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# Water Resource Issues in the 118<sup>th</sup> Congress

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## Water Resource Issues in the 118<sup>th</sup> Congress

Congress has long demonstrated interest in water resource issues; over time, it has enacted hundreds of water-related federal laws and authorized thousands of projects with purposes such as navigation, flood control, and water storage, among others. Congress also has directed federal agencies to perform various scientific activities to improve understanding and forecasts of water resources. Federal activities in these areas include 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. The 118<sup>th</sup> 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 project investments and water resource-related science.

Development and economic pressures, hydrologic events (e.g., droughts, floods), and other concerns—aquatic invasive species, land-use change, and climate change, among other issues—have increased stakeholder interest in water science and water resource development. Many stakeholders have expressed interest in (1) federal financial and technical assistance for constructing new water resource infrastructure (e.g., storm-surge gates, water storage) at various locations and (2) new types of projects (e.g., nature-based flood and drought risk reduction). In addition, some stakeholders and Members of Congress have called for improved management of available water 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, including rehabilitation and repair of aging projects, also draw congressional attention and encompass a sizable portion of some water resource agency budgets.

The 118<sup>th</sup> 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 (USACE, in the Department of Defense) or the Bureau of Reclamation (Reclamation, in the Department of the Interior) 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 also own and operate water resource projects (e.g., the Tennessee Valley Authority). Congress has tasked various federal agencies—including the U.S. Geological Survey (USGS) and the National Oceanic and Atmospheric Administration (NOAA), among others—with water resource research, monitoring, and forecasting activities.

The 118<sup>th</sup> Congress also may focus on crosscutting water resource and related science topics, including the following:

- The federal response to drought, particularly in the Colorado River Basin
- Oversight of agency implementation of new authorities and supplemental funding enacted in the 117<sup>th</sup> Congress, including for tribal water resource issues, dam safety, and maintenance of existing water infrastructure
- Advances in water science and technology to observe, forecast, and respond to droughts, floods, and other climate events
- The expansion of water supplies, including through new technologies, 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 enacted hundreds of water-related federal laws and authorized thousands of water-related projects with purposes such as navigation, flood control, and water storage, among others. Congress also has directed federal agencies to perform various science activities to improve understanding and forecasts of water resources. Members of Congress can introduce legislation related to water resource issues, and congressional committees are involved in legislating, funding, and overseeing the water-related activities of federal agencies, such as the Bureau of Reclamation (Reclamation) and the U.S. Geological Survey (USGS), each of which has a distinct focus to its water work. Activities of various agencies listed in **Table 1** include 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 over federal management of water resources. Federal involvement in water resource development and management and water science entails a complex web of agencies and authorities. The 118<sup>th</sup> 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—aquatic invasive species, land-use change, and climate change, among others—have increased stakeholder interest in water science and water resource development. Many stakeholders have expressed interest in (1) federal financial and technical assistance for constructing new water resource infrastructure (e.g., storm-surge gates, water storage) at various locations and (2) new types of projects (e.g., nature-based flood and drought risk reduction). In addition, some stakeholders and Members of Congress have called for improved management of available water supplies through advances in water science (e.g., monitoring, modeling) and operational changes. 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 of the 118<sup>th</sup> Congress may include the following:

- Certain authorization issues (e.g., biennial consideration of a Water Resources Development Act [WRDA], reauthorization of appropriations for the National Integrated Drought Information System [NIDIS])
- Oversight of agency implementation of new authorities and supplemental funding enacted in the 117<sup>th</sup> Congress, including for tribal water resource issues, dam safety, and maintenance of existing and aging infrastructure
- Advances in water science and technology to observe, forecast, and respond to droughts, floods, other climate events, and water use demands
- Expansion of water supplies and ecosystem resilience, including through new technologies, natural and nature-based infrastructure, updated operations, and new construction

This report addresses broad categories of water resource topics that the 118<sup>th</sup> 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 water resource science, development, and management by the U.S. Army Corps of Engineers (USACE),

Reclamation, the USGS, and the National Oceanic and Atmospheric Administration (NOAA).<sup>1</sup> The report also references other agencies with water resource-related responsibilities, such as the National Aeronautics and Space Administration (NASA) and the Bureau of Indian Affairs (BIA), 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. **Table 1** provides an overview of many such agencies. The first part of the table reflects the four agencies 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. **Table 1** illustrates that some agencies have significant water resource responsibilities central to their activities, and numerous other agencies have roles in water resources in addition to other responsibilities.

- **Projects.** Congress directs USACE, in the Department of Defense, and Reclamation, in the Department of the Interior (DOI), to undertake various water resource project and assistance activities, including the planning, construction, operation, and maintenance of most federally owned water resource projects.<sup>2</sup> Other federal agencies, such as the Tennessee Valley Authority, also may own and operate water resource projects.
- **Science.** Congress has tasked various federal agencies with water resource research, monitoring, and forecasting activities. As identified by this report, those agencies include USGS and NOAA, among others (e.g., NASA).

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<sup>1</sup> This report is not exhaustive or comprehensive. For example, it does not address federal support for municipal water systems; municipal wastewater infrastructure; environmental protections, such as water quality and wetlands regulations; or ocean waters and associated science.

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

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

<b>Agency (Department)</b>	<b>Selected Water Resource Roles</b>	<b>Principal House and Senate Authorization Committees</b>	<b>House and Senate Appropriations Subcommittees</b>
<b>Agencies Addressed in Detail in This Report</b>			
U.S. Army Corps of Engineers (Dept. of the Army)	Plan and construct projects for navigation, flood risk reduction, and aquatic ecosystem restoration. Maintain navigation channels and operate multipurpose dams.	House Transportation and Infrastructure (TI) Senate Environment and Public Works (EPW)	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 (NR) Senate Energy and Natural Resources (ENR)	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 NR House Science, Space, and Technology (SST) Senate ENR Senate EPW	Interior-Environment
National Oceanic and Atmospheric Administration (Dept. of Commerce)	Research, observe, model, predict, warn, and disseminate information, with a focus on water-related atmospheric and oceanic phenomena.	House NR House SST Senate Commerce, Science, and Transportation (CST)	Commerce-Justice-Science
<b>Selected Illustrative Other Agencies Involved in Water Resources</b>			
Bureau of Indian Affairs (Dept. of the Interior)	Manage various irrigation projects on tribal reservation lands. Fund implementation of certain Indian water rights settlements, as directed by Congress.	House NR Senate ENR Senate Indian Affairs	Interior-Environment
International Boundary and Water Commission	Construct and maintain U.S.-Mexico border water infrastructure, as part of agency's role in implementing transboundary water treaties.	House Foreign Affairs House NR Senate ENR Senate Foreign Relations	State-Foreign Operations
International Joint Commission	Resolve and prevent disputes concerning transboundary or boundary waters between the United States and Canada.	House Foreign Affairs Senate Foreign Relations	State-Foreign Operations

Agency (Department)	Selected Water Resource Roles	Principal House and Senate Authorization Committees	House and Senate Appropriations Subcommittees
National Aeronautics and Space Administration	Develop and launch space observations that advance understanding of Earth's water processes and management of water resources.	House SST Senate CST	Commerce-Justice-Science
Natural Resources Conservation Service (Dept. of Agriculture)	Assist with rural water resource projects and watershed management.	House Agriculture House TI Senate Agriculture Senate ENR	Agriculture
Tennessee Valley Authority	Maintain water resource projects for regional development.	House TI Senate EPW	(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 every agency conducting water resource activities (e.g., the Environmental Protection Agency, over which numerous committees have jurisdiction). For definitive evaluation of committee jurisdictions related to water, the views of the House and Senate Parliamentarian Offices are official.

