ASSOCIATE ADMINISTRATOR FOR CONGRESSIONAL AND INTERGOVERNMENTAL RELATIONS
WASHINGTON, D.C. 20460

August 8, 2024

The Honorable Mike Johnson
Speaker
United States House of Representatives
Washington, D.C. 20515

Dear Speaker Johnson:

I am pleased to transmit the report to Congress titled *Water Reuse Interagency Working Group: Report to Congress*. The U.S. Environmental Protection Agency prepared this report as required by Section 50218 of the *Infrastructure Investments and Jobs Act*.

The report presents key information and metrics to communicate progress and outcomes related to the Working Group's duties, as specified by Congress, including the implementation of the Water Reuse Action Plan, and outlines anticipated future activities. The report reflects activities undertaken and products produced through January 2024.

I would be pleased to further discuss the contents of this report at your convenience, or your staff may contact Laura Gentile in the EPA's Office of Congressional and Intergovernmental Relations at gentile.laura@epa.gov or (202) 805-3243.

Sincerely,

Tim Del Monico

ENCLOSURE

ASSOCIATE ADMINISTRATOR FOR CONGRESSIONAL AND INTERGOVERNMENTAL RELATIONS
WASHINGTON, D.C. 20460

August 6, 2024

The Honorable Kamala Harris
President
United States Senate
Washington, D.C. 20510

Dear Madam President:

I am pleased to transmit the report to Congress titled *Water Reuse Interagency Working Group: Report to Congress*. The U.S. Environmental Protection Agency prepared this report as required by Section 50218 of the *Infrastructure Investments and Jobs Act*.

The report presents key information and metrics to communicate progress and outcomes related to the Working Group's duties, as specified by Congress, including the implementation of the Water Reuse Action Plan, and outlines anticipated future activities. The report reflects activities undertaken and products produced through January 2024.

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ENCLOSURE

Water Reuse Interagency Working Group

Report to Congress

June 2024

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1. Report Background and Purpose

Water reuse—also commonly known as water recycling or water reclamation—reclaims water from a variety of sources and then treats and reuses it for beneficial purposes such as agriculture and irrigation, potable water supplies, groundwater replenishment, industrial processes, and environmental restoration. Water reuse can provide alternatives to existing water supplies and can be used to enhance water security, sustainability and resilience.

The Water Reuse Interagency Working Group ("Working Group"), established in May 2022 under the Bipartisan Infrastructure Law (BIL),[1] develops and coordinates actions, tools and resources to help advance water reuse across the United States. It is chaired by the U.S. Environmental Protection Agency and is composed of senior officials from the 15 federal agencies listed below, who convene regularly to support ongoing federal engagement and coordination around water reuse.

- Centers for Disease Control and Prevention (CDC)
- Council on Environmental Quality (CEQ)
- Federal Emergency Management Agency (FEMA)
- General Services Administration (GSA)
- Office of Management and Budget (OMB)
- U.S. Agency for International Development (USAID)
- U.S. Army Corps of Engineers (USACE)
- U.S. Department of Defense (DoD)
- U.S. Bureau of Reclamation (Reclamation)
- U.S. Department of Agriculture (USDA)
- U.S. Department of Energy (DOE)
- U.S. Department of State (DOS)
- U.S. Environmental Protection Agency (EPA)
- U.S. Food and Drug Administration (FDA)
- U.S. Geological Survey (USGS)

Part of the Working Group's purpose is to demonstrate leadership through implementation of the February 2020 National Water Reuse Action Plan (WRAP), which creates opportunities for water reuse in the mission areas of each of the federal agencies included in the Working Group. The WRAP is a collaborative effort across the water sector that strives to ensure that water reuse is accessible, attainable to implement, and sensitive to climate and environmental justice considerations. The WRAP is a key tool for identifying needs, compiling and creating resources, and facilitating the identification of water reuse opportunities in the mission areas of the Working Group member agencies. Leveraging the expertise of the water sector, the WRAP is comprised of a series of actions led by federal, state and local organizations that aim to advance water reuse through efforts to clarify regulatory and policy choices for states, improve public acceptance, advance research, provide financial support, and offer technical assistance. New actions are added to the WRAP on a quarterly basis (i.e., in January, April, July and October) to maintain growth and address gaps and priorities. Each action is implemented through the completion of a series of milestones to achieve the action's goals and create products (e.g., research articles, webinars, funding tools) that address identified needs in the water sector.

The WRAP is organized around the 11 strategic themes listed below. Each action is numbered according to the strategic theme area with which it most closely aligns.

[1] Sec. 50218 of the Infrastructure Investments and Jobs Act (page 752).

1. **Integrated Watershed Action.** Enable consideration of water reuse with integrated and collaborative action at the watershed scale.
2. **Policy Coordination.** Coordinate and integrate federal, state, Tribal and local water reuse programs and policies.
3. **Science and Specifications.** Compile and refine fit-for-purpose specifications.
4. **Technology Development and Validation.** Promote technology development, deployment and validation.
5. **Water Information Availability.** Improve availability of water (quality and quantity) information.
6. **Finance Support.** Facilitate financial support for water reuse.
7. **Integrated Research.** Integrate and coordinate research on water reuse.
8. **Outreach and Communications.** Improve outreach and communication on water reuse.
9. **Workforce Development.** Support a talented and dynamic workforce.
10. **Metrics for Success.** Consider water reuse metrics that support goals and measure progress.
11. **International Collaboration.** Build on the experiences of international partners.

This report fulfills requirements under the Bipartisan Infrastructure Law, which directs the EPA to submit a report to Congress on the Working Group's activities and findings not less frequently than once every two years. The report presents key information and metrics to communicate progress and outcomes related to the Working Group's duties, as specified by Congress, and outlines anticipated future activities. The report reflects activities undertaken and products produced through January 2024.

2. Working Group Charges and Activities

The interagency Working Group members began convening informally in 2019 to coordinate the implementation of the WRAP. The Working Group focused on creating a collaborative forum for federal, state, Tribal, local and water sector partners to build capacity for communities to pursue water reuse practices. The first WRAP action (Action 1.1) involved development of a federal policy statement to support and encourage consideration of water reuse in a watershed-scale planning context.

Federal Policy Statement on Water Reuse

Water is critical to the nation's health, strength, security and resilience, but the solutions available to manage water and its availability are often complex. When incorporated into an integrated water management plan, water reuse can be a valuable tool to enhance the availability and effective use of water resources. The federal government recognizes, acknowledges and respects the primacy of states in the management of water resources within their borders.

The federal government supports the consideration of water reuse to increase water security, sustainability and resilience, especially when considered through integrated and collaborative water resource planning approaches, typically at the watershed or basin scale.

This policy statement is intended to guide federal agencies to:

- Encourage consideration of water reuse and integrated watershed-scale planning approaches;
- Communicate the value and benefits of water reuse; and
- Leverage existing programmatic, funding and technical resources.

The Working Group meets quarterly, working to build upon the initial success and the momentum generated by the federal policy statement and the coordinated WRAP launch in 2020. Importantly, the Working Group's duties, summarized below, ensure continued federal coordination to advance water reuse practices across the water sector with the goal of creating a more water-resilient future for communities of all sizes.

Congressional Charges

In the BIL, Congress charged the Working Group with carrying out the following duties to advance water reuse nationwide:

Duty 1. Leverage the expertise of industry, the research community, nongovernmental organizations (NGOs) and government.

Duty 2. Seek to foster water reuse as an important component of integrated water resources management.

Duty 3. Conduct an assessment of new opportunities to advance water reuse and annually update the [WRAP] with new actions, as necessary, to pursue those opportunities.

Duty 4. Seek to coordinate federal programs and policies to support the adoption of water reuse.

Duty 5. Consider how each federal agency can explore and identify opportunities to support water reuse through the programs and activities of that federal agency.[2]

[2] For purposes of brevity, this report combines duties 4 and 5 based on the complementary objectives.

Duty 6. Consult, on a regular basis, with representatives of relevant industries, the research community and NGOs.[3]

In December 2022, the Joint Explanatory Statement accompanying the 2023 Consolidated Appropriations Act directed the EPA to coordinate with the Working Group on an additional effort:

> Undertake a study on the public benefit of a potential federal investment tax credit to support private investment in water reuse and recycling systems.[4]

Working Group activities that address these Congressional charges are described below.

Working Group Activities

This section highlights the activities undertaken by the Working Group in response to each duty. Where appropriate, the section includes metrics and information used to track progress and communicate outcomes. The Bipartisan Infrastructure Law was signed into law in November 2021. Although the Working Group was not formalized until May 2022, activities from January 2022 through January 2024 are summarized in this report for the purposes of (1) reflecting the Working Group's ongoing coordination and growth over two full calendar years, and (2) incorporating actions that were added to the WRAP in January 2022 in accordance with the WRAP's quarterly action onboarding cycle. The Bipartisan Infrastructure Law duties are arbitrarily numbered, and certain duties have overlapping objectives. Therefore, to reduce redundancy and facilitate orientation to the Working Group and its activities, some duties have been combined and others are listed non-sequentially for the purposes of this report.

A. Leverage the expertise of industry, the research community, NGOs and government, including through consultation, on a regular basis, with representatives of relevant industries, the research community and NGOs. (Duties #1 and #6 combined)

Through regular engagements and outreach initiatives, the Working Group invites public feedback and involvement and actively seeks input related to priorities and needs from interested parties. A total of 157 dedicated partner organizations contribute at various scales to the implementation of WRAP actions (Figure 1), including organizations from relevant industries, members of the research community and NGOs. This diverse set of stakeholders also serves as an informal advisory group on the overall direction of the WRAP, which supports the Working Group's purpose. For example, members coordinate on BIL-related activities and funding opportunities, present on agency initiatives related to water reuse to inspire similar activities across agencies, discuss potential new WRAP actions based on agency priority topics in quarterly Working Group meetings, and seek input from WRAP partners in quarterly WRAP action leader meetings. Since its inception, the WRAP community has continued to grow; in fact, anyone may propose and lead new actions that advance water reuse planning and implementation by emailing waterreuse@epa.gov. In addition, the WRAP Online Platform includes contact information for each WRAP action to encourage input and partnering.

[3] For purposes of brevity, this report combines duties 1 and 6 given the significant overlap in target engagement.
[4] Page 92 of the House Report on the Department of the Interior (DOI), Environment, and Related Agencies Appropriations Bill, 2023.

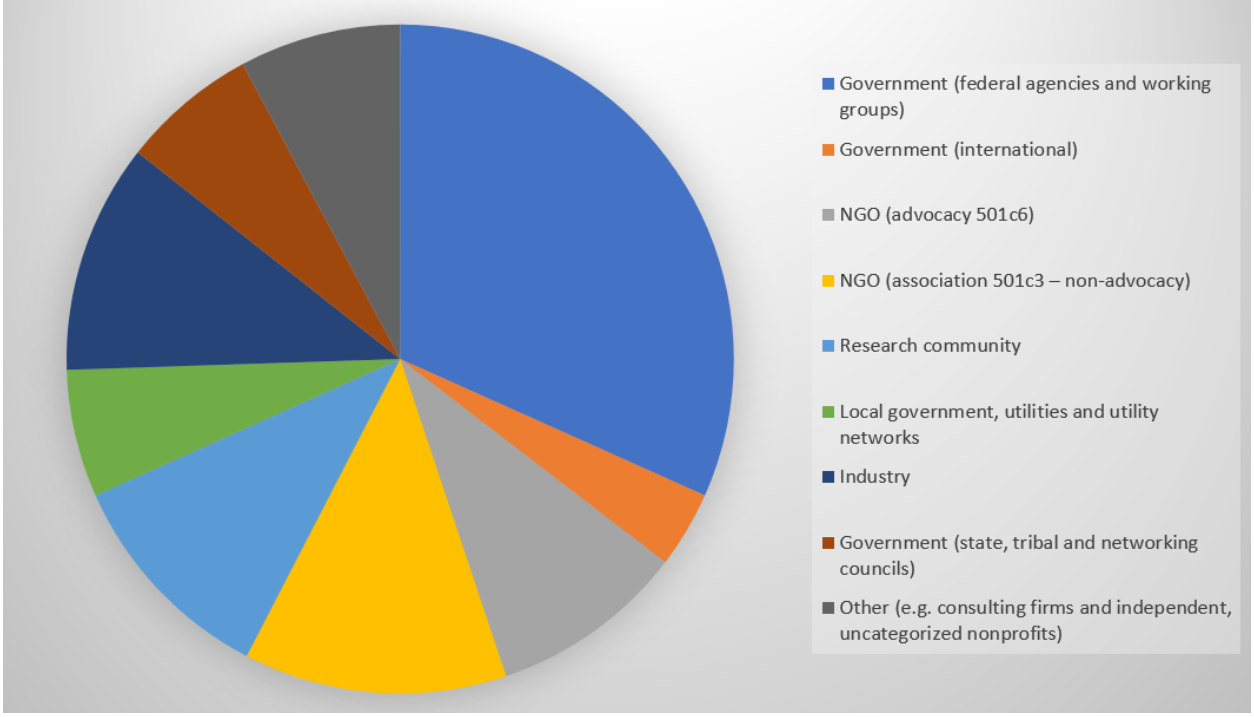

Figure 1: Types of organizations engaged through the WRAP and with the Working Group.

As the Working Group chair, the EPA identifies, facilitates and creates opportunities for federal participation at key external forums that engage water sector experts within industry, NGOs and the research community. Such participation helps (1) inform future WRAP action commitments and products, and (2) leverage the expertise of organizations across the water sector. Examples of recent engagements include the following:

- **National convening on innovative permitting.** The EPA organized a workshop of invited experts, regulators and utility leaders in August 2023, designed to advance thinking within the wastewater sector on how National Pollutant Discharge Elimination System (NPDES) permitting can support innovation (to include water reuse) while maintaining robust environmental protections. A forthcoming summary report should contain foundational content to support innovation at the state and local levels and outline recommended actions for further progress. *(Action 2.19, led by EPA, UC Berkeley and Stanford University)*[5]
- **U.S.-Israel exchange on water reuse.** A delegation of 39 representatives from the U.S. water sector, including experts from the DOE, EPA, USDA, water utilities, academia and industry, traveled to Israel in fall 2022 as part of a science, technology and policy information exchange focused on agricultural water reuse practices. U.S. and Israeli water sector leaders discussed specific reuse strategies for U.S. communities in a public webinar, and a summary report captures key takeaways from the trip. The EPA and MoEP renewed their Memorandum of Understanding (MOU) in 2023 to continue to leverage Israeli reuse expertise and "improve

[5] University of California, Berkeley

institutional capacity through technical cooperation on environmental management." *(Action 11.1, led by EPA, MoEP and MoEI in collaboration with USDA and FDA)*[6]

- **Agricultural reuse conference in Israel.** In fall 2022, technical and research experts convened in Kibbutz Hagoshrim, Israel, for the TreWAG conference *Understanding and Mitigating Effects of Treated Wastewater Reuse in Agriculture: From Risks to Policy and New Opportunities,* hosted by the Volcani Institute. The EPA, USDA and FDA were among the WRAP action leaders who co-hosted the event, which focused on understanding and mitigating effects and risks of using treated wastewater reuse in agriculture and identifying new opportunities for expanding agricultural reuse. Action leaders and participants developed a collaborative journal article based on the technical discussions. *(Action 1.6, led by University of Arizona, USDA, EPA, FDA and Volcani Institute)*
- **State regulator summits on water reuse.** The EPA and state associations ACWA, ASDWA, GWPC, ECOS and ASTHO[7] have collaborated to create a forum for state government leaders and other water reuse industry experts to connect on water reuse issues, priorities and progress. State Summits on Water Reuse were held as part of the WateReuse Symposium in 2019, 2020 and 2023. Federal agencies participated in each of the events to date, and several agencies (e.g., the EPA, Reclamation, DoD, USDA) plan to participate in the next event in 2024. *(Action 2.2, led by EPA, ACWA and ASDWA)*
- **2023 WateReuse Symposium federal plenary session.** Working Group members from the CDC, EPA, FEMA, USACE, Reclamation and USDA led the development of and participated in an interactive session at the WateReuse Association's Annual Symposium in spring 2022, during which more than 200 participants engaged in a survey. The survey identified the greatest needs for improved federal coordination in the areas of communication, regulations/guidance and financial assistance. Sufficient funding, public perception, lack of regulations and project cost were perceived as significant challenges to water reuse implementation at the local level.

In addition, Working Group members facilitate broad, ongoing external engagement as part of the overarching WRAP effort. For example, members coordinate with industry representatives, researchers and NGOs as appropriate to each agency's mission. Working Group members share relevant observations and feedback with each other during the regular quarterly Working Group meetings. These regular convenings help Working Group members foster relationships, communicate relevant information, and share reuse challenges and ideas—many of which feed into the WRAP framework and future actions. Working Group members also engage through panels, workshops, presentations and conferences with targeted forums specific to water sector groups, where audience engagement helps members identify water reuse priorities and barriers. As the Working Group identifies effective examples of water reuse institutionalization within their agencies (e.g., research, funding), members are encouraged to explore options within their own purview. In coming years, the Working Group aims to maintain and expand engagements with non-federal partners to help illuminate and support future Working Group activities. The following lists are not comprehensive but represent types of engagements

[6] Israeli Ministry for Environmental Protection (MoEP); Israeli Ministry for Economy and Industry (MoEI)
[7] Association of Clean Water Administrators (ACWA); Association of State Drinking Water Administrators (ASDWA); Ground Water Protection Council (GWPC); Environmental Council of the States (ECOS); Association of State and Territorial Health Officials (ASTHO)

that members participate in annually. Informal engagements represent those that occurred prior to the Working Group's formalization.

