

# NATIONAL WATER REUSE ACTION PLAN



## Update on Collaborative Progress – Year 3

MARCH 2023

The [WRAP collaborative](#) marks its third anniversary with increasing evidence of impact. Since inception it has grown to more than [60 actions](#). Many of these efforts are ongoing, while 13 have [successfully concluded](#). All action outputs—now totaling more than 100—are freely accessible online. The development of this robust suite of tools and resources by WRAP collaborators directly supports the adoption of reuse in communities of all sizes and will help enhance water resilience both locally and nationwide.



**Water reuse is a key climate adaptation tool that can be leveraged to combat flooding and drought. EPA not only supports the adoption of these innovative solutions but is helping to make them accessible by developing tools and partnerships with the National Water Reuse Action Plan.**

– EPA Administrator Michael Regan

## WRAP YEAR 3 ACTIVITIES ADVANCING POTABLE AND NON-POTABLE WATER REUSE

Now with more than 130 collaborators, the WRAP and its partners are seeing progress in advancing water reuse capacity across the country. The following highlights reflect accomplishments over the past year in several key categories and show forward momentum through new action commitments.

### Policy and Regulations

- **Compiling state regulations to support reuse adoption.** The [REUSExplorer](#) now includes nine end-use applications searchable by state, source of water, and end-use. ([Action 3.1](#), led by EPA and supported by ACWA, AMWA, ASDWA, ASTHO, CDPHE, FDA, WRF, and WateReuse)
- **Creating a better understanding of how to permit water reuse projects under the National Pollutant Discharge Elimination System (NPDES) program.** The [report](#), *Navigating the NPDES Permitting Process for Water Reuse Projects*, 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)
- **Supporting state regulators through collaborative information exchanges.** Multiple state associations hosted two webinars featuring state perspectives and relevant resources on [aquifer storage and recovery/managed aquifer recharge](#) and [direct potable reuse](#). ([Action 2.2](#), outputs led by GWPC and ASDWA)
- **Recharging groundwater to increase local resilience.** A recent [white paper](#), *Water Recycling for Climate Resilience Through Enhanced Aquifer Recharge and Aquifer Storage and Recovery*, explores technical and policy considerations influencing how recycled water can be used to recharge groundwater. ([Action 7.4](#), output led by EPA)
- ★ **New action:** *Advance Strategies for Permitting Innovative Wastewater Management Practices and Water Reuse Through the NPDES Program* ([Action 2.19](#), led by EPA, UC Berkeley, and Stanford University)
- ★ **New action:** *Highlight Water Reuse Opportunities in the National Pretreatment Program Framework* ([Action 8.7](#), led by EPA)
- ★ **New action:** *Support Multi-Stakeholder Alignment to Advance Reuse Along the U.S.–Mexico Border* ([Action 11.4](#), led by CONAGUA and EPA)



Numbers since WRAP launch in 2020

**Sign up for EPA's water reuse email updates to learn about the latest activities and find opportunities to get engaged.**



## Research Funding

- **Encouraging innovative, cost-competitive water technologies.** NAWI awarded \$2.3 million to three reuse projects that advance [energy-efficient, affordable water supplies](#) and use [non-traditional water sources](#), as well as \$5 million for 11 projects piloting [desalination technologies](#). ([Action 4.6](#), led by DOE and NAWI)
- **Supporting the development of an aquifer recharge implementation tool.** Through an EPA STAR grant, the University of California, Berkeley, was [awarded](#) \$2 million to develop a cost-benefit tool to help reduce barriers to enhanced aquifer recharge implementation. ([Action 7.7](#), led by EPA)
- **Addressing national research priorities on water reuse.** EPA [awarded](#) \$6.4 million to Iowa State University and WRF for research on reducing technological and institutional barriers for expanded water reuse across multiple sources and applications. ([Action 10.3](#), led by EPA)
- ★ **New action:** *Enhanced Aquifer Recharge Performance and Potential Risk in Different Regional and Hydrogeological Settings Research Grant* ([Action 7.8](#), led by EPA)