## U.S. Army Corps of Engineers

Congress directs and funds USACE to undertake projects across the nation primarily to improve navigation, reduce flood damage, and restore aquatic ecosystems.<sup>3</sup> Congress generally authorizes USACE water resource activities and makes changes to the agency's policies through omnibus WRDAs. In addition to annual appropriations (e.g., \$8.3 billion in FY2023), Congress also may provide supplemental appropriations to USACE for its projects and activities (see "Water Resource Development Funding and Oversight", below). The 118<sup>th</sup> Congress may consider a WRDA, similar to the 113<sup>th</sup>-117<sup>th</sup> Congresses, each of which enacted an omnibus water resources authorization act.<sup>4</sup>

The following subsections address USACE-related water resource issues that the 118<sup>th</sup> Congress may consider in addition to issues raised by specific events, such as floods and droughts.

### USACE Project Funding and USACE Financing

- **Advancing USACE Projects.** Congress has authorized USACE to construct more water resource projects than can be accomplished with appropriated funds. USACE has a backlog of more than \$100 billion in authorized water resource

<sup>3</sup> For a primer on U.S. Army Corps of Engineers (USACE) civil works activities, related appropriations documents, and other resources, see CRS Insight IN11810, *U.S. Army Corps of Engineers Civil Works: Primer and Resources*, by Anna E. Normand and Nicole T. Carter. Congress also directs USACE to assist with certain municipal water and wastewater investments (referred to as *environmental infrastructure* [EI] assistance). For more information on USACE EI assistance, see CRS Report R47162, *Overview of U.S. Army Corps of Engineers Environmental Infrastructure (EI) Assistance*, by Anna E. Normand.

<sup>4</sup> The 117<sup>th</sup> Congress enacted the Water Resources Development Act of 2022 as Title LXXXI, Division H, of the James M. Inhofe National Defense Authorization Act for Fiscal Year 2023 (P.L. 117-263).

construction projects. The 118<sup>th</sup> Congress may consider options for funding or financing the federal and nonfederal costs associated with these projects, including some large projects (sometimes referred to as *megaprojects*) that USACE is studying or Congress has authorized for construction.

- **Funding USACE Projects.** The 118<sup>th</sup> Congress may consider how trends in annual and supplemental appropriations influence the effective, efficient, and accountable use of USACE funding. Congress also may evaluate enacted changes to trust funds for USACE coastal and inland navigation projects, as well as the effectiveness of federal spending for maintaining a nationally and regionally efficient navigation system. The 118<sup>th</sup> Congress also may oversee USACE's efforts to employ public-private partnerships for its projects.
- **Funding Nonfederal Projects.** USACE released a proposed rulemaking for its Corps Water Infrastructure Financing Program (CWIFP) in 2022 and may request its first CWIFP applications in 2023 for nonfederal dam safety projects.<sup>5</sup> The 118<sup>th</sup> Congress may conduct oversight of this new role for USACE as a provider of credit assistance, primarily loans.

## USACE Project Decisionmaking and Planning Practices

- **Updated Guidance and Policies.** USACE has initiated an update to its project planning principles and guidelines and its tribal program guidance.<sup>6</sup> The agency is also reviewing its tribal consultation policy, environmental justice guidance, and definition for *economically disadvantaged communities*. USACE has published a proposed rule to change the procedures for its emergency response and assistance authority, including the program to rehabilitate certain damaged nonfederal flood control works. The 118<sup>th</sup> Congress may consider these efforts as part of its oversight activities and may consider whether to provide USACE additional guidance regarding project planning, tribal activities, social considerations, and emergency response.
- **Oversight of USACE Decisionmaking.** The 118<sup>th</sup> Congress may oversee implementation of changes enacted by each of the 113<sup>th</sup>-117<sup>th</sup> Congresses on how USACE is to evaluate nonstructural project alternatives, including nature-based alternatives, and to consider more water-related hazards (e.g., erosion) and changing hydrological conditions.

## Bureau of Reclamation

Pursuant to the Reclamation Act of 1902, as amended,<sup>7</sup> Reclamation is responsible for the management and development, primarily for irrigation purposes, of many of the large federal dams and water diversion structures in the 17 conterminous states west of the Mississippi River. 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 due to their effects on habitat and species.

<sup>5</sup> For more on the Corps Water Infrastructure Financing Program, see CRS Insight IN12021, *Corps Water Infrastructure Financing Program (CWIFP)*, by Nicole T. Carter.

<sup>6</sup> 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.

<sup>7</sup> 32 Stat. 388 (43 U.S.C. §391).



Reclamation’s annual budget (\$1.9 billion in FY2023) has recently been supplemented with historic funding amounts (see “Water Resource Development Funding and Oversight,” below).

Congress has authorized more than 180 individual *Reclamation projects* throughout the West. The first projects, developed in the early 20<sup>th</sup> century, were single purpose and focused primarily on irrigation development. Subsequent projects have been larger and more complex. Congress has authorized Reclamation to operate these Reclamation 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 users and stakeholders. Such projects regularly generate congressional attention.

At Congress’s direction, Reclamation has been increasingly involved in western water projects whose primary purpose is not 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); grants for water and energy conservation efforts (i.e., the WaterSMART Grants program); and funding for rural water projects, ecosystem restoration, and water infrastructure associated with congressionally authorized Indian water rights settlements. How to balance these new priorities with the upkeep 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 118<sup>th</sup> Congress include the status of new and proposed surface water storage projects under Section 4007 of the Water Infrastructure Improvements for the Nation Act (P.L. 114-322) and whether to extend and/or amend authority under that section.<sup>8</sup> Another ongoing issue of congressional interest involves Reclamation pumping operations in the San Francisco Bay/San Joaquin and Sacramento Rivers’ Delta, including effects on water users and on threatened and endangered species.<sup>9</sup> The 118<sup>th</sup> Congress may oversee ongoing Central Valley Project operations and any related proposals by the Biden Administration. Other river basins where Reclamation has a prominent role in water management issues—including the Colorado River Basin,<sup>10</sup> the Columbia River Basin, and the Klamath River Basin, among others—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 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.<sup>11</sup> Initially established under the Organic Act of 1879 (43 U.S.C. §31), the USGS is a scientific agency within DOI. The USGS has conducted water resource science and surveys since 1888, and it

<sup>8</sup> 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 Act*, by Charles V. Stern.