Targeted federal collaboration

- Formal federal Working Group meetings
    - 2023: October 19, July 20, April 20, March 7, January 26
    - 2022: October 24, July 21
- Informal federal meetings
    - 2022: April 21, January 20
- EPA full team meetings and EPA regional liaison meetings
    - 2023: November 9, September 11, May 15, February 6
    - 2022: October 3, August 2, June 27, April 19

External engagement opportunities

- Targeted convenings and engagements
    - 2023
        - November 3–5: WateReuse California annual conference
        - October 23–25: ASDWA annual conference
        - October 19: Metropolitan Washington Council of Governments webinar
        - October 17: National Groundwater Association webinar
        - October 10: International Code Council's Increasing Sustainability and Community Resilience Through Water Reuse webinar
        - September 28: CDC and EPA Action 8.6 meeting
        - September 12–14: GWPC annual forum
        - August 29: National Alliance for Water Innovation (NAWI) panel—pushing technology into commercialization
        - August 23–25: Convening on permitting innovation and reuse
        - August 10: Hawaii Stormwater Quality BMPs workshop
        - July 24–26: American Water Works Association (AWWA) Potable Reuse & Biological Treatment Symposium presentations
        - June 15: Next Generation Water Summit presentation
        - June 13–15: Universities Council on Water Resources / National Institutes of Water Resources (UCOWR/NIWR) annual conference special session: Best of the Best from the Water for Agriculture Portfolio
        - April 25: Water Week and National Water Policy Fly-In
        - March 20–23: United Nations Water Conference
        - March 5–8: WateReuse Symposium and State Summit on Water Reuse
        - February 9: NAWI Extreme Decentralization workshop
    - 2022
        - October 30–November 3: U.S. delegation to Israel
        - October 23–27: TreWAG conference
        - October 8–12: WEFTEC
        - June 14: AWWA's Annual Conference and Expo
        - May 16–20: International Code Council annual conference

        - April 27: Water Week and National Water Policy Fly-In
        - March 6–9: WateReuse Symposium
- WRAP Action Leader meetings
    - 2023: July 31, March 20
    - 2022: November 14, July 25, April 4, January 18

B. *Coordinate federal programs and policies to support the adoption of water reuse and identify additional opportunities through the programs and activities of each agency.* (*Duties #4 and #5 combined*)

Through ongoing conversations and collaboration on water reuse priorities, the Working Group helps maintain interagency coordination that was initiated by the federal policy statement on water reuse (Action 1.1). As the Working Group chair, the EPA convenes federal partners to coordinate on and support water reuse opportunities and activities.

There are 60 WRAP actions with direct federal involvement, as of January 2024. To provide additional details on federal leadership in the water reuse space, Working Group members developed brief profiles that summarize and document their agencies' efforts and explicit roles (Appendix C). Each profile describes actions the agency has taken to advance water reuse, as well as opportunities the agency has to champion reuse within its mission area. The compilation of profiles, which is also available through the EPA's website, describes the individual and collective efforts of the federal partners and serves as a public resource to enable more targeted engagement on water reuse topics and needs.

Beyond each agency's individual efforts, involvement in the Working Group encourages interagency collaborations. Nearly half of all actions with federal involvement have two or more agencies collaborating (Appendix A). Federal leadership on water reuse is key to generating awareness, alignment and enthusiasm within the water sector. The following are examples of WRAP actions that embody multi-agency partnerships, water reuse institutionalization and federal collaborations with water sector organizations. The ideas for many of these actions stemmed from discussions among Working Group members. The actions are grouped to represent critical progress in five primary areas of impact: state regulatory and policy clarity, public perception, scientific and technological research, funding and infrastructure investments, and technical assistance support.

1. Improve Regulatory and Policy Clarity to Enable Reuse

These actions provide clarity on permitting, codes, standards, and state or federal policies and regulations to inform water reuse best practices and facilitate broader implementation of reuse projects.

- ✓ **Creating a better understanding of how to permit water reuse projects under the NPDES program.** The report *Navigating the NPDES Permitting Process for Water Reuse Projects*, developed by the WRAP action team, presents key information and strategies for permitting authorities and permittees to better understand how to permit reuse projects. *(Action 2.6, output led by EPA, ACWA, NACWA, NMSA, WateReuse and WEF)*[8]

[8] National Association of Clean Water Agencies (NACWA); National Municipal Stormwater Alliance (NMSA); Water Environment Federation (WEF)

- ✓ **Updating facility design standards to include reuse.** The GSA is updating the latest version of the P100 facilities standards for the Public Buildings Service. The P100 establishes design standards and contains both performance-based standards and prescriptive requirements for programing, design and documentation of GSA buildings. As part of the P100 goals for water net-zero, GSA is considering including the following: "Onsite non-potable water systems are permitted provided that they satisfy the risk-based water quality standards established by the National Blue-Ribbon Commission for Onsite Non-potable Water Systems." *(Action 2.18, led by EPA and NBRC in collaboration with GSA)*[9]
- ✓ **Compiling state regulations to support reuse adoption.** The REUSExplorer tool provides summaries of state water reuse regulations or guidelines, along with downloadable water quality metrics. The tool is searchable by state, source of water and end-use application. It includes nine end-use applications and four water sources. *(Action 3.1, led by EPA and supported by ACWA, AMWA, ASDWA, ASTHO, CDPHE, FDA, WRF and WateReuse)*[10]

2. Improve Public Perception of Water Reuse

These actions help support stakeholders during the development of reuse projects by improving their communication with the general public to help foster community support of water reuse projects that can preserve local water supplies. Effective communication should be tailored and disseminated to different stakeholder groups to increase project investments and foster alignment and integration within communities.

- ✓ **Developing educational materials to reduce concentrations of pharmaceuticals in wastewater.** The action team updated the Flush3P.org website and created two fact sheets to inform the public about keeping pharmaceuticals out of water for downstream end-uses. *(Action 2.9, led by LACSD, AWWA, AMWA, NACWA, NSAC, FDA, EPA and WateReuse)*[11]
- ✓ **Illustrating integration of stormwater capture and use in urban settings.** The action team created two infographics covering stormwater capture and use at the building and community scales. The infographics can help practitioners garner support for new projects by explaining how stormwater capture can contribute to different water quality and supply goals. *(Action 3.3, led by EPA, JFW, NMSA, ReNUWIt, WateReuse and WEF)*[12]
- ✓ **Making the connection between water reuse and public health.** The CDC and EPA are collaborating to provide information about the safety of recycled water to the public and to medical and public health professionals. A special issue of *The Bulletin*, a magazine published by the Santa Clara County Medical Association (SCCMA), helps answer critical questions that doctors and their patients have about water quality and water reuse. *(Action 8.6, led by CDC and EPA)*
- ✓ **Engaging the medical community in reuse communications.** The products from this action are designed to help the medical community better understand the need for recycled water and the available treatment technologies for removing pathogens, chemicals and constituents of emerging concern. Medical professionals—individually and through their

[9] National Blue Ribbon Commission (NBRC)
[10] Association of Metropolitan Water Agencies (AMWA); Colorado Department of Public Health and Environment (CDPHE); Water Research Foundation (WRF)
[11] Sanitation Districts of Los Angeles County (LACSD); National Stewardship Action Council (NSAC)
[12] Johnson Foundation at Wingspread (JFW); Re-Inventing the Nation's Urban Water Infrastructure (ReNUWIt)

professional associations—will then be empowered to share their informed opinion with their patients and the general public. *(Action 8.8, led by SCCMA, Valley Water, Envirospectives, WateReuse and EPA)*

3. Advance Scientific and Technological Research on Reuse

These actions support the development of sound science and research initiatives that can lower the costs, energy use and material use of water treatment technologies employed for reuse. Individual agencies within the Working Group have created new funding opportunities for water reuse research.

- ✓ **Addressing research priorities on water reuse.** Between 2020 and March 2023, the EPA funded $33.2 million in research through the Science to Achieve Results (STAR) and National Priorities Grant Programs to support safe and sustainable water resources. Research focuses have included viral pathogen and surrogate approaches for assessing treatment performance in water reuse, supporting fit-for-purpose use and risk characterization for potential enhanced aquifer recharge sites, and understanding the life cycle costs and benefits of enhanced aquifer recharge. *(Actions 3.6, 7.7 and 7.8, led by EPA)*
- ✓ **Improving reuse technology through research to ensure safety and lower costs.** NAWI plans to announce 2024 funding for early-stage applied research and development that can help achieve pipe parity (i.e., reaching a point where the cost of using non-traditional waters is equivalent to the cost of using water from conventional sources). To date, DOE has provided over $70.5 million across 75 research projects. *(Action 4.6, led by DOE and NAWI)*
- ✓ **Helping small businesses develop innovative reuse technologies.** The EPA's Small Business Innovation Research (SBIR) program began to incorporate water reuse topics in the annual EPA SBIR solicitations in 2020. Through collaborations with WRAP partners, high-priority water reuse topics have been identified for inclusion to address emerging needs. Initially, the topics were broad, such as treatment and monitoring technologies for water reuse, but over the years, they have evolved to target more specific needs, such as modular decentralized non-potable water reuse for urban applications. From 2020 to January 2023, the EPA awarded $3.4 million in EPA SBIR funding to U.S. small businesses to develop water reuse technologies. As the EPA is one of 11 federal agencies that have an SBIR program, action leaders developed example language to share with other agencies to help accelerate the inclusion of water reuse in solicitations. For example, from 2020 to March 2023, USDA-NIFA[13] awarded $2.5 million in USDA SBIR funding to U.S. small businesses to develop innovative reuse technologies, such as using recycled water to produce natural indigo dye year-round. *(Action 7.5, led by EPA)*
- ✓ **Funding an academic consortium to advance reuse research.** In June 2023, USACE announced the award of $12.3 million to the Water Reuse Consortium, a research collaboration among the University of Southern California, the University of Arizona and the University of Nevada, Reno. This new consortium aims to tackle pressing water challenges through innovative research, education, communication, and unprecedented collaborative efforts between government, local communities, industry and academia. Up to $38 million will be awarded to revolutionize water reuse practices and promote sustainable solutions

[13] National Institute of Food and Agriculture (NIFA)

for the benefit of communities, industries and the environment. *(Action 7.10, led by USACE and the Water Reuse Consortium)*

4. **Provide and Highlight Infrastructure Funding to Enable Communities of All Sizes to Pursue Reuse**

These actions create funding tools that support and incentivize water reuse. Multiple existing federal programs are available to support community and state efforts that meet cross-cutting policy goals, including reuse.

- ✓ **Supporting infrastructure for water reliability, conservation and reuse, as well as drought resilience.** Since 2020, USDA's Natural Resources Conservation Service (NRCS) has included water reuse in the Conservation Innovation Grants (CIG) program and has awarded $8.8 million across project proposals focused on reuse. USDA also assessed new opportunities for water reuse within its Water and Waste Disposal Loan and Grant Program. *(Actions 2.12, 5.1 and 6.4, led by USDA)*
- ✓ **Supporting safe and sustainable water resources.** Between 2020 and March 2023, the USDA-NIFA funded $28.7 million in competitive research through the Agriculture for Food and Research Initiative (AFRI) programs in Water Quantity and Quality, Critical Agriculture Research and Extension and Sustainable Agricultural Systems. Example research topics include bioreactors for onsite reuse, nutrients and clean water recovery, recycled water for irrigation, recycled water for the replenishment of groundwater resources, chemicals of emerging concern in recycled wastewater, antimicrobial resistance in water for irrigation and pathogenic contamination in recycled water. Research includes socioeconomic and biophysical considerations, and seeks to improve understanding of the life cycle costs and benefits of managed aquifer recharge. *(Action 2.12, led by USDA)*
- ✓ **Promoting reuse within disaster recovery financial assistance programs.** The EPA and FEMA are collaborating to provide clarification to hazard mitigation professionals and the water sector on whether water reuse projects, stormwater capture and use projects, and other applicable water sector projects are eligible for funding from FEMA's Building Resilient Infrastructure and Communities (BRIC) program and Hazard Mitigation Grant Program (HMGP). In August 2023, FEMA announced the final selection of sub-applications eligible for more than $3 billion available for the BRIC and HMGP programs. More than $200 million in funding will be awarded to six projects that use aquifer recharge as a nature-based solution to drought by replenishing groundwater supplies. Three of these projects will collectively receive $108 million to reuse treated municipal wastewater. *(Action 2.14, led by FEMA and EPA)*
- ✓ **Investing in resilient and drought-proof water infrastructure.** The EPA awarded more than $450 million in Water Infrastructure Finance and Innovation Act (WIFIA) funding in 2022 to the Helix Water District, the City of Oxnard, the Inland Empire Utilities Agency and the City of Boise for projects that include water reuse elements. The WIFIA program is implementing five key Biden Administration priorities in its 2023 notice of funding, two of which are supportive of reuse projects: *Mitigating the Impacts of Drought* and *Supporting One Water Innovation and Resilience.* In addition, state governments awarded over $300 million in loans for water reuse projects through Clean Water State Revolving Funds in 2022. *(Actions 6.2A and 6.2B, led by EPA)*

- ✓ **Funding reuse project infrastructure in western states.** Reclamation's Title XVI Program is identifying opportunities to recycle wastewater and impaired ground and surface water in the 17 Western states and Hawaii. In 2022 and 2023, Reclamation awarded a total of $549 million for water reclamation and reuse project planning, design and construction. *(Action 6.5, led by Reclamation)*

5. Provide Reuse Technical Support/Information

These actions help communities better understand how to implement reuse projects that best fit their needs. The success of a reuse project depends on engaging stakeholders across community types to identify their interests and priorities, provide targeted training support, and promote collaboration within programs to support local priorities.

- ✓ **Promoting USDA resources for rural communities.** The action team provided information and technical assistance to rural communities, promoted and financed water reuse projects, and assessed new opportunities for water reuse within USDA Rural Development programs, such as the Technical Assistance and Training Program. *(Action 6.4, led by USDA)*
- ✓ **Describing effective technical assistance approaches to improve water infrastructure in small and underserved communities.** The report *Lessons for Optimizing the Adoption of Water Reuse in Underserved Communities*, published by the action leaders in July 2023, showcases three communities and documents their engagement with technical assistance providers and regulators, lessons learned, and ongoing technical assistance efforts and support opportunities. *(Action 8.5, led by EPA and Ochotona LLC)*

C. Conduct an assessment of new opportunities to advance water reuse and annually update the WRAP with new actions, as necessary, to pursue those opportunities. (Duty #3)

The Working Group assesses new opportunities to advance water reuse and seeks potential partners to help fill identified gaps on an ongoing basis. One-way gaps are addressed through the formation of new WRAP actions. As Working Group chair, the EPA facilitates the quarterly addition of new WRAP actions, as well as voluntary commitments by the involved leader and partner organizations. New WRAP actions typically reflect current reuse priorities and opportunities. As part of implementing an action, action teams meet regularly—as frequently as weekly—to coordinate on progress to advance reuse. New WRAP actions are featured in WRAP quarterly updates, which also include an open call for new partners.

In addition, members of the Working Group meet quarterly to share progress on actions, communicate relevant agency initiatives and foster new action ideas to advance water reuse. New opportunities to advance water reuse are often identified though continuous assessments and Working Group member engagement with organizations across the water sector. Table 1 presents a representative sample of these opportunities.

Table 1: Working Group member engagements with the water sector since 2022 aimed at identifying new opportunities for actions and collaboration.

	Engagement Event	Audience Engaged	Activities & Outcomes
Quarterly	WRAP action leader meetings	WRAP action leaders including participants across the water sector and federal agencies	• Develop ideas for new WRAP actions (e.g., ongoing meetings have resulted in 21 new actions since 2022). • Organize new action collaborations. • Identify reuse priorities.
	Working Group meetings	Federal agencies	
	EPA full team and regional liaison meetings	EPA program offices and regions	
	National Blue-Ribbon Commission for Onsite Non-potable Water Systems	State and local government officials and federal employees	• Provide opportunities to share recent research developments, determine needs for future research, webinars and publications. • Encourage identification of log reduction targets and associated treatment trains for onsite non-potable water reuse applications. • Develop ideas for new actions and partnerships (e.g., collaborations have resulted in actions with building code groups, including the ICC, IAPMO and ARSCA, and GSA's update of their facility design standard, the P100).[14]
Annually	WateReuse Symposium	Research community, utilities, academia, NGOs, industry, and federal, state, and local government	• Develop ideas for new WRAP actions. • Generate ideas for research funding awards (e.g., SBIR). • Organize WRAP-specific presentations (e.g., in 2023, six action teams held technical sessions and seven Working Group members comprised a federal plenary).
	GWPC Annual Forum	State groundwater agencies and regulators	• Share new resources (e.g., the EPA Water Reuse Program team member research and a report on aquifer recharge). • Develop new collaborations with stakeholders.
	AWWA Potable Reuse & Biological Treatment Conference	Research community, utilities, industry	• Share new resources (e.g., the EPA Water Reuse Program team member shared information on the Water Reuse Program and WRAP implementation, including new publications and resources).

[14] The International Code Council (ICC), International Association of Plumbing and Mechanical Officials (IAMPO), and American Rainwater Catchment Systems Association (ARCSA)

	Engagement Event	Audience Engaged	Activities & Outcomes
	State convenings on water reuse (e.g., summits, webinars)	State regulators, federal agencies	• Form close relationships (e.g., between state agencies, and between state agencies and the EPA).
Ad hoc	2023 Innovative Permitting and Reuse Convening	Academia, state regulators, research community	• Published summary report. • Proposed actions for further development and support. • Created ongoing federal and state contacts list.
	2022 U.S. Delegation to Israel	Utilities, state agencies, federal agencies, Israeli water authorities	• Created delegation summary report and webinar on state perspectives. • Formed new collaborators for future actions.
	2022 TreWAG conference	Federal agencies, agricultural organizations, Israeli water authorities	• Published journal article on using treated wastewater for irrigation.
	Environmental Financial Advisory Board	State and local government officials, finance and business industries, federal employees, NGOs	• Approved charge and plan to undertake a study on the public benefit of a potential federal investment tax credit to support private investment in water reuse and recycling systems.

The EPA also publishes an annual WRAP update, which highlights the significant contributions from across the water sector to the field of water reuse. The annual release coincides with the WateReuse Symposium and is an opportunity to take stock of stakeholder priorities, identify outstanding needs and inform the direction of future activities. For example, at the 2023 Symposium, audience members provided feedback to Working Group members on priority research and investment needs. Top responses included:

- Brine management.
- Per- and polyfluoroalkyl substances (PFAS).
- Emerging contaminants.
- Risk assessment.
- Real-time monitoring.

As a direct result of this input, the EPA SBIR program incorporated zero liquid discharge and brine concentrate minimization as a topic within their 2023 solicitation for project funding. Other efforts are also underway to address these responses. For example, the EPA Water Reuse Program recently began development of a framework titled *State of the Science: Fit for Purpose Framework for Water Reuse Applications* (anticipated release in 2024). The expectation is that states will be able to use this framework to develop their own treatment targets to protect public health.

