwrs-allocations.pdf>. The Bureau of Trust Fund Administration (BTFA) manages the financial assets held in trust by DOI on behalf of Tribes and individual tribal citizens. For more information, see BTFA, "BTFA," <https://www.bia.gov/btfa>.