<sup>9</sup> 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.

<sup>10</sup> See below section, “Spotlight: Colorado River Basin”.

<sup>11</sup> U.S. Geological Survey (USGS), *Budget Justifications and Performance Information Fiscal Year 2023 U.S. Geological Survey*, p. 1, at <https://www.usgs.gov/bpi/usgs-fy2023-budget>. Hereinafter USGS, *FY2023 Budget*.

continues to do so through its Water Resources Mission Area (hereinafter referred to as *Water Resources*).<sup>12</sup>

Water Resources covers scientific activities that involve collecting, assessing, and disseminating hydrological data and analysis. It also provides information on water availability and use and research on hydrological systems. Water Resources makes available to the public real-time water monitoring data from approximately 19,200 groundwater wells; 11,350 streamgages; and 2,100 water quality sampling stations across the nation. These data are collected in partnership with more than 1,400 federal, state, tribal, and local agencies.<sup>13</sup> In addition, the USGS Water Resources Research Act Program supports state and regional water science research and workforce development at State Water Resources Research Institutes.<sup>14</sup>

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.<sup>15</sup> At these basins, the USGS is using high-density monitoring and new research techniques through the Next Generation Water Observing System (NGWOS) to inform advanced water-availability models that are to be extrapolated to model water dynamics in larger regions represented by the IWS basins. The USGS asserts that the new monitoring technology in these basins may lead to the agency incorporating these advances into the routine operation of its monitoring networks. As of February 2023, the USGS has initiated five IWS basins (see **Figure 1** for the three basins initiated prior to April 2021). Ultimately, it aims to establish 10 basins.

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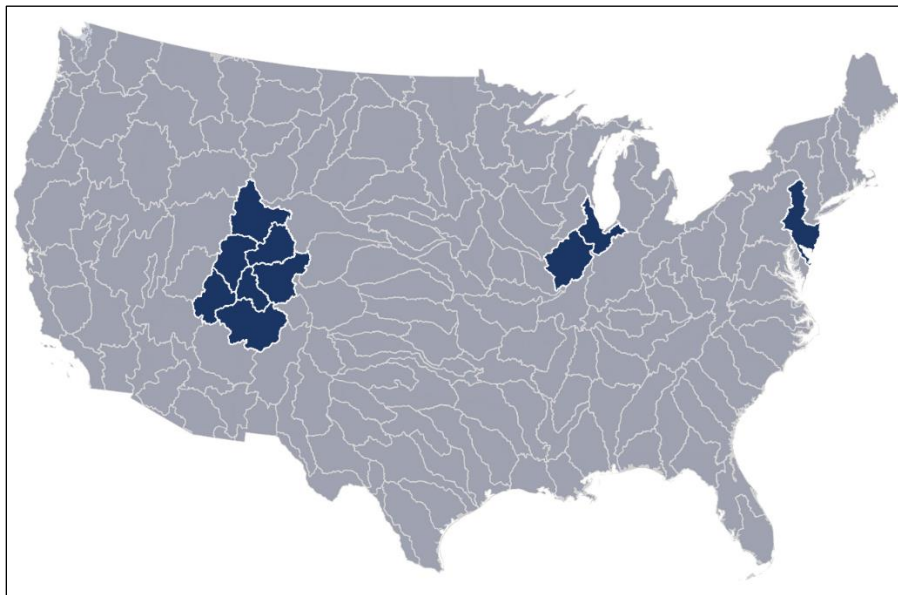
<sup>12</sup> USGS, *FY2023 Budget*, p. 97. The Water Resources Mission Area is one of five mission areas in the USGS. USGS, “Water Resources,” at <https://www.usgs.gov/mission-areas/water-resources>.

<sup>13</sup> USGS, *FY2023 Budget*, p. 99.

<sup>14</sup> 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,” at <https://water.usgs.gov/wrri/>.

<sup>15</sup> 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, *FY2023 Budget*, p. 98.

**Figure 1. USGS Selected Integrated Water Science (IWS) Basins**  
(as of April 2021)



**Source:** U.S. Geological Survey (USGS), “Integrated Water Availability Assessments (IWAAs),” April 13, 2021, at <https://www.usgs.gov/mission-areas/water-resources/science/integrated-water-availability-assessments-iwaas>.

**Notes:** White lines in the figure represent level-4 hydrologic unit boundaries of the USGS Watershed Boundary Dataset. IWS basins may comprise one or more level-4 hydrologic units. The three IWS basins in the figure include the Delaware River Basin (initiated in 2018), Upper Colorado River Basin (initiated in 2019), and Illinois River Basin (initiated in 2021). The USGS announced the Willamette River Basin in the Pacific Northwest as the fourth IWS basin in March 2022, and the Trinity-San Jacinto River Basin in Texas as the fifth IWS basin in February 2023.

The 118<sup>th</sup> Congress may consider the amount of funding it provides to the USGS for routine operation of its monitoring networks as the agency pursues advances in monitoring technologies and modeling. For example, recent funding levels for USGS streamgages, which inform local decisionmaking and federal models and forecasts, have caused the USGS to discontinue some monitoring and to rely increasingly on partners to cover cost increases.<sup>16</sup> Conversely, Congress has provided appropriations for new NGWOS and other IWS activities, which may have the potential to transform water observation and information.<sup>17</sup> The 118<sup>th</sup> 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 in carrying out 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. NOAA works independently and with other agencies to understand

<sup>16</sup> See CRS Report R45695, *U.S. Geological Survey (USGS) Streamgaging Network: Overview and Issues for Congress*, by Anna E. Normand.

<sup>17</sup> For example, see Explanatory Statement Submitted by Mr. Leahy, Chair of the Senate Committee on Appropriations, Regarding H.R. 2617, Consolidated Appropriations Act, 2023, Congressional Record, daily edition, vol. 168 (December 20, 2022), pp. S8650-S8651, at <https://www.congress.gov/117/crec/2022/12/20/168/198/CREC-2022-12-20-bk2.pdf>.

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 include collecting atmospheric and oceanic data; modeling the extent and depths of flood inundation; monitoring and 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.