As of January 2024, the water sector, including federal agencies, has committed to 69 actions to advance water reuse. Many of these efforts are ongoing, but 20 have successfully concluded. Federal agencies are involved in approximately 90 percent of WRAP actions, including 16 of the 21 new actions that have been added to the WRAP since January 2022.

D. Foster water reuse as an important component of integrated water resources management. (Duty #2)

An integrated water resources management approach to reuse is one of the guiding principles outlined in the *National Water Reuse Action Plan: Collaborative Implementation* document: "Water reuse must not be considered in isolation or as a unique outcome; rather, it should be considered as one potential tool in the [integrated water resources management] framework 'toolbox,' and it is perhaps best accomplished at the watershed scale." Coordinated federal leadership through the Working Group helps support state and local water reuse by aligning efforts toward integrated water resources management (e.g., policy, technical assistance, funding). All WRAP actions are created with the understanding that water reuse should be implemented in the context of holistic water planning and management, and the first WRAP strategic theme, "Integrated Watershed Action," groups actions that specifically work toward achieving integrated water resources management.

Within the Working Group, members consider how their agency's work fosters integrated water resources management on a national scale. For example, Working Group members advance water reuse as a component of integrated water resources management through the following national initiatives, which have multiple water quality and quantity goals:

- **Encouraging the development of innovative, cost-competitive water technologies.** NAWI focuses on early-stage research on desalination and reuse-associated water treatment technologies to secure affordable and energy-efficient supplies for the United States from

nontraditional water sources (e.g., brackish groundwater, municipal wastewater, agricultural drainage, seawater). For example, NAWI awards funding to projects that advance energy-efficient, affordable water supplies, use non-traditional water sources and pilot desalination technologies, challenging applicants to prioritize water supply diversification. *(Action 4.6, led by DOE and NAWI)*

- **Permitting wastewater innovation.** Fully understanding the NPDES permitting processes and available practices can positively influence a water manager's motivation and ability to pursue water reuse and other innovative technologies and strategies. The EPA spearheaded an August 2023 convening of nearly 30 water sector experts, utility leaders and regulators, which created a foundation to support innovation and demonstrate how effective and collaborative permitting processes can encourage local integrated water resources management. *(Action 2.19, led by EPA, UC Berkeley and Stanford University)*

The Working Group also encourages action leaders to adopt an integrated water resources management lens and generate tools and resources to support (and address barriers to) water reuse implementation on a local scale. To house these resources, in spring 2023 the EPA launched a Water Reuse Resource Hub, organized by end-use, as a tool for communities seeking to initiate and implement water reuse. The Resource Hub contains state policies and regulations, webinars, publications, and other resources, many of which were created through WRAP actions. For example, the Resource Hub features several water reuse case studies, developed through Action 11.3, that help to demonstrate how reuse can be implemented within an integrated water resources management framework and guide communities seeking to pursue similar solutions:

- A Technology Development Challenge for Onsite Non-potable Reuse to Address Rural Alaska Water Needs: The Alaska Water and Sewer Challenge (Alaska).
- Increasing Regional Recycled Water Supplies by Diverting Stormwater and Urban Runoff to Municipal Wastewater Reclamation Plants During Dry Weather (California).
- The "Living Machine®" at Corkscrew Swamp Sanctuary: Treats Wastewater for Onsite Non-potable Reuse (Florida).
- City Reuses Treated Wastewater for Landscape Irrigation and Wetland Maintenance (Georgia).
- City Uses a Lagoon Treatment System to Reclaim Municipal Wastewater for Golf Course Irrigation (Kansas).
- Treating Municipal Wastewater from a Tribal Community for Landscape Irrigation and Wetland Restoration to Reduce Local Groundwater Demands (Minnesota).
- Brooklyn, New York Leverages New Development Project to Reduce Potable Demand and Improve Sewer Capacity (New York).
- Fairfax County Reuses Water for Landscaping and Industrial Cooling Water (Virginia).
- Microsoft Reuses Water, Helping Improve Local Groundwater Supply (Washington).

Additional WRAP actions that support community-scale integrated water resources management in pursuit of fostering collaboration and healthy watersheds include the following:

- **Enhancing cross-agency collaboration on water reuse.** This action team created a framework for considering the dynamics and value of interagency collaboration on water reuse projects. Enabling agencies and communities to work across programs and jurisdictions is critical to successful reuse projects. *(Action 2.16, led by Eric Rosenblum, EPA and WateReuse)*

- **Leveraging water partnerships to highlight the intersection of water reuse and equity.** This report, developed by the action team, relays lessons learned from two pilot projects and identifies barriers and opportunities for integrating water reuse and water equity into water resource management at the river system scale. With a systems-based approach to water conservation and management, economic, social and environmental welfare can be maximized equitably. *(Action 1.4, led by EPA)*

E. Undertake a study on a potential federal investment tax credit. (Directed in December 2022)

T*he Joint Explanatory Statement accompanying the 2023 Consolidated Appropriations Act directed the EPA to coordinate with the Working Group to "undertake a study on th*e public benefit of a potential federal investment tax credit to support private investment in water reuse and recycling systems."[15] The Working Group's interpretation of such a tax incentive focuses on encouraging investment in equipment at privately owned industrial facilities to enable the use of municipally provided recycled water and/or enable onsite treatment and reuse of water from different sources. For example, manufacturing facilities would receive a tax credit to purchase and operate equipment to use municipally provided recycled water for different processes and/or to treat and reuse process water within a facility for use in other processes rather than discharging wastewater into the environment or to a publicly owned treatment works.

In response to this directive, a charge was presented to the EPA's Environmental Finance Advisory Board (EFAB), which is comprised of experts from the public and private sectors. The charge requested a brief study to (1) evaluate the potential public benefit of an investment tax credit, and (2) evaluate the optimal tax incentive to encourage innovation. In October 2023, EFAB accepted this charge, and work has begun to assemble background information and begin the process of stakeholder engagement. This study will result in a brief report and is expected to be completed in calendar year 2024.

3. Continuing Federal Leadership to Advance Reuse

In the first two years of the Working Group's efforts, the EPA and participating federal agencies have begun to implement the six duties outlined by Congress through the development and coordination of actions and resources that help advance water reuse across the United States. The 60 WRAP actions with direct federal involvement outlined in **Appendix A** reflect specific commitments toward this goal. Notably, many of these activities are conducted in partnership with key stakeholders, including relevant industries, the research community and NGOs. **Appendix B** highlights some preliminary examples of progress by this unique collaborative of 157 organizations, while **Appendix C** features federal efforts through a compilation of Working Group member profiles summarizing each agency's water reuse roles and activities.

To maximize impact, the Working Group will continue to prioritize actions related to state regulatory and policy clarity, funding and infrastructure investments, scientific and technological research, public perception, and technical assistance support. In its leadership role, the EPA remains committed to

[15] Page 92 of the House Report on the Department of the Interior, Environment, and Related Agencies Appropriations Bill, 2023.

ensuring the delivery of meaningful products to help communities of all sizes pursue water reuse when in need of an alternative water supply.

The next report is anticipated for spring 2026. Interim progress on key actions and activities—as well as a growing suite of water reuse tools and resources—will continue to be shared through the EPA's website.

Appendix A: WRAP Actions with a Federal Leader or Partner

The following table presents all actions under the WRAP that federal agencies are supporting as of January 2024. The table is organized by WRAP strategic theme. In the Leader(s) and Partner(s) columns, references to federal agencies are shown in **bold**. Actions where two or more federal agencies collaborate are highlighted in green.

Action No. and Name	Leader(s)	Partner(s)
Action 1.1: Develop a Federal Policy Statement to Support and Encourage Consideration of Water Reuse in a Watershed-Scale Planning Context **[Complete]**	**U.S. Environmental Protection Agency**	**Federal agencies**
Action 1.4: Leverage EPA's Water Partnership Programs to Consider Water Reuse in the Context of Integrated Water Resources Management at the Watershed Scale	**U.S. Environmental Protection Agency**	American Clean Water Association; Association Metropolitan Water Agencies; National Estuary Programs; Urban Waters; **U.S. Environmental Protection Agency Regions**; member agencies of the **Urban Waters Federal Partnership**; **National Park Service**; River Network; Groundwork USA; water utilities in Urban Waters and/or National Estuary Program locations; Restore America's Estuaries; Coastal State Organization; National Association of Clean Water Agencies; WateReuse Association
Action 1.5: Develop Case Studies of Successful Low-Input Water Reuse Solutions to Meet Local Water Needs	Environmental Council of the States	**U.S. Environmental Protection Agency**
Action 1.6: Address Barriers to Water Reuse in Agriculture Through Improved Communication and Partnerships	**U.S. Environmental Protection Agency**; U.S. **Food and Drug Administration**; Pacific Institute; University of Arizona; **U.S. Department of Agriculture**	Volcani Institute; Water Research Foundation; U.S. **Environmental Protection Agency**
Action 2.1: Compile Existing State Policies and Approaches to Water Reuse	American Clean Water Association; Association of State Drinking Water Administration; **U.S. Environmental Protection Agency**; WateReuse Association	Association of State and Territorial Health Officials; Environmental Council of the States; Western States Water Council; Ground Water Protection Council
Action 2.2: Foster Ongoing State Collaboration on Water Reuse	American Clean Water Association; Association of State Drinking Water Administration; **U.S. Environmental Protection Agency**	Association of State and Territorial Health Officials; Environmental Council of the States; Ground Water Protection Council; WateReuse Association
Action 2.3: Complete the EPA Study of Oil and Gas Extraction Wastewater Management **[Complete]**	**U.S. Environmental Protection Agency**	None

Action No. and Name	Leader(s)	Partner(s)
Action 2.4: Enhance Wastewater Source Control Through Local Pretreatment Programs to Support Water Reuse Opportunities for Municipal Wastewater	National Association of Clean Water Agencies; Water Environment Federation	American Clean Water Association; Association of Metropolitan Water Agencies; American Water Works Association; National Water Research Institute; **U.S. Environmental Protection Agency**
Action 2.6: Develop Informational Materials to Address How CWA NPDES Permits Can Facilitate Water Reuse/Capture **[Complete]**	American Clean Water Association; **U.S. Environmental Protection Agency**	National Association of Clean Water Agencies; National Municipal Stormwater Alliance; WateReuse Association; Water Environment Federation
Action 2.7: Utilize Existing Multi-Agency Federal Working Groups to Serve as Forums for Coordinated Federal Engagement on Water Reuse	**U.S. Environmental Protection Agency**	**Water Reuse Working Group**; **U.S. Department of State Interagency Water Working Group**; **U.S. General Service Administration and U.S. Department of Energy Federal Energy Management Program—Interagency Sustainability Working Group**; **National Drought Resilience Partnership**; **U.S. Department of Agriculture**
Action 2.9: Align Policies and Communication Tools to Promote Best Management of Unused and Expired Pharmaceuticals to Support Water Reuse and Recycling **[Complete]**	Sanitation Districts of Los Angeles County	American Water Works Association; Association of Metropolitan Water Agencies; National Association of Clean Water Agencies; National Stewardship Action Council; **U.S. Environmental Protection Agency**; **U.S. Food and Drug Administration**; WateReuse Association
Action 2.12: Leverage Existing U.S. Department of Agriculture Programs to Encourage Consideration and Integration of Agricultural Water Reuse	**U.S. Department of Agriculture**	None
Action 2.14: Integrate Water Reuse and Water Security into FEMA Hazard Mitigation Programs	**Federal Emergency Management Agency**; **U.S. Environmental Protection Agency**	None
Action 2.15: Conduct Outreach and Training with Tribes to Build Water Reuse Capacity **[Complete]**	**U.S. Environmental Protection Agency**	**National Tribal Caucus (U.S. Environmental Protection Agency point of contact)**; **National Drought Resilience Partnership**; **National Tribal Water Council (U.S. Environmental Protection Agency point of contact)**; Regional Tribal Operations Committees
Action 2.16: Support Local and Regional Reuse Projects by Identifying Challenges, Opportunities and Models for Interagency Collaboration **[Complete]**	Eric Rosenblum; **U.S. Environmental Protection Agency**; WateReuse Association	Robert S. Raucher; Felicia Marcus; Shannon Spurlock; Regional and State Sections of WateReuse Association
Action 2.17: Propose U.S. Army Corps of Engineers Nationwide Permit Addressing Reuse **[Complete]**	**U.S. Army Corps of Engineers**	None
Action 2.18: Incorporate Water Quality and Onsite Reuse Research into Codes and Standards for Premise Plumbing	**U.S. Environmental Protection Agency**; National Blue Ribbon Commission for Onsite Non-potable Water Systems	International Association of Plumbing and Mechanical Officials; International Code Council; National Science Foundation International; **U.S. General Services Administration**

Action No. and Name	Leader(s)	Partner(s)
Action 2.19: Advance Strategies for Permitting Innovative Wastewater Management Practices and Water Reuse	**U.S. Environmental Protection Agency**; University of California Berkeley; Stanford University—Water in the West Program	American Clean Water Association, WateReuse Association, Johnson Foundation; Water Innovation Services
Action 3.1: Compile Existing Fit-for-Purpose Specifications	**U.S. Environmental Protection Agency**	American Clean Water Association; Association of Metropolitan Water Agencies; Association of State Drinking Water Administrators; Association of State and Territorial Health Officials; Colorado Department of Public Health and Environment; Water Research Foundation; WateReuse Association; Wyoming Department of Environmental Quality
Action 3.3: Convene Experts to Address Opportunities and Challenges Related to Urban Stormwater Capture and Use **[Complete]**	**U.S. Environmental Protection Agency**; Johnson Foundation; National Municipal Stormwater Alliance; Re-Inventing the Nation's Urban Water Infrastructure; WateReuse Association; Water Environment Federation	American Clean Water Association; Association of Metropolitan Water Agencies
Action 3.4: Develop Research and Tools to Support the Implementation of Onsite Non-potable Water Reuse Systems (ONWS)	National Blue Ribbon Commission for Onsite Non-potable Water Systems	California State Water Board; **U.S. Army Corps of Engineers**; **U.S. Environmental Protection Agency**; U.S. Water Alliance; Water Research Foundation; WateReuse Association
Action 3.5: Assess Specifications for Potential Reuse of Wastewater in Food Animal Protein Processing Facilities	**U.S. Environmental Protection Agency**	National Tyson Foods, Inc.; **U.S. Department of Agriculture**
Action 3.6: Viral Pathogen and Surrogate Approaches for Assessing Treatment Performance in Water Reuse	**U.S. Environmental Protection Agency**	None
Action 3.7: Develop Issue Papers on Emerging Public Health Topics in Water Reuse	**U.S. Environmental Protection Agency**; **U.S. Food and Drug Administration**	None
Action 4.3: Support Water Reuse Through the U.S. Department of Energy's Water Security Grand Challenge **[Complete]**	**U.S. Department of Energy**	**U.S. Environmental Protection Agency**; **U.S. Department of the Interior U.S. Geological Survey**; **U.S. Department of Agriculture**; **U.S. Department of Defense**; Electric Power Research Institute

Action No. and Name	Leader(s)	Partner(s)
Action 4.5: Evaluate and Promote Air-Cooling Condensate Water Reuse Standards, Methods, Tools and Technologies for Implementing Systems in Large Buildings	American Society of Heating, Refrigeration and Air-Conditioning Engineers; Design Aire; International Association of Plumbing and Mechanical Officials; **U.S. Environmental Protection Agency**; Water Works, Inc.; Water Tech Alliance	Austin Water Utilities; American Society of Landscape Architects; American Hospital Association and American Society of Healthcare Engineers Sustainability Program; Columbia Water Center; Ecolab; Association of Physical Health Administrators; Galaxy Consulting Engineers; GlaxoSmithKline; Global Center for Cleantech Innovation; International Code Council; International Society of Pharmaceutical Engineers; Isle Utilities, North America; Johnson Controls International; Los Angeles Department of Water and Power; Metropolitan Water District; National Blue Ribbon Commission for Onsite Non-potable Water Systems; Natural Systems Utilities; NeoTech Aqua; Public Health Alliance of Southern California; Rice University; San Antonio Water Systems; Smart Water Networks Forum; University of California Davis; University of California Merced; University of California San Diego; U.S. Green Building Council; Wahaso; Water Environment Federation; WateReuse Association; Xylem
Action 4.6: Implement and Manage the National Alliance for Water Innovation Energy-Water Desalination Hub **[Complete]**	**U.S. Department of Energy**; National Alliance for Water Innovation	**Oak Ridge National Laboratory**; **National Renewable Energy Laboratory**; industry partners; U.S. research universities
Action 4.7: Evaluate and Optimize Low-Input Treatment Methods to Remove Pharmaceutical Residues from Treated Wastewater Used for Irrigation	**U.S. Department of Agriculture**	Pennsylvania State University
Action 4.8: Develop an NSF Protocol for Deployable Greywater Reuse Systems in Military Operations	**Defense Centers for Public Health-Aberdeen**	National Science Foundation International
Action 4.9: Incorporate Water Reuse Technology Resources into the Searchable Clearinghouse of Wastewater Technology (SCOWT) Platform	**U.S. Environmental Protection Agency**	**U.S. Department of Energy**; WaterOperator.org; Northwest Biosolids; Water Environment Federation; Water Research Foundation; National Onsite Wastewater Association; Rural Community Assistance Partnership
Action 5.1: Foster U.S. Department of Agriculture Watershed-Scale Pilot Projects to Share Water Information to Support Water Reuse Actions	**U.S. Department of Agriculture**	None
Action 5.2: Identify Water Quality Monitoring Practices for Reuse Applications	Water Research Foundation	Southern California Coastal Water Research Project; California State Water Resources Control Board; **U.S. Environmental Protection Agency**
Action 5.4: Develop National Integrated Water Availability Assessments	**U.S. Geological Survey**	None

Action No. and Name	Leader(s)	Partner(s)
Action 5.5: Quantify the National Volumes of Water Potentially Available for Reuse for Municipal Wastewater and One Additional Source of Water	**U.S. Environmental Protection Agency**; Water Environment Federation; WateReuse Association	California State Water Resources Control Board
Action 5.6: Develop a Dashboard That Reflects Water Usage to Help Evaluate the Life Cycle Impacts of Materials	**U.S. Environmental Protection Agency**	**U.S. Geological Survey**
Action 5.7: Identify Opportunities to Implement Water Reuse within the Beverage Industry	GHD	**U.S. Environmental Protection Agency**; Beverage Industry Environmental Roundtable; Water Environment Federation Industrial Reuse Committee; **U.S. Food and Drug Administration**; WateReuse Association; San Francisco Public Utilities Commission; Trussell Technologies; Cambrian Innovation; PepsiCo, Inc.
Action 6.1: Compile Existing Federal Funding Sources for Water Reuse and Develop an Interagency Decision Support Tool **[Complete]**	**U.S. Environmental Protection Agency**	**U.S. Department of Agriculture**; **Federal Emergency Management Agency**; **U.S. Bureau of Reclamation**; **U.S. Department of Energy**; **U.S. Army Corps of Engineers**; **U.S. Department of Housing and Urban Development**; **U.S. Department of Transportation**
Action 6.2A: Clarify and Communicate the Eligibility of Water Reuse Under the Clean Water and Drinking Water State Revolving Fund Programs **[Complete]**	**U.S. Environmental Protection Agency**	Council of Infrastructure Financing Authorities; American Clean Water Association; Association of State Drinking Water Administration
Action 6.2B: Continue to Actively Support and Communicate the Eligibility of Water Infrastructure Finance and Innovation Act Funding for Water Reuse **[Complete]**	**U.S. Environmental Protection Agency**	None
Action 6.4: Compile and Promote Existing U.S. Department of Agriculture Funding and Resources for Rural Communities	**U.S. Department of Agriculture**	**U.S. Environmental Protection Agency**; National Rural Water Association; Rural Community Assistance Partnership
Action 6.5: Develop the Bureau of Reclamation's Large-Scale Water Recycling and Reuse Funding Opportunity	**U.S. Bureau of Reclamation**	None
Action 6.6: Study the Public Benefit of a Potential Water Reuse Tax Credit	**U.S. Environmental Protection Agency**; Denver Water	**Environmental Financial Advisory Board**
Action 7.2: Develop a Coordinated National Research Strategy on Water Reuse	Water Research Foundation	**U.S. Environmental Protection Agency**; WateReuse Association; Water Environment Federation
Action 7.4: Increase Understanding of Current Aquifer Storage and Recovery Practices	Ground Water Protection Council; **U.S. Environmental Protection Agency**	**U.S. Department of Agriculture**; National Ground Water Association
Action 7.5: Coordinate and Promote Water Reuse Technology in Federal Small Business Innovation Research Programs **[Complete]**	**U.S. Environmental Protection Agency**	**Federal Small Business Innovation Research programs**
Action 7.6: Develop the Bureau of Reclamation's Advanced Water Treatment Research Roadmap	**U.S. Bureau of Reclamation**	**Federal Water Treatment Interagency Working Group**
Action 7.7: Life Cycle Analysis to Support Cost-Effective Enhanced Aquifer Recharge	**U.S. Environmental Protection Agency**	None

Action No. and Name	Leader(s)	Partner(s)
Action 7.8: Enhanced Aquifer Recharge Performance and Potential Risk in Different Regional and Hydrogeological Settings Research Grant	**U.S. Environmental Protection Agency**	None
Action 7.9: Evaluate Antimicrobial Resistance in Wastewater and Sewage Sludge and Its Impact on Surface Waters: Research Grant	**U.S. Environmental Protection Agency**	None
Action 7.10: Implement the DoD-Funded Water Reuse Consortium for Water Resiliency at Military and Municipal Facilities	**U.S. Army Corps of Engineers**; The Water Reuse Consortium	University of Arizona; University of Nevada, Reno; University of Southern California
Action 8.5: Engagement with Disadvantaged and Rural Communities on Water Reuse	**U.S. Environmental Protection Agency**	**U.S. Department of Agriculture**; National Rural Water Association; American Water Works Association
Action 8.6: Develop Public Health and Resiliency-Focused Communication Tools for Water Reuse	**U.S. Environmental Protection Agency**; **U.S. Centers for Disease Control and Prevention**	**U.S. Food and Drug Administration**; Valley Water
Action 8.7: Highlight Water Reuse Opportunities in the National Pretreatment Program Framework	**U.S. Environmental Protection Agency**	WateReuse Association
Action 8.8: Engage the Medical Community to Inform the Public About the Risks and Benefits of Water Reuse	Santa Clara County Medical Association; Valley Water; Eric Rosenblum; WateReuse Association; **U.S. Environmental Protection Agency**	El Paso Water Utilities; Hillsborough County Public Utilities
Action 9.2: Support and Promote Opportunities for Creating a Skilled Workforce for Water Reuse Applications	American Water Works Association; **U.S. Environmental Protection Agency**; WateReuse Association; Water Environment Federation	None
Action 10.3: Facilitate Implementation of the National Water Reuse Action Plan	**U.S. Environmental Protection Agency**	**All WRAP action leaders**
Action 11.1: Facilitate U.S.-Israel Collaboration on Technology, Science and Policy of Water Reuse **[Complete]**	**U.S. Environmental Protection Agency**; Israeli Ministry for Environmental Protection	**U.S. Department of State**; **U.S. Department of Agriculture**; **U.S. Food and Drug Administration;** Embassy of Israel; Israel Water Authority; WateReuse Association
Action 11.2: Raise Global Awareness and Preparedness for Water Reuse and the Water Reuse Action Plan **[Complete]**	**U.S. Department of State**	**U.S. Department of the Interior**; **U.S. Agency for International Development**; **U.S. Department of Agriculture**; **Department of Commerce**; **U.S. Environmental Protection Agency**; **U.S. Geological Survey**; **U.S. Bureau of Reclamation**; **U.S. Department of Energy**; U.S. Water Partnership; Water Environment Federation; WateReuse Association
Action 11.3: Develop and Highlight Case Studies Relevant to the Water in Circular Economy and Resilience (WICER) Framework **[Complete]**	**U.S. Environmental Protection Agency**; the World Bank	American Water Works Association; CDM Smith; GHD; International Water Management Institute; Jacobs; Stantec; **U.S. Department of State**; Xylem

Action No. and Name	Leader(s)	Partner(s)
Action 11.4: Support Multi-Stakeholder Alignment to Advance Reuse Along the U.S.–Mexico Border	Comisión Nacional del Agua; **U.S. Environmental Protection Agency**	**U.S. International Boundary and Water Commission**; **U.S. Bureau of Reclamation**; **U.S. Department of State**; Comisión Estatal de Servicios Públicos de Tijuana; Comisión Internacional de Limites y Aguas; Secretario para el Manejo, Saneamiento y Protección del Agua; Secretaría de Relaciones Exteriores; North American Development Bank
Number of actions in which multiple agencies collaborate	**28**	

Appendix B: Working Group and Other Federal Accomplishments—2020 to Present

This section highlights some of the example products that resulted from WRAP and Working Group member partnerships. The products are categorized by five areas of impact. Note that certain products are listed in multiple areas of impact.

Improve Regulatory and Policy Clarity to Enable Reuse

These actions provide clarity on permitting, codes, standards, and state or federal policies and regulations to inform water reuse best practices and facilitate broader implementation of reuse projects.

- ☑ **September 2023**—The EPA and Israel sign MOU on environment and climate cooperation, including reuse. *(Action 11.1, led by EPA, MoEP and MoEI)*
- ☑ **August 2023**—GSA seeks proposals for updating design standards for facilities (P100) to include onsite non-potable water systems. *(Action 2.18, led by EPA and NBRC in collaboration with GSA, IAPMO, ICC, NSF International and ARCSA)*
- ☑ **August 2023**—EPA workshop on innovation and permitting. *(Action 2.19, led by EPA, UC Berkeley and Stanford University)*
- ☑ **May 2023**—Blog post: A Decade of Unraveling the Effects of Regulation on Water Innovation. *(Action 2.19, led by EPA, UC Berkeley and Stanford University)*
- ☑ **March 2023**—Summary report: *From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach. (Action 11.1, product led by EPA)*
- ☑ **January 2023**—Webinar: Water Recycling in Israel: U.S. Lessons from Israel's Water Reuse Approach. *(Action 11.1, product led by EPA)*
- ☑ **November 2022**—U.S. delegation mission to Israel. *(Action 11.1, led by EPA, MoEP and MoEI)*
- ☑ **September 2022**—Webinar: Public demonstration of the REUSExplorer tool. *(Action 3.1, led by EPA)*
- ☑ **March 2022**—Collaboration and report on NPDES permitting processes. *(Actions 2.6, 2.16 and 3.3, led by EPA in collaboration with multiple partners)*
- ☑ **March 2022**—Expert convening and report on stormwater capture and use. *(Action 3.3, led by EPA, NMSA, WateReuse, WEF, ReNUWIt and the Johnson Foundation)*
- ☑ **March 2022**—Report: *Navigating the NPDES Permitting Process for Water Reuse Projects. (Action 2.6, led by EPA in collaboration with the action team)*
- ☑ **January 2022**—USACE publishes Nationwide Permit 59 for construction of water reclamation facilities. *(Action 2.17, led by USACE)*
- ☑ **May 2021**—Virtual tour on water reuse with the government of Israel. *(Action 11.1, led by MoEP, MoEI and EPA in collaboration with seven partners)*
- ☑ **April 2021**—Compendium of Urban Waters and National Estuary Program water reuse activities. *(Action 1.4, led by EPA)*
- ☑ **April 2021**—Document: *Integrating Water Reuse into the Clean Water State Revolving Fund. (Action 6.2A, led by EPA)*
- ☑ **February 2020**—Federal policy statement on water reuse. *(Action 1.1, led by EPA in collaboration with federal agencies)*

Improve Public Perception of Water Reuse

These actions help support stakeholders during the development of reuse projects by improving their communication with the general public. Effective communication should be tailored and disseminated to different stakeholder groups to increase alignment and integration within communities.

- ☑ **October 2022**—Conference: Understanding and Mitigating Effects of Treated Wastewater Reuse in Agriculture. *(Action 1.6, led by Pacific Institute, EPA, FDA, University of Arizona, USDA and Volcani Institute)*
- ☑ **June 2022**—Special issue of *The Bulletin* magazine: Water & Health: The Coming Water Crisis and What We Can Do About It. *(Action 8.6, product led by Valley Water, EPA, SCCMA and Envirospectives)*
- ☑ **May 2022**—Fact sheets on the EPA prohibition on the sewering of hazardous waste pharmaceuticals. *(Action 2.9, product led by EPA in collaboration with action team)*
- ☑ **March 2022**—Report: *Multi-Agency Water Reuse Programs: Lessons for Successful Collaboration. (Action 2.16, led by EPA, Envirospectives and WateReuse in collaboration with four partners)*

Advance Scientific and Technological Research on Reuse

These actions support the development of sound science and research initiatives that can lower the costs, energy use and material use of water treatment technologies employed for reuse. Individual agencies within the Working Group have created new funding opportunities for water reuse research.

- ☑ **September 2023**—TreWAG research article: Mitigating Risks and Maximizing Sustainability of Treated Wastewater Reuse for Irrigation. *(Action 1.6, led by University of Arizona, USDA, EPA, FDA and Volcani Institute)*
- ☑ **August 2023**—DOE announces $27.8 million for 10 projects to reduce both direct and indirect greenhouse gas emissions from water resource recovery facilities. *(Action 4.6, led by DOE in partnership with NAWI)*
- ☑ **July 2023**—EPA Water Reuse Program publishes International Desalination Association Journal. *(led by EPA)*
- ☑ **June 2023**—Journal article: Onsite Nonpotable Water Systems Pathogen Treatment Targets: A Comparison of Infection and Disability-Adjusted Life Years (DALYs) Risk Benchmark Approaches. *(Action 3.4, product led by EPA)*
- ☑ **June 2023**—USACE funds academic consortium to advance water reuse. *(Action 7.10, led by USACE and the Water Reuse Consortium)*
- ☑ **June 2023**—Reuse topic of zero liquid discharge and brine concentrate minimization is included in SBIR solicitation. *(Action 7.5, led by EPA)*
- ☑ **May 2023**—NAWI successfully conducts its second peer review, receiving high marks in all categories. *(Action 4.6, led by DOE in partnership with NAWI)*
- ☑ **May 2023**—EPA opens $9.5 million National Priorities Grant on antimicrobial resistance in wastewater and sewage sludge. *(Action 7.9, led by EPA)*
- ☑ **February 2023**—White paper: *Water Recycling for Climate Resilience Through Enhanced Aquifer Recharge and Aquifer Storage and Recovery. (Action 7.4, product led by EPA)*
- ☑ **October 2022**—Report: *Cotton Gin Waste and Walnut Shells Derived Biochar for the Removal of Pharmaceuticals and Humic Acids from Aqueous Solutions. (Action 4.7, product led by USDA and Penn State)*

- ☑ **September 2022**—$6.5 million in grant funding to support EPA's National Water Program for Innovation, Water Infrastructure and Water Reuse. *(Action 10.3, led by EPA)*
- ☑ **September 2022**—$2 million in STAR-grant funding to support cost-effective enhanced aquifer recharge. *(Action 7.7, led by EPA)*
- ☑ **August 2022**—DOE Water and Wastewater Research, Design and Development Workshop Series Report. *(Led by DOE)*
- ☑ **June 2022**—DOE and NAWI awards to accelerate energy-efficient water treatment technology development. *(Action 4.6, led by DOE in partnership with NAWI)*
- ☑ **June 2022**—DOE peer review of the NAWI Energy-Water Desalination Hub. *(Action 4.6, led by DOE in partnership with NAWI)*
- ☑ **January 2022**—Launch of the Regulations and End-Use Specifications Explorer (REUSExplorer). *(Action 3.1, led by EPA in collaboration with seven partners)*
- ☑ **December 2021**—$3 million to small businesses to develop water technologies, including reuse technologies, under SBIR program. *(Action 7.5, led by EPA)*
- ☑ **October 2021**—$6 million in STAR-grant funding for reuse research on viral indicators and pathogens. *(Action 3.6, led by EPA)*
- ☑ **July 2021**—Report: *Enhanced Aquifer Recharge of Stormwater in the United States: State of the Science Review. (Action 7.4, product led by EPA)*
- ☑ **June 2021**—Future of Water Infrastructure and Innovation Summit and report. *(Action 4.3, led by DOE in collaboration with five partners)*
- ☑ **February 2021**—Non-potable Environmental and Economic Water Reuse (NEWR) Calculator. *(Action 3.4, product led by EPA in partnership with NBRC for ONWS)*

Provide and Highlight Infrastructure Funding to Enable Communities of All Sizes to Pursue Reuse

These actions create funding tools that support and incentivize water reuse. Multiple existing federal programs are available to support community and state efforts that meet cross-cutting policy goals, including reuse.

- ☑ **October 2023**—FEMA announces $1.8 billion in funding for the BRIC and Flood Mitigation Assistance (FMA) grant programs. *(Action 2.14, led by FEMA and EPA)*
- ☑ **September 2023**—DOI launches $180 million for large-scale water recycling projects. *(Action 6.5, led by Reclamation)*
- ☑ **August 2023**—FEMA announces $200 million in funding for six projects that will employ aquifer recharge and reuse. *(Action 2.14, led by FEMA and EPA)*
- ☑ **February 2023**—$25 million in funding available for WaterSMART investments. *(Action 2.12, led by USDA)*
- ☑ **August 2022**—Fact sheet on funding drought resiliency projects with the Clean Water State Revolving Fund. *(Action 6.2A, led by EPA)*
- ☑ **July 2022**—Brochure on agricultural water reuse technology supported by NRCS. *(Action 2.12, led by USDA)*
- ☑ **July 2022**—Compilation of water reuse infrastructure funding programs. *(Action 6.1, led by EPA, USDA, FEMA, Reclamation, DOE, USACE, HUD and DOT)*
- ☑ **May 2022**—Launch of webinar series to inform borrowers about hazard mitigation tools, which include water reuse. *(Action 2.14, led by EPA and FEMA)*
- ☑ **December 2021**—$2.4 million in Conservation Innovation Grants. *(Action 5.1, led by USDA)*

Provide Reuse Technical Support/Information

These actions help communities better understand how to implement reuse projects that best fit their needs. The success of a reuse project depends on engaging stakeholders across community types to identify their interests and priorities, provide targeted training support, and promote collaboration within programs to support local priorities.

- ☑ **August 2023**—Publication of five water reuse case studies within the Water Reuse Resource Hub by End-Use Application. *(Action 11.3, products led by EPA, the World Bank, Jacobs and Stantec)*
- ☑ **July 2023**—Report: *Lessons for Optimizing the Adoption of Water Reuse in Underserved Communities. (Action 8.5, led by EPA and Ochotona LLC)*
- ☑ **March 2023**—Launch of the Water Reuse Resource Hub by End-Use Application. *(Led by EPA)*
- ☑ **March 2023**—Publication of two infographics covering reuse at the building and community scales. *(Action 3.3, product led by EPA)*
- ☑ **April 2022**—Report: *Promoting Equitable Water Supply Management Through Integrated Planning and Partnerships*. *(Action 1.4, led by EPA)*
- ☑ **March 2022**—Report: *Pure Potential: The Case for Stormwater Capture and Use. (Action 3.3, led by EPA in collaboration with the action team)*
- ☑ **March 2022**—Compilation of water reuse and advanced water treatment training resources. *(Action 9.2, led by EPA and AWWA)*
- ☑ **December 2021**—NAWI annual meeting to discuss the NAWI Master Roadmap and the water-agricultural nexus. *(Action 4.6, led by DOE in partnership with NAWI)*
- ☑ **November 2021**—Webinar: Improving Permitting Processes to Support New Water Management Technologies and Strategies. *(Actions 2.6, 2.16 and 3.3, led by EPA and three partners)*
- ☑ **November 2021**—Small and underserved communities' outreach and listening sessions and training. *(Action 8.5, led by EPA)*
- ☑ **September 2021**—Webinar series: Stormwater Capture and Use. *(Action 3.3, product led by EPA, NMSA, WateReuse, WEF and ReNUWIt)*

Appendix C: Federal Partner Profiles

This appendix compiles profiles from the 15 federal partners in the Water Reuse Interagency Working Group. Each profile describes actions the agency has taken to advance water reuse, as well as opportunities the agency has to champion reuse within its mission area. The descriptions below are intended to be high level and illustrative, not comprehensive or representative of each agency's entire portfolio that may be applicable to water reuse or nexus opportunities. The following federal partner profiles are included in this appendix:

- Centers for Disease Control and Prevention.
- Executive Office of the President.[16]
- Federal Emergency Management Agency.
- General Services Administration.
- U.S. Agency for International Development.
- U.S. Bureau of Reclamation.
- U.S. Department of Agriculture.
- U.S. Department of Defense.
- U.S. Department of Defense—U.S. Army Corps of Engineers.
- U.S. Department of Energy.
- U.S. Department of State.
- U.S. Environmental Protection Agency.
- U.S. Food and Drug Administration.
- U.S. Geological Survey.