Some of these activities occur as part of NOAA's National Water Center (NWC) and its National Water Model (NWM).<sup>18</sup> The NWM is a hydrological modeling framework for simulating observed and forecasted streamflows in the continental United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands.<sup>19</sup> In FY2023, the NWC plans to begin using NWM 3.0, which would extend the model to its 50<sup>th</sup> state, Alaska.<sup>20</sup> NOAA anticipates subsequent NWM efforts to include pluvial (i.e., rainfall) flooding information. NOAA is also working on a next-generation framework for hydrologic modeling. The framework will use common standards, which would allow models from other agencies and entities to be operated directly within the framework.

The 117<sup>th</sup> Congress augmented NOAA's water resource-related responsibilities, including by directing the agency to work with federal and nonfederal stakeholders to improve the federal collection and dissemination of precipitation estimates through the PRECIP Act (Division D of P.L. 117-229). Congress also provided NOAA with supplemental appropriations in 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. The 118<sup>th</sup> Congress may conduct oversight on NOAA's progress in implementing these new authorities and funding. Congress also may consider potential additional directives regarding water resource-related observations, modeling, forecasting, and research.

## Selected Crosscutting Topics

As previously mentioned, Congress has directed various federal agencies to conduct certain water resource and water resource science activities. Some of the authorities and appropriations provided to these agencies address crosscutting water resource and water science issues facing the nation, such as infrastructure and technology improvements and their funding, drought preparedness and response, and tribal needs, among others. The 118<sup>th</sup> Congress may consider legislation, appropriations, and oversight to address a number of crosscutting topics, such as the ones discussed below.

## Water Resource Development Funding and Oversight

Congress provides funding for federal water resource development agencies 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.

<sup>18</sup> Information in this paragraph is derived primarily from personal communication between National Oceanic and Atmospheric Administration (NOAA) staff and CRS on February 24, 2022.

<sup>19</sup> The National Water Center also collaborates with academic institutions, commercial partners, and others to improve the National Water Model (NWM). The NWM attempts to integrate multiple physical process (e.g., snowmelt and infiltration) with other variables (e.g., elevation changes, soil and vegetation types) to derive hydrologic information at a fine spatial and temporal scale (e.g., 1 square mile). NOAA, *National Water Model: Improving NOAA's Water Prediction Services*, August 2016, at <https://water.noaa.gov/documents/wrn-national-water-model.pdf>.

<sup>20</sup> NOAA specifically sought in the NWM 3.0 capabilities to include compound coastal flooding—combined water height from both riverine and coastal hazards from tides, surges, and waves.

Some funding may be for other agency activities (e.g., grants administered by Reclamation, loans through USACE's CWIFP, research and development). In each of FY2022 and FY2023 annual appropriations, USACE and Reclamation received \$8.3 billion and \$1.9 billion, respectively.<sup>21</sup> Congress also provided these agencies with supplemental appropriations in these and previous fiscal years (discussed below). For these agencies, annual appropriations generally funded projects and activities at the Administration-requested level and then provided additional funding to certain categories of projects and to specific projects and activities requested by Members of Congress.<sup>22</sup> In some cases, this additional funding was provided for projects and activities not included in the budget request; in other cases, the additional funding provided funding above the requested level for projects and activities.

In the annual appropriations process for the 117<sup>th</sup> Congress, Members of Congress were able to request funding for specific USACE and Reclamation studies, projects, and certain activities as Community Project Funding (CPF) in the House and as Congressional Directed Spending (CDS) in the Senate. In total, the 117<sup>th</sup> Congress funded 343 CPF/CDS items for USACE, totaling \$1.6 billion, and 27 CPF/CDS items for Reclamation, totaling \$112 million.<sup>23</sup>

The 118<sup>th</sup> Congress may consider whether to revise the process for requesting and evaluating CPF/CDS requests. The 118<sup>th</sup> Congress also may consider how much funding to provide to water resource development projects through the CPF/CDS process versus providing additional funding to the agencies for certain categories of work that the agencies then allocate to projects in a work plan. During the FY2024 and FY2025 annual appropriations processes, Congress also may consider the level of funding to provide to these agencies and how many new studies and projects to require the agencies to initiate. 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 the 117<sup>th</sup> Congress.

From FY2018 through FY2023, Congress provided supplemental appropriations for USACE and Reclamation for disaster response and mitigation (e.g., drought, flood); study, construction, maintenance, and repair of projects (e.g., dam safety construction in **Figure 2**); new authorities that expand the agencies' activities; and COVID-19 precautions, among other purposes.<sup>24</sup> **Table 2** details in nominal dollars supplemental appropriations based on the fiscal year when funds are 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.<sup>25</sup>

<sup>21</sup> Division D of P.L. 117-103 and Division D of P.L. 117-328.

<sup>22</sup> CRS Report R47293, *Energy and Water Development: FY2023 Appropriations*, by Mark Holt and Anna E. Normand.

<sup>23</sup> See FY2022 and FY2023 lists for Energy and Water Development, and Related Agencies at House Committee on Appropriations, "Transparency," at <https://democrats-appropriations.house.gov/transparency>.

<sup>24</sup> 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 (IIJA) Funding for U.S. Army Corps of Engineers (USACE) Civil Works: Policy Primer*, by Nicole T. Carter and Anna E. Normand; 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; and CRS Report R47262, *Inflation Reduction Act of 2022 (IRA): Provisions Related to Climate Change*, coordinated by Jane A. Leggett and Jonathan L. Ramseur.

<sup>25</sup> §§50233 and 80004 of P.L. 117-169 appropriations are to remain available through FY2026. §§50231 and 50232 of P.L. 117-169 appropriations are to remain available through FY2031.



**Figure 2. IIJA-Funded Bureau of Reclamation B. F. Sisk Dam Safety Construction Project**



**Source:** Reclamation Flickr website, B. F. Sisk Dam Safety Construction - November 1, 2022 (BIL Funded) album, at <https://www.flickr.com/photos/usbr/>.

**Notes:** IIJA = Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58). Reclamation allocated \$100 million of IIJA funding in FY2022 for its Safety of Dams Program to support the modification of the B. F. Sisk Dam.