[16] CEQ and OMB profiles are presented jointly under the Executive Office of the President.

Water Reuse Federal Partner Profile

U.S. Centers for Disease Control and Prevention (CDC)

Atlanta, Georgia

Agency Mission

The CDC serves as the national focus for developing and applying disease prevention and control, environmental health and health promotion and education activities designed to improve the health of the people of the United States. With respect to achieving clean and safe water, the CDC strives to protect people's health from environmental hazards that can be present in the water we drink and use in diverse ways to sustain health, productivity and well-being.

Context and Applicability to Water Reuse

The CDC strives to protect public health through nonregulatory actions that decrease environmental threats to water systems and may directly and indirectly influence water reuse. Nonregulatory actions the CDC has undertaken to protect public health from waterborne diseases and outbreaks in all types of water, including reused water, include:

- Conducting applied scientific research for risk assessment.
  - National Center for Environmental Health (NCEH) Safe Water Program.
  - Waterborne Disease Prevention Branch (WDPB).
- Developing better laboratory detection and sampling methods.
- Investigating the causes and sources of waterborne disease and outbreaks.
- Tracking waterborne diseases nationally.
- Developing partnerships with state, local and Tribal public health organizations.
- Providing technical assistance and funding to state, local, territorial and Tribal public health organizations.
- Promoting safe water use guidance through public communication and education.

Explicit Roles and Actions in Water Reuse

Science and Research of Contaminants of Emerging Concern

- The CDC develops reports, recommendations and other studies as a part of its efforts to investigate and prevent waterborne disease outbreaks that may impact surface waters and drinking waters, including those where the source water is reused. Examples include:
  - An A–Z Index of water-related health topics and data.
  - Publications and surveillance reports on emerging infectious diseases and outbreak surveillance. For example:
    - Lead in Drinking Water website.
    - *Estimating Waterborne Infectious Disease Burden by Exposure Route*.
    - *2015 Waterborne Disease Outbreaks Annual Surveillance Report*.

- The CDC's National Environmental Public Health Tracking Network provides public access to climate change, community design, drought, drinking water, populations and vulnerabilities, and toxic substance release data.
- The CDC is developing improved laboratory methods for sampling, testing and monitoring water quality through WDPB's Environmental Microbiology and Engineering Laboratory. The CDC NCEH Environmental Health Laboratory conducts laboratory testing of clinical specimens to enable detection, diagnosis, treatment and prevention of diseases resulting from exposure to environmental chemicals and toxins.

Building National Surveillance Capacity

- The CDC operates the National Outbreak Reporting System and national Waterborne Disease and Outbreak Surveillance System, which collect data on waterborne diseases and outbreaks in the United States. These efforts provide important information on how germs, harmful chemicals or toxins spread, as well as which types of water are linked to people getting sick.

Collaboration and Partnerships

- The CDC works with the EPA and other federal and non-governmental partners (e.g., AWWA) to provide guidance on water-related best practices, policies and research priorities.
- The CDC provides water-related support to state health departments and works with national partners (e.g., ASTHO, the Council of State and Territorial Epidemiologists, the National Association of County and City Health Officials) that represent state and local partners on water-related issues.
- The CDC's Safe Water Program and WDPB support state, local and Tribal public health organizations in planning, implementing and evaluating programs promoting water safety. For example:
    - During a harmful algal bloom in Lake Erie, the CDC provided health officials from Toledo, Ohio, with tools and educational materials to support their response to harmful algal blooms and protect nearly 500,000 citizens.
    - The CDC has worked with Iowa's Cerro Gordo County Department of Public Health to protect the health of residents who may have been exposed to arsenic in private well water.
- The CDC's Safe Water for Community Health cooperative agreement funds local health departments to identify and close environmental health service gaps in their programs.

Risk Communication and Information Dissemination

- The CDC develops and improves access to water-related health and disease prevention information through the development of the content and resources found on the Healthy Water website.
- The CDC promotes national drinking water–related observances, celebrations and awareness days to educate the public about water-related issues.
- The CDC assists health departments responding to natural disasters and other emergencies that disrupt water service and create environmental hazards and infectious disease risks.
- The CDC assists health departments investigating water-related disease outbreaks and exposures to water-related contaminants.
- The CDC has developed a Drinking Water Advisory Communication Toolbox, which provides information on how to plan for, develop, implement and evaluate communication activities with the public and stakeholders during drinking water notifications and advisories. The toolbox complements the EPA's Revised Public Notification Handbook.

Examples of Partners and Stakeholders

- State, local, territorial and Tribal health departments.
- Council of State and Territorial Epidemiologists.
- National Environmental Health Association.
- National Network of Public Health Institutes.
- Association of Public Health Laboratories.
- ASTHO.
- National Association of County and City Health Officials.
- The EPA.
- AWWA.
- ASDWA.

WRAP Action Leadership

- Action 8.6: Develop Public Health and Resiliency-Focused Communication Tools for Water Reuse.

Water Reuse Federal Partner Profile

Executive Office of the President (EOP)

Washington, D.C.

Agency Mission

Both the OMB and the CEQ work within the EOP.

OMB

The OMB oversees the implementation of the President's vision across the Executive Branch. The OMB carries out its mission through five main functions across executive departments and agencies:

- Budget development and execution.
- Management, including oversight of agency performance, procurement, financial management and information technology.
- Coordination and review of all significant federal regulations from executive agencies, privacy policy, and information policy, and review and assessment of information collection requests.
- Clearance and coordination of legislative and other materials, including agency testimony, legislative proposals and other communications with Congress, and coordination of other Presidential actions.
- Clearance of Presidential executive orders (EOs) and memoranda to agency heads prior to their issuance.

CEQ

The CEQ coordinates the federal government's efforts to improve, preserve and protect America's public health and environment. Within the CEQ, the Office of the Federal Chief Sustainability Officer leads development of policies, programs and partnerships to advance sustainability and climate-resilient federal operations, including implementing EO 14057, "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability" and President Biden's Federal Sustainability Plan.

Context and Applicability to Water Reuse

The OMB, in coordination with other agencies, supports federal efforts to incorporate water reuse in the following areas:

- Agency budget oversight and execution related to water reuse funding opportunities, research and agency implementation activities.
- Review and clearance of WRAP actions, reports to Congress, policy statements and more.
- Incorporation of water reuse into policy documents, as appropriate.
- Identification of opportunities for agency collaboration.

The CEQ coordinates with the OMB to implement EO 14057, which established a goal for agencies to increase water efficiency in their operations and set 2030 targets for water use efficiency as well as annual progress targets. The chair of the CEQ, in coordination with the director of the OMB, is responsible for assessing progress on agency sustainability plans, goals and targets. The CEQ also oversees implementation of the National Environmental Policy Act for infrastructure projects and federal actions.

Explicit Roles and Actions in Water Reuse

The OMB conducts review and clearance of WRAP publications and activities involving multiple agencies, including the following:

- WRAP Annual Updates.
- New WRAP actions.
- Water Reuse Interagency Working Group reports to Congress.

The CEQ coordinates activities related to EOP initiatives involving water reuse (e.g., EO 14057).

Examples of Partners and Stakeholders

Federal partners, including the EPA, DOI, and other agencies and departments.

Water Reuse Federal Partner Profile

Federal Emergency Management Agency (FEMA)

Washington, D.C.

Agency Mission

FEMA's mission is helping people before, during and after disasters. FEMA's 20,000 employees form a team of dedicated emergency management leaders. These leaders work collaboratively to share experiences and resources, building the FEMA that the nation needs and deserves. FEMA draws upon the strengths and expertise of various stakeholders—Tribal nations, territories, individuals, communities, the private sector and nonprofit organizations—to guide how the agency accomplishes its mission. "Whether it is before a flood, amid hurricane season, or after a wildfire damages a community, FEMA is committed to helping people" impacted by disasters (2022–2026 FEMA Strategic Plan).

Context and Applicability to Water Reuse

Water reuse is one of several tools that various federal funding programs, established to help address hazards such as drought and flooding, could support. FEMA has several grant programs that can support mitigation in communities. Mitigation activities can address water reuse if the project is mitigating the risk of natural hazard events. Projects solely focused on water quality are not eligible for Hazard Mitigation Assistance (HMA) programs.

Explicit Roles and Actions in Water Reuse

Hazard Mitigation for Flooding and Drought

- Mitigation for flood and drought can involve the capture of water for reuse. Examples include Aquifer Storage and Recovery (ASR) projects, where floodwater can be captured and used to recharge groundwater aquifers, and nature-based solutions that allow for water capture (e.g., rainwater harvesting). FEMA's Nature-Based Solutions website has links to guides and other resources.
- FEMA provides grant funding to assist jurisdictions with planning for mitigation and implementing projects to mitigate hazard risk, including water reuse projects for mitigation of flooding and drought risk. For example:
  - FEMA's BRIC program supports states, local communities, Tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. FEMA announced the availability of $1 billion in BRIC funding in the fiscal year 2023 Notices of Funding Opportunities.
  - FEMA's FMA grant program is a competitive program that provides funding to states, local communities, federally recognized Tribes and territories for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program. Eligibility of mitigation projects is addressed in FEMA's *Hazard Mitigation Assistance Program and Policy Guide*. FEMA announced the availability of $800 million in FMA funding in the fiscal year 2023 Notices of Funding Opportunities.
  - FEMA's HMGP provides funding to state, local, Tribal and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces or mitigates future disaster losses in their communities.

  - FEMA's Safeguarding Tomorrow Revolving Loan Fund program is authorized under Section 205 to provide capitalization grants to states, eligible federally recognized Tribes, territories and the District of Columbia to establish revolving loan funds that provide hazard mitigation assistance for local governments to reduce risks from natural hazards and disasters.
- Jurisdictions can identify priorities for water reuse in Hazard Mitigation Plans, including mitigation strategies that will address those priorities. For instance, a community that is wildfire and drought prone may identify that it needs to capture water for recharging aquifers and suppressing fires. Hazard Mitigation Plans must be approved by FEMA to be eligible for HMA grant programs.

Examples of Partners and Stakeholders

- Eligible applicants and sub-applicants, including states, federally recognized Tribes, territories and local governments.
- Interagency and non-federal partner organizations that play a role in hazard mitigation and resilience.

WRAP Action Leadership

- Action 2.14: Integrate Water Reuse and Water Security into FEMA Hazard Mitigation Programs.

Water Reuse Federal Partner Profile

U.S. General Services Administration (GSA)

Washington, D.C.

Agency Mission

The GSA delivers the best customer experience and value in real estate, acquisition and technology services to the government and the American people. The GSA's business line, the Public Buildings Service, provides workplaces for federal employees by constructing, managing and preserving government buildings and leasing and managing commercial real estate.

Context and Applicability to Water Reuse

The GSA's purview includes sustainable building design, construction, retrofit, operations, maintenance and water reuse implementation. One of the agency's strategic goals is to "establish and implement cross-cutting solutions that mitigate climate risks by increasing building resilience, reducing overall greenhouse gas emissions, [and] improving energy, water, and waste efficiency" (GSA 2022–2026 Strategic Plan). Water usage in commercial buildings accounts for nearly 10 percent of all water used in the United States. With almost 9,000 assets under management, the GSA has the potential to achieve wide-ranging impacts across the federal government through initiatives that employ water reuse as a response to reducing water consumption and wastewater production.

Explicit Roles and Actions in Water Reuse

Design and Construction Requirements

- The GSA publication *Facilities Standards for the Public Buildings Service* (P100) establishes mandatory design standards and performance for federally owned buildings under the jurisdiction, custody and control of the GSA and lease construction that the government intends to own or has an option to purchase. For example, calculations for the water-use baseline must include water conservation and reuse methods, and the basis of design must describe how water savings or reuse measures offset the water baseline.
- As part of WRAP Action 2.18 (Incorporate Water Quality and Onsite Reuse Research into Codes and Standards for Premise Plumbing), the EPA, the National Blue Ribbon Commission for Onsite Non-potable Water Systems, and the GSA are collaborating to update P100 to better identify water performance standards, including water net-zero.

Risk Reduction and Building Resilience

- The GSA's *Climate Change Risk Management Plan* identifies top climate-related vulnerabilities, like actual disruptions in water service due to severe drought and water shortages. These disruptions affect water access at water and wastewater utilities and other facilities and may be especially disruptive for remote sites like land ports of entry.
- The GSA's Net Zero Energy Building webpage includes examples and reference materials on achieving significant reductions in greenhouse gas emissions related to resource use, including through a net zero water approach that balances water demand with water availability.

Examples of Partners and Stakeholders

- Executive offices, White House CEQ and OMB, federal agencies such as EPA (regulators) and DOE, and DOE's Federal Energy Management Program.
- Municipal governments, because they manage potable and wastewater treatment plants.
- Neighboring properties and community members who benefit from improved watersheds and waterways and reduced strain on aquifers.

WRAP Action Leadership

- Action 2.7: Utilize Existing Multi-Agency Federal Working Groups to Serve as Forums for Coordinated Federal Engagement on Water Reuse.
- Action 2.18: Incorporate Water Quality and Onsite Reuse Research into Codes and Standards for Premise Plumbing.

Water Reuse Federal Partner Profile

U.S. Agency for International Development (USAID)

Washington, D.C.

Agency Mission

USAID promotes and demonstrates democratic values abroad, and advances a free, peaceful and prosperous world. In support of America's foreign policy, USAID leads the U.S. government's international development and disaster assistance through partnerships and investments that save lives, reduce poverty, strengthen democratic governance, and help people emerge from humanitarian crises and progress beyond assistance.

USAID's objective is to support partners so that they become self-reliant and capable of leading their own development journeys. USAID helps reduce the reach of conflict, prevent the spread of pandemic disease, and counteract the drivers of violence, instability, transnational crime and other security threats. USAID promotes American prosperity through investments that expand markets for U.S. exports; creates a level playing field for U.S. businesses; and supports more stable, resilient and democratic societies. When disaster strikes or crisis emerges, USAID stands with people as the world leader in humanitarian assistance.

Context and Applicability to Water Reuse

In conjunction with the U.S. Department of State, USAID is tasked with implementing the 2022 U.S. Global Water Strategy. Water reuse is included as part of Strategic Objective 3: Improve Climate Resilient Conservation and Management of Freshwater Resources and of Associated Ecosystems. The U.S Global Water Strategy specifies that USAID promote practices and innovations that improve water reuse to allocate and manage water resources more efficiently.

Explicit Roles and Actions in Water Reuse

- Through the Water Reuse & Environmental Conservation Project, USAID worked with Jordan's government to protect and conserve scarce resources from 2011 to 2015. This project helped communities generate income through water reuse and increased public awareness on the benefits of water reuse.
- USAID collaborated with EPA to develop the 2012 *Guidelines for Water Reuse*. The guidelines serve as a reference for water reuse practices, facilitating water reuse development and implementation.
- As a WRAP Action 11.2 partner, USAID compiled a list of programs that include water reuse in 2020.

Examples of Partners and Stakeholders

- Federal agencies, such as the DOS and EPA.
- International governments and communities that receive assistance from USAID.

Water Reuse Partner Profile

U.S. Bureau of Reclamation

Washington, D.C./Denver, Colorado

Agency Mission

The mission of the Bureau of Reclamation is to manage, develop and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Context and Applicability to Water Reuse

Reclamation provides grant funding and technical expertise for water reuse research and project development and implementation.

Explicit Roles and Actions in Water Reuse

Desalination and Water Purification Research Program

The Desalination and Water Purification Research (DWPR) Program is authorized under the Water Desalination Act of 1996 (P.L. 104-298), amended in 2016 by the Water Infrastructure Improvements for the Nation (WIIN) Act. The program provides financial assistance for research and development projects in desalination and water treatment that lead to improved technologies for converting unusable water sources into useable supplies. Water sources include, but are not limited to, sea water, brackish groundwater, municipal wastewater, and produced waters from oil and gas activities.

The DWPR Program announced two competitive funding opportunities in fiscal year 2023. The first invited research projects at the laboratory and pilot scale. The second invited proposals to pilot projects testing innovative and disruptive technologies that are poised for commercialization; it featured an application process streamlined for small businesses and entrepreneurs. Both funding opportunities seek solutions that address water reuse objectives identified by the National Research Council's 2012 report *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater*.

WaterSMART Title XVI Water Reclamation and Reuse Program

Through the Title XVI Program, Reclamation provides funding for planning, design and construction of water reclamation and reuse projects in partnership with local entities in the West. Title XVI projects reclaim and reuse municipal, industrial, domestic and agricultural wastewater and impaired ground and surface water. The Title XVI Program provides funding on a year-by-year basis through a competitive selection process, with a maximum federal cost share of 25 percent of total project costs, up to $30 million, unless Congress specifies otherwise.

Fiscal year 2023/2024 funding opportunities include the planning, design or construction of Title XVI congressionally authorized projects and Title XVI WIIN Act projects, where a total of $239 million is available. Reclamation also announced $180 million for large-scale water recycling projects and a funding opportunity for WIIN Act desalination projects.

WaterSMART Drought Response Program

In 2015, Reclamation reformulated its existing drought program to improve the program's capacity to help stakeholders build resilience to drought in advance of a crisis. Through the Drought Response Program, Reclamation partners with states, Tribes and local governments for drought contingency planning and

actions that build long-term resiliency to drought—including projects that increase flexibility for water managers through system modifications/improvements and development of alternative water supplies, and other projects to mitigate the impacts of future drought. Water desalination or recycling projects with a total estimated project cost of less than $20 million are eligible for funding. Reclamation allocates program funding annually through funding opportunities, with projects chosen through a competitive process. Normally, a 50 percent non-federal cost share contribution is required, although some exceptions may apply, based on project type.

Examples of Partners and Stakeholders

- States.
- Indian Tribes or Tribal organizations.
- Municipalities.
- Water districts.
- Wastewater districts.
- Rural water districts.
- Regional or local authorities.
- Individuals/entrepreneurs.
- Institutions of higher education.
- For-profit organizations.
- Nonprofit organizations.
- Federally funded research and development centers.
- United States–Mexico binational research foundations and interuniversity research programs.

WRAP Action Leadership

Action 6.5: Develop the Bureau of Reclamation's Large-Scale Water Recycling and Reuse Funding Opportunity.

Action 7.6: Develop Bureau of Reclamation's Advanced Water Treatment Research Roadmap.

U.S. Department of Agriculture (USDA)

Washington, D.C.

Agency Mission

The USDA provides leadership on food, agriculture, natural resources, rural development, nutrition and related issues based on public policy, the best available science and effective management. The USDA has a vision to provide economic opportunity through innovation in order to help rural America to thrive; promote agriculture production that better nourishes Americans while also helping feed others throughout the world; and preserve America's natural resources through conservation, restored forests, improved watersheds and healthy private working lands. The USDA's strategic goals serve as a roadmap to help ensure the department achieves its mission and implements its vision.

Various USDA agencies work to advance consideration of water reuse, including the seven agencies described in more detail in this profile. These seven agencies are:

Agricultural Marketing Service (AMS)

The AMS administers programs that create domestic and international marketing opportunities for U.S. producers of food, fiber and specialty crops. AMS also provides the agriculture industry with valuable services to ensure the quality and availability of wholesome food for consumers across the country. AMS provides regulatory oversight for over 20 research and promotion programs, and it also enforces other federal regulations such as the Perishable Agricultural Commodities Act and the Seed Act.

Agricultural Research Service (ARS)

The ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination. It seeks to ensure high-quality, safe food and other agricultural products; assess the nutritional needs of Americans; sustain a competitive agricultural economy; enhance the natural resource base and the environment; provide economic opportunities for rural citizens, communities and society as a whole; and provide the infrastructure necessary to create and maintain a diversified workplace.

Economic Research Service (ERS)

The ERS anticipates trends and emerging issues in agriculture, food, the environment and rural America and conducts high-quality, objective economic research to inform and enhance public and private decisionmaking. ERS's research provides context for and informs policy and production decisions that affect the agricultural sector, which in turn benefits society through efficient stewardship of agricultural resources and economic prosperity of the sector. ERS's research and analysis covers a broad range of economic and policy topics, including the agricultural economy, food and nutrition, food safety, global markets and trade, resources and environment, and the rural economy.

Food Safety and Inspection Service (FSIS)

The FSIS protects the public's health by ensuring that meat, poultry and egg products are safe, wholesome and properly labeled. The FSIS is part of a science-based national system to ensure food safety. The FSIS ensures food safety through the authorities of the Federal Meat Inspection Act, the Poultry Products Inspection Act and the Egg Products Inspection Act, as well as humane animal handling through the Humane Methods of Slaughter Act.

National Institute of Food and Agriculture (NIFA)

The NIFA mission is "Invest in and advance agricultural research, education, and extension to solve societal challenges." NIFA is committed to properly managing agricultural practices and improving the efficiency of agricultural water use to protect water quality and increase water and food security.[17] NIFA will provide competitive support to improve water science, management, technologies, conservation and efficiency; promote common data exchange formats and access to data for decisionmaking; and improve forecasting and model water-related systems. Practically, NIFA funds research to reduce the freshwater demand (both groundwater and surface water) for irrigation and the nutrient demand for maximum crop production by using innovative technologies, management practices and/or other water sources (e.g., recycled wastewater, brackish groundwater, agricultural return flow and produced water from industry) while retaining appropriate soil health (i.e., managed salinity, adequate infiltration) and eliminating accelerated erosion from farm fields. NIFA funds are also allocated to improve nutrient management and reduce nutrient load to surface water or groundwater. NIFA supports research, education and outreach toward developing management practices, technologies and tools for farmers, ranchers, forest owners and managers, public decisionmakers, and citizens to improve water resource quantity and quality.

Natural Resources Conservation Service (NRCS)

"Helping People Help the Land" is the NRCS vision for productive working lands in harmony with a healthy environment. The NRCS improves the health of the nation's natural resources while sustaining and enhancing the productivity of American agriculture. It achieves this mission by providing voluntary assistance through strong partnerships with private landowners, managers and communities to conserve, protect, restore and enhance the lands and waters upon which people and the environment depend.

Rural Utilities Service (RUS)

The RUS mission is to enhance the quality of life for and improve economic opportunity in rural communities by providing financing for the basic infrastructure of modern life. Within the RUS, the Water and Environmental Programs (WEP) provide loans, grants and loan guarantees to rural communities for drinking water, wastewater and stormwater infrastructure.

Context and Applicability to Water Reuse

ARS

The ARS provides research capability and already published studies on wastewater reuse in the agricultural sector. Recent work has focused on salinity accumulation and pathogen and pharmaceutical transport.

ERS

The ERS provides research capability and has published studies on the use of nontraditional water sources, including recycled and reclaimed water, for irrigation to address water scarcity and water quality concerns in the United States.

FSIS

Water use is extensive in many state and federally inspected meat, poultry and egg products establishments. To conserve this valuable natural resource, it can be appropriate in certain circumstances to reuse water. In all instances where reused water is employed, it is important to ensure the water is safe to reuse for its intended purpose. FSIS encourages the development of water reuse technologies in state and federally inspected establishments. However, food safety cannot be compromised by these

[17] U.S. Government Global Water Strategy: 2022–2028.

technologies. Establishments must consider the source of the water, the measures taken to recondition the water and the intended reuse application when determining whether food safety hazards exist.

NIFA

NIFA funds water quality and quantity programs under the Agriculture Improvement Act of 2018 (the Farm Bill), which authorizes the AFRI flagship competitive grants program and other funding lines. A domestically focused agency, NIFA partners through competitive and capacity grants with universities, research laboratories, governmental organizations, NGOs and Tribes to improve the knowledge base and technology adoption of water reuse in agriculture. More specifically, NIFA:

- Establishes national priorities for research, education and outreach in the use of recycled water for agricultural irrigation, saltwater intrusion, groundwater conservation and replenishment, surface water habitats, crop processing, and agroecosystem functioning.
- Creates irrigation guidelines for using recycled water on fresh-eaten crops to protect food safety and public health.
- Secures water for agriculture by funding the use of nontraditional water sources.
- Promotes a new paradigm for water and water reuse education.
- Advances science through research.
- Creates new processes for research translation and outreach.

NRCS

The NRCS mission of helping people help the land was originally established by Congress under the Soil Conservation and Domestic Allotment Act of 1935. Providing national leadership in a partnership that helps people conserve natural resources remains the NRCS's principal tenet. To support this mission, the NRCS focuses on a core strategic goal to strengthen the stewardship of private lands through technology and research. The NRCS's paramount responsibility is to meet the challenges of population increases, land use changes and water supply deficits with science-based conservation systems. The cornerstone of the nation's long-term water resilience is the adoption of new science and technology that provides economically and environmentally sustainable solutions to water resource needs.

The NRCS's leadership is supported by technical and financial assistance it provides to its beneficiaries: U.S. agricultural producers. Pursuant to the 2018 Farm Bill, the NRCS was directed to offer enhanced financial incentives to farmers who protect water quality and quantity.

The NRCS is committed to collaborative efforts with other federal agencies, state and local governments, Tribes, and conservation partners to leverage resources to accomplish its shared responsibility of protecting human health and conserving natural resources.

Agriculture is one of the largest users of the nation's surface water and groundwater, with irrigation being the greatest use.[18] The NRCS supports agricultural producers who implement local-level conservation practices and management strategies that benefit water quality and improve water management. The NRCS has worked for decades to promote water conservation efforts, and water reuse is one of the approaches used to reduce stress on surface water and groundwater supplies.

[18] "Irrigation & Water Use," which includes information compiled by the ERS from the USGS report "Estimated Use of Water in the United States in 2015" and the USDA's 2018 Irrigation and Water Management Survey (formerly Farm and Ranch Irrigation Survey), conducted every five years by the USDA National Agricultural Statistics Service.

A common example of agricultural water reuse is collecting irrigation or drainage tailwater to help meet irrigation needs. The water is applied by gravity (from higher elevation fields to those at lower elevations) or with a pump. Another example is reusing nearby municipal or industrial process water for agricultural irrigation.

The NRCS performs many functions and implements programs that may have a direct and indirect influence on local water reuse efforts, including:

- Voluntary financial assistance programs.
  - Conservation Innovation Grants (CIG).
  - Environmental Quality Incentives Program (EQIP).
  - Conservation Stewardship Program (CSP).
  - Agricultural Management Assistance Program (AMA).
  - Water Bank Program (WBP).
- Frameworks and initiatives.
- Technical assistance.
- Service centers.
- National Water and Climate Center water supply forecasts.

RUS

Water reuse projects, including agricultural reuse and indirect and direct potable reuse have always been eligible for WEP funding. In response to ongoing drought conditions across much of the United States, WEP is enhancing its outreach to rural communities and consultants to highlight this opportunity.

Explicit Roles and Actions in Water Reuse

ARS

Agriculture is one of the largest users of the nation's surface water and groundwater and thus has a large potential role in reusing wastewater to irrigate crops. The specifics of reuse depend on local climate. In dry climates where irrigation is needed for crop production, wastewater can supply all or part of evapotranspiration demand throughout the growing season. In more humid climates, wastewater may be viewed as a supplemental water source for irrigation during droughts. In these cases, using wastewater for irrigation could help maximize food production during times of short-term water scarcity.

Future research to maximize the utility of wastewater for irrigation will focus on managing salinity, preventing foodborne illnesses and the development of antibody resistance, quantifying the effect of the accumulation of biologically active compounds (e.g., endocrine-disrupting compounds, pharmaceutically active compounds) within the food chain, and developing cost-effective and low-input treatment methods for wastewater.

The ARS implements many national programs that may have a direct and indirect influence on local water reuse efforts, including programs on:

- Water availability and watershed management.
- Aquaculture.
- Sustainable agricultural systems research.

Examples of ARS research projects include:

- *Case study on the Phoenix Active Management Area.* The Phoenix Active Management Area contains more than 60 percent of the total population of Arizona. Within the area, 82 percent of all wastewater

produced is reused. One community within the active management area is the town of Gilbert, with a population of about 250,000. In Gilbert, 100 percent of all wastewater produced is treated and reused for either groundwater recharge or landscape irrigation.

Over three years, the ARS evaluated the ability of natural soil processes to remove pharmaceuticals from wastewater during groundwater recharge. The research determined that these processes prevented the accumulation of some pharmaceuticals. Others did accumulate, but at very low levels; in all cases, accumulation was less than 5 parts per billion over 30 years of groundwater recharge. These levels are orders of magnitude below the lowest therapeutic dose.

- *Low-input treatment methods for removing trace organics from wastewater.* The ARS investigated if increased aeration could reduce the fate and uptake of pharmaceuticals in wastewater using an air injection system prior to subsurface drip irrigation. The air injection was shown to reduce the concentration of three pharmaceuticals (caffeine, carbamazepine and gemfibrozil) in the soil and leachate. Uptake of caffeine and gemfibrozil into lettuce was lower in the air injection treatments, but carbamazepine uptake was greater. In addition, the air injection resulted in changes in the soil microbial community. Air injection may be a useful point-of-use treatment technology to reduce the environmental availability of pharmaceuticals.

For more information on research projects, search the ARS research project database.

ERS

The ERS has conducted recent research into U.S. irrigated agriculture trends and found that irrigated production expanded significantly over the last century, as public reclamation policy and technological innovations opened new lands to irrigated production. The ERS's 2021 report, Trends in U.S. Irrigated Agriculture: Increasing Resilience Under Water Supply Scarcity, concluded that the resiliency of U.S. irrigated agriculture under projected climate change will depend on how the sector—and the institutions that influence water supply and use—adapts to increasing water scarcity. Regional adaptation to increasingly limited water supplies may involve a combination of measures, including continued shifts in irrigated areas, increased irrigation efficiency through system upgrades, enhanced water management practices, changes in regional cropping patterns and shifts in water supply sources, including potentially novel sources of irrigation water such as recycled or reclaimed water.

FSIS

The regulatory requirements for water reuse are listed in 9 Code of Federal Regulations (CFR) 416.2(g). FSIS has issued the Sanitation Performance Standards Compliance Guide, which provides in-depth guidance on how a state or federally-inspected establishment may meet the sanitation regulatory requirements with respect to specific water reuse applications. Compliance guidelines are not regulatory requirements but suggestions on how to comply with the above regulatory requirements.

FSIS also developed a series of public Q&As that address the reuse of water, ice and aqueous solutions that contact a product, equipment, or other surfaces and are reused for the same purpose or another purpose within the limits of 9 CFR 416.2(g). FSIS developed these Q&As in response to numerous inquiries sent to askFSIS regarding water reuse and how to interpret the underlying regulations. The questions presented are representative of those that FSIS has received.

NIFA

Competitive funding for water reuse in agriculture research, outreach and education includes:

- Water Quantity and Quality Program investment[19] ($8 million) for projects on contaminants of emerging concern in recycled water that affect agroecosystems, contaminants of emerging concern

[19] AFRI Foundational and Applied Science Program funding.

from recycled water irrigating crops eaten fresh, antimicrobials and other pathogenic uptake by crops irrigated with recycled water, as well as endocrine-disrupting compounds found in turf irrigated with recycled water.

- Active Small Business Innovation Research, including the following 2022–2023 examples:
  - Progress toward a scalable continuous flow plasma water treatment architecture for PFAS destruction (Fourth State LLC, Michigan, $175,000).
  - A low-cost solar desalination method for agriculture drainage management (SolMem LLC, Texas, $649,974).
  - PFAS detection (MBIO Diagnostics, Inc., Colorado, $175,000).
  - Brackish water for condensation irrigation (Advanced Cooling Technologies, Inc., Pennsylvania, $175,000).

Capacity funding for water reuse in agriculture includes:

- Active Hatch Act projects, such as:
  - Onsite wastewater treatment and reuse systems research, education, and demonstration project (Texas A&M University).
  - Environmental fate of antibiotics originating from agricultural byproducts and wastes (University of Idaho).
  - Getting the most from Florida's reclaimed water: meeting future water demand by overcoming barriers to the reuse of treated wastewater (University of Florida).
  - Water reuse, organic matter recycle, saltgrass selection and carbon footprint of urban turfgrass systems (Colorado State University).
- Active Hatch Multistate projects, such as:
  - Beneficial reuse of residuals and reclaimed water: impact on soil ecosystem and human health (Ohio State University).
  - Collaboration between the Conservation Drainage Network and the North Central Extension and Research Activity.

NIFA also supports international specialty workshops. For example:

- NIFA was significantly involved in constructing the first iteration of the WRAP.
- NIFA participated with the mission to Israel on *From Water Stressed to Water Secure: Lessons from Israel's Water Reuse Approach*. This report provides a summary of the 2022 U.S. delegation mission to Israel, including activities, key observations and other insights, to share with interested parties throughout the United States (WRAP Action 11.1: Facilitate U.S.-Israel Collaboration on Water Reuse).
- NIFA participated in the treWAG Workshop in Israel, "Understanding and Mitigating Effects of Treated Wastewater in Agriculture: From Risks to Policy and New Opportunities."

New data for irrigation water use include:

- DOE-NAWI's goal, "Enable cost-effective (small-scale) distributed water treatment and reuse." USDA-NIFA assisted with developing the NAWI Agriculture Water Roadmap as well as drafting and editing the final report.

Technical guidance on water reuse includes:

- Edits to the 2012 Guidelines for Water Reuse and contributions to Chapter 3, "Types of Reuse Applications—Discussion on Agriculture."

Science and policy work includes:

- Consistent membership in the Water Reuse Interagency Working Group.
- Participation in the development of the DOS's Global Water Strategy.

NRCS

The NRCS offers numerous voluntary financial assistance programs. For example:

- The NRCS CIG program offers competitive grants that drive public and private-sector innovation in resource conservation. CIG projects inspire creative problem-solving that boosts production on farms, ranches and private forest land. Ultimately, the projects improve water quality, soil health and wildlife habitat, as well as promoting water conservation. The NRCS recognizes both the water supply challenges facing the United States and the significant breadth of opportunity for expanding the application of reclaimed water. Accordingly, the NRCS stands committed to supporting the development of innovative conservation approaches necessary to harness the value of recycled water in the coming years.
- EQIP assists farm, ranch and forest production and improves and protects environmental quality. EQIP offers payments for more than 160 conservation practices, some of which are directly related to water resources (e.g., irrigation water management, irrigation and drainage tailwater recovery, pipelines, stormwater runoff control, waste transfer).
- CSP helps producers build on existing conservation efforts and strengthen operations (e.g., advanced tailwater recovery). CSP is the largest conservation program in the United States, with more than 70 million acres of productive agricultural and forest land and thousands of people enrolled voluntarily.
- AMA provides financial assistance for installing conservation practices in the 16 states where participation in the Federal Crop Insurance Program is historically low. This program can provide up to 75 percent of the cost of a conservation practice with a maximum of $50,000 annual per participant.
- WBP is designed to keep water on the land to benefit migratory wildlife such as waterfowl. Landowners and operators can sign new 10-year rental agreements to protect wetlands and provide wildlife habitat.
- The Regional Conservation Partnership Program (RCPP) offers new opportunities for the NRCS, conservation partners and agricultural producers to work together to harness innovation, expand the conservation mission, and show the value and efficacy of voluntary, private lands conservation. RCPP projects may include conservation activities associated with other USDA programs, such as EQIP, CSP and the PL 83-566 Watershed Program.
- The Watershed and Flood Prevention Operations Program helps federal, state and local governments and Tribes protect and restore watersheds up to 250,000 acres. This program provides cooperation between the federal government and the unit of governments and their political subdivisions to work together to prevent erosion and floodwater and sediment damage; to further the conservation, development, use and disposal of water; and to further the conservation and proper use of land in authorized watersheds. The NRCS offers financial and technical assistance through this program for erosion and sediment control; watershed protection; flood prevention; water quality improvements; rural, municipal and industrial water supply; water management; fish and wildlife habitat enhancement; and hydropower sources.