**Table 2. Enacted Supplemental Appropriations for USACE and Reclamation**  
(FY2018-FY2026 dollars in millions)

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

**Source:** CRS using public laws enacted in FY2018-FY2023.

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

Congress may conduct oversight on these agencies' use of the appropriated funds. Potential oversight issues include staff's capacity to administer the awards, contracts, and procurements required by the level of funding and authorizations provided and to perform project management and oversight. For example, in December 2022, DOI described challenges related to increasing

staffing at Reclamation to implement IJA activities (e.g., hiring staff with necessary engineering and hydrology expertise).<sup>26</sup>

Some in Congress have expressed concerns about USACE's implementation of supplemental appropriations. These concerns include continued challenges with execution, cost overruns, and significant delays in completing projects funded under the Bipartisan Budget Act of 2018 (P.L. 115-123).<sup>27</sup> Other concerns include USACE interpreting Disaster Relief Supplemental Appropriations Act of 2022 (P.L. 117-43) provisions in a way that may require more cost sharing by nonfederal sponsors than Congress intended.<sup>28</sup>

In addition, the 118<sup>th</sup> Congress may consider the following in regard to USACE and Reclamation supplemental appropriations:

- The effects of inflation and cost overruns on 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 Response to Drought<sup>29</sup>

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 the National Integrated Drought Information System (NIDIS) and the U.S. Drought Monitor. USDA also distributes the primary federal financial aid intended to lessen the impacts of drought 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 tradeoffs 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 trends. As noted, the 117<sup>th</sup> Congress enacted various pieces of legislation relevant to drought, such as

<sup>26</sup> Testimony from Deputy Secretary of the U.S. Department of the Interior (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, 117<sup>th</sup> Cong., 2<sup>nd</sup> sess., December 13, 2022, at <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>.

<sup>27</sup> See Explanatory Statement accompanying Division D of P.L. 117-328, p. S8306, at <https://www.congress.gov/117/crec/2022/12/20/168/198/CREC-2022-12-20.pdf>.

<sup>28</sup> Ibid.

<sup>29</sup> 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.

WRDA 2022 (Title LXXXI, Division H, of P.L. 117-263) and the IRA (see an example of such funding in the following section, “Spotlight: Colorado River Basin”). The 117<sup>th</sup> Congress also considered, but did not enact, several pieces of drought-related legislation that may be reintroduced in the 118<sup>th</sup> Congress. 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 (e.g., H.R. 5118). Other proposed bills would have directed NOAA to report on the impacts of droughts, among other phenomena, on Great Lakes, ocean, and coastal ecosystems (e.g., H.R. 3764). Other proposals aimed to authorize multiple interrelated efforts with the overall goal of increasing drought resiliency. Proposed drought resiliency efforts in the 118<sup>th</sup> Congress may include new Reclamation funding for storage, water reuse and recycling, and desalination, as well as investments in improved technology and data.

### Spotlight: Colorado River Basin

Severe drought in the Colorado River Basin may continue to receive attention in the 118<sup>th</sup> 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 (see **Figure 3**). These trends have received widespread attention because of the prominent role basin waters and energy play for numerous agricultural and municipal customers throughout the Southwest.<sup>30</sup>

**Figure 3. Lake Mead Water Levels in August 2022**



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

DOI, through Reclamation, has a prominent role in managing Colorado River Basin waters, and 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,<sup>31</sup> which Congress authorized in the Colorado River Drought

<sup>30</sup> For additional 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: Federal and State Efforts*, by Charles V. Stern.

<sup>31</sup> Under the Colorado River Compact of 1922, the dividing line between the Upper and Lower Colorado River Basins is Lee Ferry, AZ (i.e., Northern Arizona).



Contingency Plan Authorization Act (P.L. 116-14). The DCPs required reduced Lower Basin water deliveries tied 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.

The hydrologic outlook for the Colorado River Basin has further deteriorated since the DCPs' passage, and there remains widespread concern about the basin's long-term water availability. On June 14, 2022, Reclamation called for basin states to commit to conserving an additional 2 million to 4 million acre-feet of water in 2023 and 2024.<sup>32</sup> When these commitments failed to materialize, Reclamation initiated a separate process in November 2022 to revise its current operational guidelines for 2023 and 2024.<sup>33</sup> This process could lead to additional major water delivery curtailments.

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). Reclamation is using some of this funding to pay water users to forgo deliveries in 2023 and 2024.<sup>34</sup> The 118<sup>th</sup> Congress may conduct oversight of and provide direction for these and other basin water conservation efforts. It also may consider whether other aid or authority may be necessary to mitigate drought in the basin.

## Science and Technology for Water Management

Federal and nonfederal water managers generally use available information 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 behind dams, in aquifers, and in 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 118<sup>th</sup> 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, such as new and existing satellite-based platforms, ultrasound sensors and radars, and autonomous in situ measurements, among others.<sup>35</sup> The 118<sup>th</sup> Congress may be

<sup>32</sup> Statement of Bureau of Reclamation Commissioner the Honorable Camille Touton, in U.S. Congress, Senate Committee on Energy and Natural Resources, *Short And Long Term Solutions to Extreme Drought in the Western U.S.*, hearings, 117<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 14, 2022.

<sup>33</sup> For more information, see Bureau of Reclamation, "Supplemental Environmental Impact Statement for Near-Term Colorado River Operations," at <https://www.usbr.gov/ColoradoRiverBasin/SEIS.html>.

<sup>34</sup> For more information, see Bureau of Reclamation, "Lower Colorado River Basin System Conservation and Efficiency Program," at <https://www.usbr.gov/lc/LCBCConservation.html>.

<sup>35</sup> National Academies of Sciences, Engineering, and Medicine, *Future Water Priorities for the Nation: Directions for the U.S. Geological Survey Water Mission Area* (Washington, DC: The National Academies Press, 2018), at

interested in using these technologies to improve estimates of water availability and quality and understanding of snow and soil moisture dynamics. For example, the USGS is conducting regional Integrated Water Availability Assessments at IWS basins to inform future periodic national water availability assessments.<sup>36</sup> 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 the observed information with both remotely collected data and tools for forecasting and modeling. Related water resource topics that may be of interest during the 118<sup>th</sup> Congress include the following:

- 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 modeling<sup>37</sup>
- Whether—and, if so, how—Congress wants to legislate or direct the federal agencies to act on the monitoring network recommendations in the 2021 *A Strategy for the National Coordinated Soil Moisture Monitoring Network* report prepared by the National Coordinated Soil Moisture Monitoring Network for NIDIS<sup>38</sup>
- Whether a long-term strategy for snowpack information investments and coordination of research is needed, in light of work underway by the USDA (see **Figure 4** for an example USDA Snow Telemetry network station), USGS, NOAA, NASA, USACE, Reclamation, state and local entities, researchers, and private entities

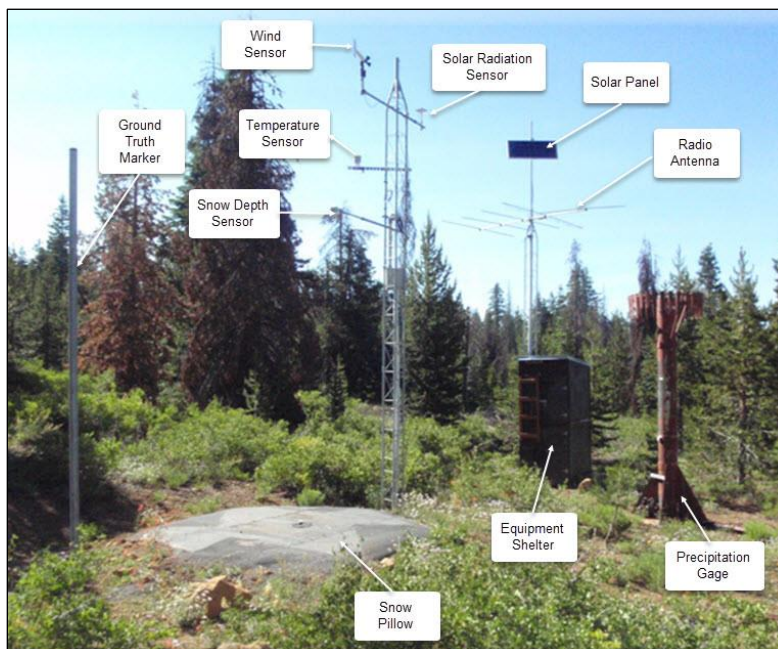
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<https://doi.org/10.17226/25134>.

<sup>36</sup> USGS, “Integrated Water Availability Assessments,” at <https://www.usgs.gov/mission-areas/water-resources/science/integrated-water-availability-assessments-iwaas>.

<sup>37</sup> NOAA Weather, Water, and Climate Board, *Precipitation Prediction Grand Challenge Strategy*, October 2020, at [https://www.noaa.gov/sites/default/files/2022-01/PPGC-Strategy\\_FINAL\\_2020-1030.pdf](https://www.noaa.gov/sites/default/files/2022-01/PPGC-Strategy_FINAL_2020-1030.pdf). Extreme precipitation events, such as the multiple atmospheric rivers (ARs) that came ashore on the West Coast in December 2022 and January 2023, may draw attention to existing and future federal activities on the topic. ARs are a flowing corridor of concentrated water vapor in the atmosphere. Improvements in forecasting ARs, especially large ARs, may be particularly helpful in preparing for flooding, as well as in understanding some droughts.

<sup>38</sup> National Integrated Drought Information System, *A Strategy for the National Coordinated Soil Moisture Monitoring Network*, May 2021, at <https://www.drought.gov/sites/default/files/2021-06/NCSMMN-Strategy-Final-May-2021.pdf>. Soil moisture is important for understanding water, energy, and carbon cycles. 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.

**Figure 4. USDA Snow Telemetry (SNOTEL) Network Station**

**Source:** U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), “Automated Snow Monitoring,” at <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 U.S. SNOTEL network stations monitor snowpack, precipitation, temperature, and other climatic conditions.

Congress also may consider the ways in which these agencies share and use water data across the federal government and with nonfederal stakeholders. For example, Congress provided funding to the USGS to build a new Hydrologic Instrumentation Facility near the NWC. According to the USGS, this facility is to house a new Network Operations Center to improve real-time data distribution and serve as a primary interface to other federal water agencies.<sup>39</sup> Federal agencies also are modernizing some information platforms and increasingly hosting data through cloud computing, which can add value to users by allowing them to analyze data and construct models through the cloud network.<sup>40</sup> However, the various dashboards that federal agencies use (e.g., the USGS National Water Dashboard, NOAA’s NWC products, NASA’s anticipated Earth Observing Dashboard)<sup>41</sup> are not explicitly coordinated to provide one definitive source for federal water information. The 118<sup>th</sup> Congress may consider directing federal agencies to improve information coordination and dissemination. Topics for consideration could include whether a congressionally

<sup>39</sup> USGS, “USGS Partners with UA to Build a Hydrologic Instrumentation Facility,” January 20, 2022, at <https://www.usgs.gov/news/national-news-release/usgs-partners-ua-build-hydrologic-instrumentation-facility>.

<sup>40</sup> 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, “Big Data Program,” at <https://www.noaa.gov/organization/information-technology/big-data-program>.

<sup>41</sup> USGS, “National Water Dashboard,” at <https://dashboard.waterdata.usgs.gov/app/nwd/en/>; NOAA, National Weather Service, “National Water Center Products and Services, Operational and Experimental,” at <https://www.weather.gov/owp/operations>; National Aeronautics and Space Administration, “Earth Observing Dashboard,” at <https://eodashboard.org/explore>.

authorized body should lead the coordination of federal water information,<sup>42</sup> whether to assess current approaches and possible alternatives to support nonfederal water data acquisition that complements and enhances federal data, and how best to provide water data to users, such as nonfederal water managers.

## Expansion of Water Supplies

Some states and communities have invested in or are looking into alternative water supplies (e.g., wastewater reuse and recycling, desalination, and aquifer recharge and management), water banks and markets for water transfers, and/or ways to reduce water demand. 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. 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 in the form of secured or direct loans for a range of water infrastructure projects. 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.<sup>43</sup>

Reclamation's WaterSMART programs constitute another example of such assistance. As previously noted, 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 ocean 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.<sup>44</sup> In addition, Congress has added new authority for Reclamation to support nonfederal groundwater recharge projects.<sup>45</sup> Actions on these authorities are generally subject to the availability of discretionary

<sup>42</sup> In the 117<sup>th</sup> Congress, legislative proposals to coordinate water data included H.R. 7792, H.R. 5118, and S. 4236.

<sup>43</sup> For more information see CRS In Focus IF11193, *WIFIA Program: Background and Recent Developments*, by Elena H. Humphreys.

<sup>44</sup> In 2016, in §1116 of P.L. 114-322, 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 §155 of Division AA of P.L. 116-260, Congress authorized USACE to carry out certain water storage projects, including for water supply and water conservation. In 2022, in §8106 of Division H, Title LXXXI, of P.L. 117-263, 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 §8108 of P.L. 117-263, 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.

<sup>45</sup> In §40910 of P.L. 117-58, 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

appropriations. The 118<sup>th</sup> Congress may assess how agencies are implementing these authorities and may consider whether it wants to support other means of financial assistance for expanding water supplies.

In addition to the above financial assistance, 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. The 118<sup>th</sup> 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).

Recent Congresses have supported expanding water supplies by changing dam operation (both federal dams and nonfederal dams with federal engagement in their flood control operations). Specifically, pilot projects involving numerous federal and state agencies and academic researchers have demonstrated the viability of USACE and Reclamation dam operators that are informed by weather and water forecasts (e.g., two-week precipitation estimates); these pilots 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 Assistant Secretary of the Army for Civil Works 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.”<sup>46</sup>

How widely and quickly benefits of FIRO may assist in drought preparedness through expanded water supplies remains an area of active interest and ongoing research. Pursuant to congressional direction, USACE is producing a report that identifies additional opportunities for applying FIRO across the United States.<sup>47</sup> The 118<sup>th</sup> Congress may continue oversight of 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 Platte River, Chesapeake Bay, and Great Lakes; federal restoration initiatives such as the Comprehensive Everglades Restoration Program; and federal programs that address specific issues, such as fish passage. Congress has passed laws authorizing, and providing the structure, purpose, and governance of, restoration activities, initiatives, and programs and has provided appropriations for their implementation. The 117<sup>th</sup> Congress appropriated funding for aquatic ecosystem restoration for existing, ongoing restoration activities as well as new activities to be implemented by federal agencies and their partners. For

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projects. This authority is in addition to several existing authorities for Reclamation to support groundwater recharge projects.