In addition, the NRCS uses frameworks and initiatives to accelerate achievement of the benefits from voluntary conservation programs, such as clean and abundant water, healthy soils, and enhanced wildlife habitat. Through Frameworks for Conservation Action, the NRCS offers strategies to address threats to U.S. natural resources and wildlife across the country, and through Landscape Conservation Initiatives, the NRCS and its partners coordinate the delivery of assistance across localities to achieve a greater impact.

Frameworks and initiatives enhance the locally driven process to address important conservation goals across wider geographies such as watershed, wildlife biome, state, regional and national scales.

Examples of frameworks and initiatives employed by the NRCS include:

- The Western Water and Working Lands Framework for Conservation Action (WWAF) offers strategies to help producers and communities across 17 western states respond to challenges resulting from declining water supply. The WWAF offers 13 different strategies, including modernizing water infrastructure, increasing reuse of wastewater for agriculture and conservation, prolonging aquifer life, and reducing surface water withdrawals. To meet the specific need to consider alternative sources of water such as treated wastewater, the NRCS will help customers develop innovative water and land conservation tools, technologies, and approaches.
- The EQIP WaterSMART Initiative (WSI) coordinates investments in local priority areas for enhancing water conservation and drought resilience projects funded by the U.S. Bureau of Reclamation. The WSI provides EQIP-eligible customers in a selected project area with the additional resources and tools needed to manage soil moisture, improve irrigation water use efficiency in crop and pasture lands, and protect irrigation water sources from depletion. Funds are made available over multiple years based on how well the activities complement those of a specific Reclamation-funded project. This collaboration is a priority of the National Drought Resilience Partnership. Visit the NRCS website to learn more about specific priority area projects and the collaboration's progress in delivering results.
- The National Water Quality Initiative is another Landscape Conservation Initiative that advances goals for clean and abundant water**.** As the USDA's premiere water quality initiative, it provides a way to accelerate voluntary, on-farm conservation investments and focused water quality monitoring and assessment resources where they can deliver the greatest benefits for clean water.

The NRCS also has technical assistance and service providers. For example:

- The NRCS delivers conservation technical assistance (CTA) to private landowners, conservation districts, Tribes and other organizations across the country through its voluntary CTA program. This support can help land users protect and improve water quality and quantity and develop and apply sustainable agricultural systems. The assistance may take the form of resource assessment, practice design, resource monitoring, or follow-up on installed practices. The CTA program provided more than $5 billion in technical assistance funds from 2003–2013. Between 2012–2017, over $5 million was spent just on tailwater recovery, not including associated practices that may have been used (e.g., pumps, pipelines, irrigation systems).
- The NRCS will contribute to the development of water reuse program outreach and communications materials. This action will include developing materials that showcase farmers and landowners who have successfully implemented water reuse systems on their farming or ranching operations. In addition, the NRCS will contribute to producing new materials based on the needs articulated by stakeholders. The NRCS will develop training resources geared towards peer-to-peer knowledge transfer as well as a broader audience of stakeholders. The NRCS will also produce technical reference documents for designing water reuse practices across agricultural landscapes.
- Technical service providers (TSPs) offer services to agricultural producers on behalf of NRCS. TSPs help producers plan, design and implement conservation practices or develop conservation activity plans to improve agricultural operations.

The NRCS also provides National Water and Climate Center water supply forecasts. For example:

- National Water and Climate Center staff publish water supply forecasts throughout the western United States; serve as technical specialists on issues of drought, soil moisture and climate change; and provide database operations and management for snow pack, water supply and climate data.

RUS

Examples of water reuse activities and opportunities:

- The Water and Waste Disposal Loans and Grant Program.
- Emergency Community Water Assistance Grants.
- Special Evaluation Assistance for Rural Communities and Households.
- Water and Waste Disposal Predevelopment Planning Grants.
- Rural Decentralized Water Systems Grant Program.
- Revolving Funds for Financing Water and Wastewater Projects.
- Grants for Rural and Native Alaskan Villages.
- Solid Waste Management Grants.
- Water and Waste Disposal Grants to Alleviate Health Risks on Tribal Lands and Colonias in New Mexico.
- Water and Waste Disposal Loan Guarantees.
- Calendar Year 2022 Disaster Water Grants.

Examples of Partners and Stakeholders

- Farmers, ranchers, private forest landowners, conservation districts, canal companies, irrigation districts, *acequias*[20] and land grant-*mercedes*.[21]
- States.
- Municipalities.
- Water districts.
- Wastewater districts.
- Rural water districts.
- Regional or local authorities.
- Institutions of higher education.
- For-profit organizations.
- Tribal colleges and associations (e.g., 1994 land-grant institutions, Native Waters on Arid Lands).
- Universities, NGOs and research laboratories (e.g., 1862 and 1890 land-grant institutions; other universities with agricultural research capabilities; national, federal and state research laboratories; the National Academy of Science and Engineering; private consultancies; USDA Climate Hubs; the NIWR).
- Water sector associations and organizations (e.g., Binational Alliance of Research and Development; Innovation and Public Health; Global Water Partnership; the NDRP; NIWR; National Nanotechnology Initiative; National Science and Technology Council Joint Subcommittee on Environment, Innovation and Public Health; U.S. Global Change Research Program Interagency Integrated Water Cycle Group; WateReuse Association; WRF).
- Outreach and educational institutions (e.g., the WEF, Cooperative Extension, Universities Council on Water Resources).

[20] A community irrigation watercourse or ditch.
[21] A special form of local government in New Mexico.

- Agricultural associations /organizations (e.g., the Agricultural Drainage Systems Management Task Force, the Irrigation Association).
- Citizen and recreation groups.
- Agricultural businesses (i.e., agribusinesses).
- Other federal agencies, such as Reclamation, the USACE, DOS, USFS, and DOE.

WRAP Action Leadership

- Action 1.6: Address Barriers to Water Reuse in Agriculture Through Improved Communication and Partnerships.
- Action 2.12: Leverage Existing U.S. Department of Agriculture Programs to Encourage Consideration and Integration of Agricultural Water Reuse.
- Action 4.7: Evaluate and Optimize Low Input Treatment Methods to Remove Pharmaceuticals from Treated Wastewater Used for Irrigation [Complete].
- Action 5.1: Foster U.S. Department of Agriculture Watershed-Scale Pilot Projects to Share Water Information to Support Water Reuse Actions.
- Action 6.4: Compile and Promote Existing USDA Resources for Rural Communities.

Water Reuse Federal Partner Profile

U.S. Department of Defense (DoD)

Washington, D.C.

Agency Mission

The DoD provides the military forces needed to deter war and ensure U.S. security.

Context and Applicability to Water Reuse

Water reuse intersects with the DoD mission in key areas, such as the establishment of resilient water supplies at installations and the reduction of water resupply requirements for personnel operating in expeditionary settings. The DoD executes its mission under Title 10, United States Code.

Examples of DoD activities that address water reuse include:

- Establishment of policies for resilient military facilities and operations.
- Research and development of water reuse capabilities for military environments.
- Development of standards and guidelines for protecting the health of military personnel and protecting the environment through the Defense Health Center-Aberdeen.
- Development of standards and guidelines for military construction.
- Implementation of projects and acquisition of systems.

Explicit Roles and Actions in Water Reuse

DoD Policies Relating to Water Reuse

- DoD Directive 4705.01E, "Management of Land-Based Water Resources in Support of Contingency Operations," establishes policy, assigns responsibilities and prescribes procedures for management of land-based water resources in support of contingency operations to ensure inter-Service compatibility and interoperability of water support equipment.
- DoD Directive 4705.01E and Joint Publication 4-03, *Joint Bulk Petroleum and Water Doctrine*, establish policy and assign responsibilities for the management of water resources in support of tactical operations.
- The *DoD Climate Adaptation Plan* (2021) highlights water reuse as an opportunity for improving installation and operational resilience with respect to climate-associated water scarcity challenges.

DoD Health Guidelines Relating to Water Reuse

- Army Technical Bulletin Medical 577, *Sanitary Control and Surveillance of Field Water Supplies*, provides general instructions and detailed technical guidance and recommendations for the sanitary control and surveillance of land-based field water supplies. It provides water quality standards for deployed personnel, including standards and guidelines for gray water reuse.

Examples of DoD Research and Development of Water Reuse Capabilities

- *Gray Water Recycling in Expeditionary Settings*. Research and development organizations within the DoD have developed and tested various technologies for gray water recycling, often integrated into containerized, deployable systems. These systems treat gray water from shower and laundry systems

such that it can be safely and efficiently reused in the shower and laundry facilities. The small scale of these systems requires increased automation and multiple barriers of treatment to control health risk. Technologies investigated include biofiltration, membrane bioreactors, ultrafiltration, forward osmosis, reverse osmosis, advanced oxidation and disinfection.

- *Direct Potable Reuse Research*. Research efforts to develop and study direct potable reuse capabilities for both expeditionary and fixed military facilities are ongoing. These studies assess various treatment processes and reuse frameworks, as well as methods for monitoring and validating water quality in military environments. As direct potable reuse by DoD personnel in expeditionary settings is not currently allowed, direct potable reuse efforts with an expeditionary focus are currently limited to research only.
- *Decentralized Wastewater Treatment and Reuse Technology Demonstrations*. The Environmental Security Technology Certification Program (ESTCP) has funded several demonstrations of innovative wastewater treatment systems with potential applications for distributed wastewater treatment and reuse at fixed installations and forward operating bases. These systems have included membrane bioreactors, microbial fuel cells and membrane distillation processes. These systems were initially developed under the Strategic Environmental Research and Development Program before maturing into an ESTCP demonstration.

Examples of DoD Engineering Guidance Relating to Water Reuse

- UFC 4-214-03, *Central Vehicle Wash Facilities*. This manual provides a comprehensive reference source for planning and designing a central vehicle wash facility and decentralized, net zero wash facilities.
- UFC 3-240-02, *Domestic Wastewater Treatment*. This manual includes stipulations for DoD facilities to implement water reuse when financially competitive with conventional discharge systems.
- UFC 3-240-13FN, *Industrial Water Treatment Operation and Maintenance*.
- UFC 1-200-02, *High Performance and Sustainable Building Requirements*.
- Public Works Technical Bulletin 200-1-142, *Applicable Guidelines for Water Reuse at Army Installations*.
- PHIP 39-06-0417, *Review of the Applicability of Published Water Reuse Guidelines for Contingency Operations*.
- Technical Guide 364a, *Water Reuse in Contingency Operations*.

Examples of Implementation and Acquisition Programs Relating to Water Reuse

- *Energy Resilience and Conservation Investment Program (ERCIP)*. ERCIP is a subset of the Defense-wide military construction program specifically intended to fund projects that save energy and water, reduce DoD's energy and water costs, improve energy and water resilience/security, and contribute to mission assurance.
- *Force Provider Shower Water Recycling System (SWRS)*. The SWRS is a containerized system that uses membrane filtration and supporting processes to convert gray water into high-quality water that can be reused for showering and laundry. It is part of the Force Provider equipment series that provides an integrated, deployable system for billeting, hygiene, dining, sanitation and other services for up to 600 personnel. The SWRS is managed by the Army Product Manager for Force Sustainment Systems.
- *Vehicle Wash Racks*. The DoD has practiced water reuse at vehicle wash racks for many decades, and the practice continues to reduce the water footprint at DoD installations by treating and reusing the wash water multiple times.

- *Reclaimed Water*. The DoD minimizes irrigation demands, and many installations have implemented purple pipe systems that facilitate irrigation of areas such as parade grounds and golf courses using reclaimed water. Reclaimed water is also used in cooling towers at many installations.
- *Water Reuse in Buildings*. There have been some limited implementations of building-scale water reuse systems in DoD buildings. For example, the Marine Corps Recruit Depot in San Diego, California, has several building-scale water reuse systems that reduce water demands associated with toilet flushing and local irrigation.

Examples of Partners and Stakeholders

- Regulatory agencies (state, federal).
- Local communities.
- Other federal agencies (the DOE, EPA, Reclamation).
- Industry contractors.
- Academic collaborators.

WRAP Action Leadership

- Action 4.8: Develop an NSF Protocol for Deployable Greywater Reuse Systems in Military Operations.

U.S. Army Corps of Engineers (USACE)

Washington, D.C.

Agency Mission

The mission of USACE is to deliver vital engineering solutions, in collaboration with its partners, to secure the nation, energize the economy and reduce disaster risk.

Context and Applicability to Water Reuse

The topic of water reuse often intersects with the water resource development activities of the USACE Civil Works program, which is overseen by the Assistant Secretary of the Army for Civil Works. The mission of the Civil Works program is to serve the public by providing the nation with quality and responsive management of the nation's water resources.

The primary water resource development activities of the USACE Civil Works program include:

- Flood risk management.
- Navigation.
- Coastal storm risk management.
- Aquatic ecosystem restoration.
- Environmental stewardship.
- Water supply.
- Recreation.
- Hydropower.

Key objectives of the USACE Civil Works program include upgrading the nation's waterways and ports; building innovative, climate-resilient infrastructure; modernizing the Civil Works program; investing in science, research and development (R&D); and strengthening communication and relationships.

Examples of USACE Civil Works activities that address water reuse include:

- Coordinating with other agencies in assessing water reuse frameworks as part of integrated water resources management strategies that consider water availability, navigation impacts and flood risk management.
- USACE Regulatory Program permitting for activities that can impact and support water reclamation and reuse projects. The Regulatory Program is committed to protecting the nation's aquatic resources and navigation capacity while allowing reasonable development through fair and balanced decisions. USACE evaluates permit applications for essentially all construction activities that occur in the nation's waters, including wetlands. A Nationwide Permit (NWP) relating to water reclamation and reuse became effective in 2022.

Outside of the Civil Works mission, USACE also furthers water reuse through support to DoD programs. These include:

- R&D to support military water reuse capabilities at the U.S. Army Engineer Research and Development Center.

- DoD facilities' engineering guidance and technical support for military construction.

Explicit Roles and Actions in Water Reuse

After completion of a public notice and comment rulemaking process, USACE published a new Nationwide Permit (NWP 59) that supports the construction of water reclamation and reuse facilities. NWPs are issued by USACE on a national basis, for a period of no more than five years. They are designed to streamline Department of the Army authorization of projects such as commercial developments, utility lines or road improvements that have no more than minimal adverse impacts on the nation's aquatic environment.

NWP 59 authorizes "discharges of dredged or fill material into non-tidal waters of the United States for the construction, expansion and maintenance of water reclamation and reuse facilities." NWP 59 became effective February 25, 2022, and expires on March 14, 2026. Reissuance after this date will follow a notice and comment rulemaking process. The establishment of this NWP provides clarity to, and reduces permitting timelines for, the construction, expansion and maintenance of certain types of water reclamation and reuse facilities.

Examples of Partners and Stakeholders

- Local communities and states.
- Tribal organizations.
- Local, state and federal agencies.
- Water districts and levee districts.
- Collaborators and contractors from academia and industry.

WRAP Action Leadership

- Action 2.17: Propose U.S. Army Corps of Engineers Nationwide Permit Addressing Reuse [Complete].

U.S. Department of Energy (DOE)

Washington, D.C.

Agency Mission

DOE's mission is "To ensure America's security and prosperity by addressing its energy, environmental and nuclear challenges through transformative science and technology solutions." The DOE has developed a robust set of activities that address challenges and opportunities for the relationship between energy and waters.

Context and Applicability to Water Reuse

Energy and water systems are inherently linked, dependent on one another for normal, vital operations. As a strongly coupled system, they share efficiencies, resilience and vulnerabilities, which each affect the other. Recognizing this interdependence is critical to successfully addressing the energy and environmental challenges that drive DOE's mission. As such DOE has a major stake and fundamental role to play in advancing the integrated systems solutions that will address the nation's combined energy-water challenges. Through enhanced coordination within the DOE and with interagency partners, the DOE aims to create more resilient, equitable, efficient and safe interdependent energy and water systems to ensure America's energy, environmental and economic security. The DOE employs an integrated systems approach to coupled energy-water initiatives and activities within the department, recognizing the importance of considering energy, carbon and water cycles holistically. Water reuse is considered part of this holistic approach.

Current areas of focus and funding within the DOE's energy-water portfolio that are directly connected to water reuse include research, development and demonstration (RD&D) related to increases in viable resource recovery from aqueous waste streams, fit-for-use water treatment processes, and more resilient and integrated energy-water systems. In addition, the DOE provides technical assistance to make wastewater treatment more energy-water efficient, including providing robust technical assistance and tools, sharing best practices, and building out a well-trained, diverse and inclusive workforce.

Explicit Roles and Actions in Water Reuse

Water reuse is an explicit part of the DOE's Energy-Water RD&D framework. Some specific examples of water reuse activities launched by the DOE include:

- The National Alliance for Water Innovation (NAWI), which is the DOE's Energy-Water Desalination Hub. NAWI is a $110 million, five-year effort that focuses on low- to mid-stage research and development of energy-efficient and cost-competitive treatment technologies for non-traditional water sources.
- The Office of Fossil Energy and Carbon Management's funding opportunity of up to $18.05 million for research and development focusing on characterizing, treating and managing produced water from oil and natural gas development and production, as well as managing legacy wastewaters with the purpose of reuse.
- The Office of Fossil Energy and Carbon Management is developing a number of decision support tools for produced water management that enable reuse, including the National Energy Water Treatment and Speciation Database (NEWTS) and the Produced Water Optimization Initiative (PARETO).

- Advancements toward deploying new technologies in water and wastewater treatment plants that allow for producing clean water and enhancing resource and energy recovery with reduced greenhouse gas emissions through the Office of Energy Efficiency and Renewable Energy.
- Partnerships with the wastewater treatment sector to advance energy efficiency and energy recovery. These programs—including the DOE's Sustainable Wastewater Infrastructure of the Future Accelerator (completed), the Better Plants Program, Industrial Assessment Centers, and Combined Heat and Power Technical Assistance Partnerships—provide wastewater treatment plants with technical assistance, tools and other resources to help them meet their energy efficiency and recovery goals.
- The U.S.-Israel Cooperation in Energy and Water Technologies project selections, issued by DOE's Office of International Affairs, which include a topic on testbeds for energy-smart water infrastructure, which can support water reuse.