<sup>46</sup> Assistant Secretary of the Army (Civil Works), “Army Civil Works Supporting Drought Resilience in America’s Communities,” memorandum, July 28, 2022.

<sup>47</sup> Ibid.



example, Congress enacted numerous aquatic ecosystem restoration-related provisions in the IIJA and IRA, in addition to other legislation.<sup>48</sup> Many of the ecosystem-related provisions in the IIJA and IRA appropriated funding that supplemented and surpassed recent annual appropriations for federal restoration activities, initiatives, and programs.<sup>49</sup> Some provisions authorized and funded new restoration activities.

The 118<sup>th</sup> Congress may consider oversight of the various departments' (e.g., DOI) and agencies' (e.g., EPA, USACE) implementations of the new authorizations and increased funding for aquatic ecosystem restoration provided in the 117<sup>th</sup> Congress. Congress may consider oversight of several issues, summarized below.

- How ecosystem restoration programs and activities authorized and funded by supplemental appropriations in the IIJA and IRA are being coordinated with existing, ongoing restoration efforts and whether activities are being implemented under broad, cross-agency plans or strategies intended to restore aquatic ecosystems
- What appropriations are needed for aquatic ecosystem restoration initiatives, programs, and activities in the 118<sup>th</sup> Congress, considering supplemental funds received in the 117<sup>th</sup> Congress
- The progress of restoration, project implementation, and effectiveness of restoration activities authorized and funded under the IIJA, IRA, and other legislation, as well as how agencies are to effectively monitor implementation and measure the performance of restoration
- Whether to organize the multiple ecosystem restoration initiatives and activities in the United States through an overarching national strategy or plan

In some cases, stakeholders implement 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. NNBFs can take various forms, including wetlands, such as salt marshes and certain submerged aquatic vegetation; oyster, mussel, and coral reef habitats; and maritime forests/shrubs. They also can combine these natural features with engineered components, such as rock gabions (i.e., a basket or other container 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 (shown in **Figure 5**, along with other NNBFs). Some laws refer to NNBFs and other terms 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.

The concept of NNBFs appears in both authorization and funding provisions. For example, the IIJA and IRA include provisions that direct NOAA to use funds to support multiple NNBF-related goals; the IIJA directs NOAA to construct or protect ecological features that protect coastal communities from flooding or coastal storms; and the IRA directs NOAA to pursue projects that support natural resources that sustain coastal and marine resource-dependent communities.<sup>50</sup>

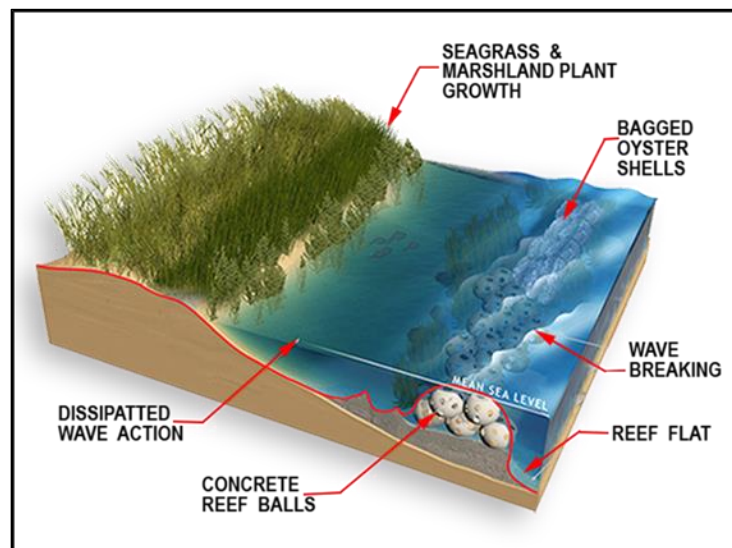
<sup>48</sup> For more information, see CRS Report R47263, *Ecosystem Restoration in the Infrastructure Investment and Jobs Act: Overview and Issues for Congress*, coordinated by Anna E. Normand and Pervaze A. Sheikh.

<sup>49</sup> Ibid.; see Table 1, "Ecosystem Restoration Activity Provisions in the IIJA," and shaded box, "Inflation Reduction Act of 2022."

<sup>50</sup> Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), Division J, Title II, provision (2) under the National Oceanic and Atmospheric Administration, Operations, Research, and Facilities section; and IRA, Title IV, §40001.

Further, the Biden Administration released an NNBf-related roadmap in November 2022, stating that the U.S. Global Change Research Program is developing a product to synthesize what is known about the effectiveness of nature-based solutions (expected publication in 2024).<sup>51</sup>

**Figure 5. Illustration of Coastal Natural and Nature-Based Features**



**Source:** U.S. Army Corps of Engineers, Engineering with Nature, “Natural and Nature-Based Features,” at <https://ewn.el.erdc.dren.mil/nbnf.html>.

The 118<sup>th</sup> Congress may consider whether to address issues associated with NNBFs. Such issues may include knowledge gaps in measuring the performance of NNBFs; federal agencies’ estimation of or accounting for NNBFs’ benefits, costs, and performance; and the effectiveness of NNBFs in addressing issues usually addressed by non-nature based activities.

## Tribal Water Resources

Congress regulates tribal affairs pursuant to its constitutional authority.<sup>52</sup> The Bureau of Indian Affairs (BIA), in DOI, is responsible for the administration and management of 56 million surface acres and 59 million acres of subsurface mineral estate held in trust by the United States for Indian tribes and individual tribal members.<sup>53</sup> In addition, the federal government has a general *federal trust responsibility* to protect tribal treaty rights, lands, assets, and water resources on behalf of tribes and tribal members.

BIA is responsible for upholding the federal trust responsibility to maintain water resources for tribes. When the Snyder Act of 1921 authorized BIA to operate programs and spend federal

<sup>51</sup> White House, *Opportunities to Accelerate Nature-Based Solutions: A Roadmap for Climate Progress, Thriving Nature, Equity, & Prosperity—A Report to the National Climate Task Force*, November 2022. For more about the terminology used to describe natural and nature-based features, including nature-based solutions, see CRS Report R46145, *Nature-Based Infrastructure: NOAA’s Role*, by Eva Lipiec.

<sup>52</sup> *United States v. Lara*, (541 U.S. 193), 200 (2004) (Indian commerce and treaty clauses and structure of 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.

<sup>53</sup> Bureau of Indian Affairs (BIA), *Budget Justifications and Performance Information, Fiscal Year 2023*, p. 91, at <https://www.doi.gov/sites/doi.gov/files/fy2023-bia-greenbook.pdf>.

funds for the benefit and assistance of Indians throughout the United States,<sup>54</sup> it specifically directed BIA to operate and spend funds for the extension, improvement, operation, and maintenance of existing tribal irrigation systems, as well as providing for the development of tribal water supplies.<sup>55</sup> BIA's Water Resources Program helps tribes protect and manage tribal water resources.<sup>56</sup> BIA performs technical studies to help tribes gather hydrology data and develop best practices for water use.<sup>57</sup> In addition, BIA helps tribes create drought management plans that include water conservation techniques, and undertake projects to support Indian water rights.<sup>58</sup>

In addition, since the late 1800s, DOI has provided irrigation for tribal lands through the Indian Irrigation Service.<sup>59</sup> Most Indian irrigation construction activities ended in the 1940s, when the Indian Irrigation Service ceased to exist, and DOI transferred project operation and maintenance to BIA.<sup>60</sup> BIA currently has 15 irrigation projects across 780,000 acres in 10 western states, mostly on Indian reservations. These projects serve 25,000 tribal and non-tribal water users.<sup>61</sup> The federal government is also responsible for operating and maintaining all dams on Indian lands, in accordance with the Indian Dams Safety Act of 1994, as amended (25 U.S.C. §§3801 et seq.).<sup>62</sup> In addition to these programs, Congress has authorized and funded Indian water rights settlements with individual tribes in specific locations.<sup>63</sup> Reclamation or BIA funds and/or administers many of these settlements.<sup>64</sup>

The 118<sup>th</sup> Congress may continue to express interest in tribal water resource issues, including through legislation and oversight of BIA's water resources, irrigation, and dam programs and

<sup>54</sup> 25 U.S.C. §13.

<sup>55</sup> Ibid.

<sup>56</sup> DOI, *The United States Department of the Interior Budget Justifications and Performance Information for Fiscal Year 2023—Bureau of Indian Affairs*, pp. 99 and 122, at [https://www.bia.gov/sites/default/files/dup/inline-files/fy2023-bia-greenbook\\_0.pdf](https://www.bia.gov/sites/default/files/dup/inline-files/fy2023-bia-greenbook_0.pdf).

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

<sup>59</sup> 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, 114<sup>th</sup> Cong., 2<sup>nd</sup> sess., S.Rept. 114-245, April 27, 2016, p 2 (hereinafter S.Rept. 114-245). See also Statement of Principal Deputy Assistant Secretary, Indian Affairs of the U.S. Department of the Interior, Larry Roberts in U.S. Congress, Senate Committee on Indian Affairs, *Irrigation Projects in Indian Country*, hearings, 113<sup>th</sup> Cong., 2<sup>nd</sup> sess., September 10, 2014, at <https://www.govinfo.gov/content/pkg/CHRG-113shrg91750/html/CHRG-113shrg91750.htm> (hereinafter S.Hrg. 113-505). For more on the federal policy of encouraging tribal farmers, see An Act to Provide for the Allotment of Lands in Severalty to Indians on the Various Reservations (General Allotment Act or Dawes Act), Statutes at Large 24, 388-91.

<sup>60</sup> S.Rept. 114-245, p 2. See also S.Hrg. 113-505.

<sup>61</sup> Ibid. and DOI, *2021 United States Department of the Interior Annual Report on Dam Safety Program*, p. 8, 2022 (hereinafter DOI, *2021 Safety Report*).

<sup>62</sup> Tribes are also able to operate and maintain dams on tribal lands under the Indian Self-Determination and Education Assistance Act (P.L. 93-638, as amended). Under ISDEAA, tribes can request the authority to conduct certain activities that otherwise would be conducted by some federal agencies. See also CRS Report R45981, *Dam Safety Overview and the Federal Role*, by Anna E. Normand.

<sup>63</sup> In the federal context, Indian water rights settlements generally refer to agreements involving tribes, the federal government, and other entities that allow tribes to quantify their water rights on paper, while also procuring access to water through infrastructure and other related expenses. For more information, see CRS Report R44148, *Indian Water Rights Settlements*, by Charles V. Stern.

<sup>64</sup> See DOI, *FY2022 Allocation of Funding for Indian Water Rights Settlements*, at <https://www.doi.gov/sites/doi.gov/files/fy-2022-bil-iwrs-allocations.pdf>.



funding for these programs. Congress also may consider authorization, funding, and oversight efforts for various other related water resource activities (e.g., implementation of ongoing Indian water rights settlements), as well as any issues related to the implementation and oversight of recent additional funding legislation, such as that provided in the IIJA.<sup>65</sup>

In addition to oversight and funding of ongoing tribal water resources activities, Congress may consider proposals to increase tribal participation in water infrastructure financial assistance programs. Tribal representatives have asserted that the high cost-share requirements of several tribal water infrastructure programs create a barrier to entry.<sup>66</sup> The 118<sup>th</sup> Congress may consider altering the cost-share requirements for tribes for water resources grant programs such as Reclamation's WaterSMART program.<sup>67</sup> The 118<sup>th</sup> Congress also may consider new Indian water rights settlements for individual tribes, some of which have been introduced but not enacted. In addition, Congress may consider the related issue of extending mandatory funding mechanisms for existing settlements (e.g., the Reclamation Water Settlements Fund) and/or authorizing such mechanisms for newly enacted settlements.<sup>68</sup>

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<sup>65</sup> The IIJA provided \$250 million over five years for BIA's Construction account, including at least \$50 million to address irrigation and power systems and \$200 million to address safety of dams, water sanitation, and other facilities.

<sup>66</sup> 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*, 117<sup>th</sup> Cong., 2<sup>nd</sup> sess., February 8, 2022, Testimony of Chairman Peter Yucopecio, Pascua Yaqui Tribe, pp. 3-4 at <https://docs.house.gov/meetings/PW/PW02/20220208/114380/HHRG-117-PW02-Wstate-YucupicioP-20220208.pdf>.

<sup>67</sup> For example, Congress has provided full federal funding for some USACE projects conducted under its Tribal Partnership Program (33 U.S.C. §2269).

<sup>68</sup> In its FY2023 budget, BIA expressed an interest in working with Congress to provide a mandatory funding source for future settlements "to support the funding stability." DOI, *Fiscal Year 2023 Budget in Brief*, p. 5, at <https://www.doi.gov/sites/doi.gov/files/fy2023-bib-bia-508.pdf>.

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