Examples of Partners and Stakeholders

- Water and wastewater utilities.
- Energy companies, including electric utilities, gas utilities, oil and gas production, and renewable energy providers.
- Water sector associations/organizations (e.g., the WRF, WEF, National Association of Water Companies, AWWA, NACWA, U.S. Water Alliance).
- Energy sector associations (e.g., EPRI).
- Academics, the DOE National Laboratories and other researchers.
- Technology companies.

WRAP Action Leadership

- Action 4.3: Support Water Reuse Through DOE's Water Security Grand Challenge [Complete].
- Action 4.6: Implement and Manage the NAWI Energy-Water Desalination Hub [Complete].

Water Reuse Federal Partner Profile

U.S. Department of State (DOS)

Washington, D.C.

Agency Mission

The DOS's mission is to "protect and promote U.S. security, prosperity, and democratic values and shape an international environment in which all Americans can thrive."

Context and Applicability to Water Reuse

The DOS advises the President and leads the nation in foreign policy issues, negotiates treaties and agreements with foreign entities, represents the United States at the United Nations and represents Americans in engagements abroad. As part of representing the United States abroad, the DOS facilitates a great deal of technical assistance and capacity exchange with foreign officials, including for technical and environmental topics. The DOS maintains water reuse as a focus in bilateral and multilateral talking points and highlights water reuse best practices in the United States during technical trainings and exchanges.

Explicit Roles and Actions in Water Reuse

- The Ambassador's Water Experts Program (AWEP) recruits U.S. experts to implement short-term water technical assistance programs, seeks to engage key governments diplomatically, and strengthens bilateral partnerships and intergovernmental organizations. AWEP recruits experts with technical expertise and experience in various issue areas, including water reuse and wastewater management, drinking water systems and efficient irrigation/agricultural water use, among others.
- Through the U.S. Action Plan on Global Water Security, DOS promotes cooperation and engagement on water management to ensure sustainable, secure access to safe water.
- In many of its programs, DOS aims to highlight the importance of water reuse as a source of water in water-scarce contexts and, more broadly, to sustainable water management overall.

Examples of Partners and Stakeholders

- Federal agencies (e.g., the DOI, USAID, USDA, EPA).
- International stakeholders (e.g., Uzbekistan, Israel, Stockholm).
- Water sector organizations (e.g., the WEF, U.S. Water Partnership, WateReuse Association).

WRAP Action Leadership

- Action 2.7: Utilize Existing Multi-Agency Federal Working Groups to Serve as Forums for Coordinated Federal Engagement on Water Reuse.
- Action 3.4: Develop Research and Tools to Support the Implementation of Onsite Non-Potable Water Reuse Systems (ONWS).
- Action 11.1: Facilitate U.S.-Israel Collaboration on Technology, Science and Policy of Water Reuse [Complete].

- Action 11.2: Raise Global Awareness and Preparedness for Water Reuse and the Water Reuse Action Plan [Complete].
- Action 11.3: Develop and Highlight Case Studies Relevant to the Water in Circular Economy and Resilience (WICER) Framework.

Water Reuse Federal Partner Profile

The U.S. Environmental Protection Agency (The EPA)

Washington, D.C.

Agency Mission

The EPA's mission is "to protect human health and the environment." With respect to achieving clean and safe water for all communities, the EPA's goals are to ensure safe drinking water and reliable water infrastructure and to protect and restore water bodies and watersheds (EPA 2022–2026 Strategic Plan).

Context and Applicability to Water Reuse

The EPA implements water resource programs under the authority of the Safe Drinking Water Act (SDWA), the Clean Water Act (CWA) and other statutes. The EPA and its state and Tribal partners perform many functions and implement programs and requirements that have a direct and indirect influence on water reuse, including:

- National policy direction.
- Drinking water standards and regulations for the protection of public health:
  - Surface water pollution control programs.
  - Funding programs for water and wastewater infrastructure.
    - Clean Water State Revolving Fund (CWSRF).
    - Drinking Water State Revolving Fund (DWSRF).
    - The WIFIA Program.
- Grants to reduce nonpoint sources of pollution.
- Financial assistance to states and Tribes to support CWA and SDWA implementation.
- Water infrastructure technical assistance.
- Programmatic guidance and training.
- Science and research.

Explicit Roles and Actions in Water Reuse

Improve Regulatory and Policy Clarity to Enable Reuse

- The EPA has established primary drinking water regulations (i.e., Maximum Contaminant Levels or treatment techniques) for over 90 contaminants that provide baseline levels of public health protection from consuming drinking water. The EPA has established secondary drinking water standards (non-enforceable guidelines) for 15 other contaminants.
- The EPA administers the NPDES program to address water pollution by regulating point sources that discharge to waters of the United States. Many states implement NPDES programs through state primacy delegations. The NPDES permitting program, pretreatment program and others play a role in many water reuse opportunities.

- The EPA's Underground Injection Control (UIC) program regulates aquifer recharge and aquifer storage and recovery injection wells under the category of UIC Class V wells, which may require a permit through the state primacy program or EPA.

Improve Public Perception of Water Reuse

- The EPA launched the WRAP collaborative in 2019 to ensure water reuse is accessible, attainable to implement, and sensitive to climate and environmental justice considerations. The WRAP—comprised of a series of actions led by federal, state and local organizations to advance water reuse—now includes 69 action commitments from 157 dedicated partner organizations as of January 2024.
- The EPA formalized its Water Reuse Program in 2020 to ensure communities across the United States can pursue water reuse as part of a resilient water management strategy. Through strategic collaboration with water sector and government partners, the program develops and shares tools, information, and other resources to build the technical, financial, and institutional capacity that supports the safe implementation of water reuse.
- The EPA chairs the Water Reuse Interagency Working Group established in 2022 with senior officials from 15 federal agencies under the Bipartisan Infrastructure Law to develop and coordinate actions, tools and resources to advance water reuse across the United States.

Advance Scientific and Technological Reuse Research

- The EPA is engaging in research, including collaborations with external partners, on new and existing water reuse practices. Research topics include alternative water sources, understanding of public health risks, treatment targets and monitoring surrogates, and interactions between stormwater and groundwater to increase supplies but reduce potential contamination.
- The EPA supports water reuse research through grants and has awarded $14.4 million since 2020 on related topics, including developing a cost-benefit tool to help reduce barriers to enhanced aquifer recharge implementation and efforts to reduce technological and institutional barriers for expanded water reuse across multiple sources and applications.

Provide Funding Tools to Enable Communities of All Sizes to Pursue Reuse

- The State Revolving Fund (SRF) Program, which is implemented at the state level, supports water and wastewater infrastructure. SRF funding can be used to support projects that include water reuse strategies. For example:
    - The CWSRF has provided more than $163 billion to support communities since 1987. State governments have awarded over $300 million in loans for water reuse projects through the CWSRF.
    - The DWSRF has provided more than $48 billion to support communities since 1997.
- The WIFIA Program accelerates investment in the nation's water infrastructure by providing long-term, low-cost supplemental loans for regionally and nationally significant projects. WIFIA has issued $19 billion in credit assistance since 2018. In 2022, the EPA awarded more than $450 million in WIFIA funding to projects that include water reuse elements.
- The EPA's Water Infrastructure and Resiliency Finance Center provides financing information to help local authorities make informed decisions for drinking water, wastewater and stormwater infrastructure to protect human health and the environment.

Provide Technical Support and Information to Enable Communities of All Sizes to Pursue Reuse

- The EPA has developed and issued four Guidelines for Water Reuse since 1980 (i.e., 1980, 1992, 2004, 2012). The EPA's two most recent related publications are the *2012 Guidelines for Water Reuse* and the *2017 Potable Reuse Compendium* to compile and share information on current and best practices.

- The EPA's REUSExplorer tool links to summaries of state water reuse regulations or guidelines and is searchable by state, source of water and end-use application. It includes nine end-use applications and four water sources.

Examples of Partners and Stakeholders

- Federal agencies (e.g., DOE, CDC, FDA, USDA, interagency working groups).
- State and Tribal environmental agencies and associations (e.g., ASDWA, ECOS, ACWA, National Tribal Water Council).
- Permitted entities (e.g., water utilities, wastewater utilities, municipal stormwater programs).
- Water sector associations and organizations (e.g., WateReuse, WEF, AWWA, NACWA).
- Research community (e.g., WRF, Stanford University, UC Berkeley).
- Industry (e.g., GHD, Trussell Tech).

WRAP Action Leadership

Integrated Watershed Action

- Action 1.1: Develop a Federal Policy Statement to Support and Encourage Consideration of Water Reuse in a Watershed-Scale Planning Context [Complete].
- Action 1.4: Leverage EPA's Water Partnership Programs to Consider Water Reuse in the Context of Integrated Water Resources Management at the Watershed Scale.
- Action 1.6: Address Barriers to Water Reuse in Agriculture Through Improved Communication and Partnerships.

Policy Coordination

- Action 2.1: Compile Existing State Policies and Approaches to Water Reuse.
- Action 2.2: Enhance State Collaboration on Water Reuse.
- Action 2.3: Complete the EPA Study of Oil and Gas Extraction Wastewater Management [Complete].
- Action 2.6: Develop Informational Materials to Address How CWA NPDES Permits Can Facilitate Water Reuse/Capture [Complete].
- Action 2.7: Utilize Existing Multi-Agency Federal Working Groups to Serve as Forums for Coordinated Federal Engagement on Water Reuse.
- Action 2.14: Integrate Water Reuse and Water Security into FEMA Hazard Mitigation Programs.
- Action 2.15: Conduct Outreach and Training with Tribes to Build Water Reuse Capacity [Complete].
- Action 2.16: Support Local and Regional Reuse Projects by Identifying Challenges, Opportunities and Models for Interagency Collaboration [Complete].
- Action 2.18: Incorporate Water Quality and Onsite Reuse Research into Codes and Standards for Premise Plumbing.
- Action 2.19: Advance Strategies for Permitting Innovative Wastewater Management Practices and Water Reuse.

Science and Specifications

- Action 3.1: Compile Existing Fit-for-Purpose Specifications.

- Action 3.3: Convene Experts to Address Opportunities and Challenges Related to Urban Stormwater Capture and Use [Complete].
- Action 3.5: Assess Specifications for Potential Reuse of Wastewater in Food Animal Protein Processing Facilities.
- Action 3.6: Viral Pathogen and Surrogate Approaches for Assessing Treatment Performance in Water Reuse.
- Action 3.7: Develop Issue Papers on Emerging Public Health Topics in Water Reuse.

Technology Development and Validation

- Action 4.5: Promote Air-Cooling Condensate Water Reuse Standards, Methods, Tools and Technologies for Implementing Systems in Large Buildings.
- Action 4.9: Incorporate Water Reuse Technology Resources into the Searchable Clearinghouse of Wastewater Technology (SCOWT) Platform.

Water Information Availability

- Action 5.5: Quantify the National Volumes of Water Potentially Available for Reuse.
- Action 5.6: Reflect Water Use and Reuse in Material Life Cycles and Actions.

Finance Support

- Action 6.1: Compile Existing Federal Funding Sources for Water Reuse and Develop an Interagency Decision Support Tool [Complete].
- Action 6.2A: Clarify and Communicate the Eligibility of Water Reuse Under the Clean Water and Drinking Water State Revolving Fund Programs [Complete].
- Action 6.2B: Continue to Actively Support and Communicate the Eligibility of Water Infrastructure Finance and Innovation Act Funding for Water Reuse [Complete].

Integrated Research

- Action 7.4: Increase Understanding of Current Aquifer Storage and Recovery Practices.
- Action 7.5: Coordinate and Promote Water Reuse Technology in Federal Small Business Innovation Research Programs [Complete].
- Action 7.7: Life-Cycle Analysis to Support Cost-Effective Enhanced Aquifer Recharge.
- Action 7.8: Enhanced Aquifer Recharge Performance and Potential Risk in Different Regional and Hydrogeological Settings Research Grant.
- Action 7.9: Evaluate Antimicrobial Resistance in Wastewater and Sewage Sludge and Its Impact on Surface Waters: Research Grant.

Outreach and Communications

- Action 8.5: Engagement with Disadvantaged and Rural Communities on Water Reuse.
- Action 8.6: Develop Public Health and Resiliency-Focused Communication Tools for Water Reuse.
- Action 8.7: Highlight Water Reuse Opportunities in the National Pretreatment Program Framework.
- Action 8.8: Engage the Medical Community on Risks and Benefits of Water Reuse.

Workforce Development

- Action 9.2: Support and Promote Opportunities for Creating a Skilled Workforce for Water Reuse Applications.

Metrics for Success

- Action 10.3: Facilitate Implementation of the National Water Reuse Action Plan.

International Collaboration

- Action 11.1: Facilitate U.S.-Israel Collaboration on Technology, Science and Policy of Water Reuse [Complete].
- Action 11.3: Develop and Highlight Case Studies Relevant to the Water in Circular Economy and Resilience (WICER) Framework.
- Action 11.4: Support Multi-Stakeholder Alignment to Advance Reuse Along the U.S.–Mexico Border.

Water Reuse Federal Partner Profile

U.S. Food and Drug Administration (FDA)

College Park, Maryland

Agency Mission

The FDA is responsible for protecting public health by ensuring the safety, efficacy and security of human and veterinary drugs, biological products and medical devices, as well as by ensuring the safety of the nation's food supply, cosmetics and products that emit radiation.

Context and Applicability to Water Reuse

The Food Safety Modernization Act Produce Safety Rule establishes science-based minimum standards for the safe growing, harvesting, packing and holding of fruits and vegetables grown for human consumption. The rule focuses on major routes of contamination, including agricultural water. In recent years, members of the produce industry have shown interest in utilizing reused water, recycled water and graywater during the production of fruits and vegetables, as well as a desire to better understand how they can do so safely. The FDA recognizes this area is of growing interest and remains committed to ensuring that industry has the knowledge and resources needed to reuse water in a way that protects public health and complies with the applicable regulations. Also, the National Environmental Policy Act generally requires that federal agencies assess the environmental impacts of their actions (e.g., the approval of human drugs and their impacts via water reuse).

Explicit Roles and Actions in Water Reuse

Current

Examples of water reuse activities in which the FDA has played a role include:

- Gathering data on impacts of pharmaceuticals in irrigation and drinking water.
- Participating in educational farm visits where members of the growing community can share information about their water use and water quality management practices, including any interest they might have in water reuse.
- Attending listening sessions in which various stakeholders—including representatives from states focused on implementing water supply planning solutions—have the opportunity to share their perspectives on water reuse and what it means for the fresh produce industry.
- Attending an advisory committee for a project aimed at facilitating the adoption of nontraditional water sources to irrigate food crops.

Near Term

The FDA seeks to:

- Assess the impacts of pharmaceuticals in irrigation and drinking water.
- Better understand the challenges the produce industry faces in meeting both water reuse and food safety goals.
- Provide support as needed to ensure members of the fresh produce industry interested in water reuse have the information they need to reuse in a way that protects public health.

Long Term

The FDA intends to support the EPA in rolling out WRAP programming in a variety of ways, including:

- Supporting stakeholders—including the fresh produce industry, the wastewater and drinking water treatment industry, and others—as interest in water reuse continues to evolve.
- Engaging with interested stakeholders to develop relationships and better understand the challenges faced when using a variety of water sources in the production of fresh produce and drinking water.

Examples of Partners and Stakeholders

The FDA regularly engages in outreach with agricultural water stakeholders through a variety of means, including conducting educational farm visits; attending and presenting at meetings of groups such as the International Association of Food Production, the Institute of Food Technologies and the American Water Resources Association; and engaging with technical experts on challenges that growers face through using water in the production of produce. The FDA also regularly engages with wastewater and drinking water treatment stakeholders by attending and presenting at meetings of groups such as the Society of Environmental Toxicology and Chemistry.

The FDA welcomes and encourages other stakeholders involved in water reuse to participate in discussions and opportunities to share knowledge and provide different perspectives as it moves forward with activities related to water use in produce production.

WRAP Action Leadership

- Action 1.6: Address Barriers to Water Reuse in Agriculture Through Improved Communication and Partnerships.
- Action 3.7: Develop Issue Papers on Emerging Public Health Topics in Water Reuse.
- Action 5.7: Identify Water Reuse Opportunities in the Beverage Industry

Water Reuse Federal Partner Profile

U.S. Geological Survey (USGS)

Reston, Virginia

Agency Mission

The USGS serves the nation by providing reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy and mineral resources; and enhance and protect quality of life. Water information is fundamental to national and local economic well-being, protection of life and property, and effective management of the nation's water resources. The USGS works with partners to monitor, assess, conduct targeted research on and deliver information on a wide range of water resources and conditions including streamflow, groundwater, water quality, and water use and availability. (For more information, see the USGS's strategic plan for water science.)

Context and Applicability to Water Reuse

The USGS implements water resource programs under the authority of the Organic Act, the SECURE Water Act and other statutes. As the nation's largest water, Earth, and biological science and civilian mapping agency, the USGS collects, monitors, analyzes and provides science about natural resource conditions, issues and problems. Current and projected water demands will require many areas of the country to access alternative sources of water to meet multiple use needs.

The USGS draws on its diverse expertise to carry out large-scale, multidisciplinary investigations and provide impartial scientific information to resource managers, including assessments of water availability. Understanding how alternative sources of water (e.g., reused, brackish) are used, and could be used in the future, is an important component of availability. The USGS collects data on water reuse and, along with local and regional partners, collaboratively assesses water reuse in terms of availability to reuse water.

Explicit Roles and Actions in Water Reuse

The SECURE Water Act directly asks the USGS to assess including impaired surface water and groundwater supplies that are known, accessible and used to meet ongoing water demands. While reused water may not legally be impaired, it is accessible water that can be used to meet ongoing demands.

As part of its mission to give resource managers the data, tools and information they need to make water management decisions, the USGS focuses on the following activities to improve understanding of water reuse and how it influences water availability:

- Modernized data collection, which can include improved water reuse data in applicable basins.
- Modernized data delivery.
- National water prediction capabilities.
- Integrated water availability assessments.

Examples of Partners and Stakeholders

The USGS's water resources mission area and its Science Centers and Regions partner with over 1,800 agencies, Tribes, municipalities, universities, organizations and research centers both locally and nationally.

WRAP Action Leadership

- Action 5.4: Develop National Integrated Water Availability Assessments.