Water reuse-related grants since WRAP launch in 2020

## Infrastructure Investment

- **Compiling federal funding sources for water infrastructure.** This [webpage](#) presents federal funding opportunities that support resilient water infrastructure, including water reuse projects. ([Action 6.1](#), output led by EPA, USDA, FEMA, Reclamation, DOE, USACE, HUD, and DOT)
- **Investing in resilient water infrastructure in communities.** EPA awarded more than \$450 million in WIFIA funding 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 in 2022. Additionally, state governments awarded over \$300 million in loans for water reuse projects through Clean Water State Revolving Funds. ([Actions 6.2B](#) and [6.2A](#), led by EPA)
- ★ **New action:** *Integrate Water Reuse and Water Security into FEMA Hazard Mitigation Programs* ([Action 2.14](#), led by FEMA and EPA)
- ★ **New action:** *Develop the Bureau of Reclamation's Large-Scale Water Recycling and Reuse Funding Opportunity* ([Action 6.5](#), led by Reclamation)



2022 federal investments in water reuse infrastructure

## Engagement, Communications, and Education

- **Developing educational materials to reduce pharmaceuticals in wastewater.** Recent [Flush3P.org](#) website updates and two new [fact sheets](#) 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 WaterReuse)
- **Promoting reuse within disaster recovery financial assistance programs.** FEMA and EPA created a [webinar series](#) to inform borrowers about hazard mitigation tools, which include water reuse. ([Action 2.14](#), led by FEMA and EPA)
- **Helping communities understand the importance of cross-agency collaboration on water reuse.** The [report](#), *Multi-Agency Water Reuse Programs: Lessons for Successful Collaboration*, offers a framework for considering the dynamics and value of interagency collaboration on water reuse projects. ([Action 2.16](#), output led by Stanford University, EnviroSpectives, EPA, WaterReuse, and Pacific Institute)
- **Engaging the medical community to address critical questions.** *Bulletin Magazine's* [special issue](#), "Water & Health: The Coming Water Crisis and What We Can Do About It," helps answer critical questions that doctors and their patients have about water quality and water reuse. ([Action 8.6](#), output led by Valley Water, EPA, SCCMA, and EnviroSpectives)
- **Sharing training resources on water reuse and advanced water treatment.** This compilation of water reuse [training opportunities](#) includes links to key training courses in the U.S. and abroad. ([Action 9.2](#), output led by AWWA and EPA)
- ★ **New action:** *Incorporate Water Reuse Technology Resources into the Searchable Clearinghouse of Wastewater Technology (SCOWT) Platform* ([Action 4.9](#), led by EPA)
- ★ **New action:** *Develop a Dashboard That Reflects Water Usage to Help Evaluate the Life Cycle Impacts of Materials* ([Action 5.6](#), led by EPA)

## Industrial Reuse



- **Understanding available produced water research and policies.** The [document](#) *Assessing Regulatory Programs and Their Fit for Produced Water Reuse Applications: Land* summarizes produced water research on land application; exposure scenarios; and potentially applicable guidelines, regulations, and laws. ([Action 3.8](#), output led by EDF)
- **Celebrating water stewards in the business sector.** The new Industrial Water Reuse Champions [Award](#) will recognize Fortune 1000 companies incorporating the best-in-class water reuse programs. ([Action 8.4](#), led by U.S. Chamber of Commerce, Veolia, WaterReuse, and UPenn Water Center)
- ★ **New action:** Identify Opportunities to Implement Water Reuse Within the Beverage Industry ([Action 5.7](#), led by GHD)

## Onsite Non-Potable Reuse



- **Inspiring onsite non-potable reuse for community resilience.** The [e-book](#) *Onsite Water Recycling: An Innovative Approach to Solving an Old Problem* encourages the use of these treatment systems for long-term water resilience planning. Additionally, the [Guidebook](#) for *Commissioning an Onsite Water Treatment System* provides information for stakeholders involved in onsite treatment operations. ([Action 3.4](#), outputs led by NBRC for ONWS)
- **Helping small businesses develop innovative onsite reuse technologies.** EPA's SBIR program [awarded](#) \$200,000 to two small businesses to develop technologies for onsite non-potable reuse. ([Action 7.5](#), led by EPA)
- ★ **New action:** Develop an NSF Protocol for Deployable Greywater Reuse Systems in Military Operations ([Action 4.8](#), led by APHC)

### New Water Reuse Resource Hub

A recently launched online Resource Hub includes end-use-specific materials to help communities seeking to initiate and implement water reuse. It contains state policies and regulations, webinars, publications, and other resources, many of which were created through WRAP actions.

## Stormwater Capture and Use



- **Prioritizing action on urban stormwater capture and use.** The *Pure Potential: The Case for Stormwater Capture and Use* [report](#) identifies actions to accelerate the implementation of stormwater capture and use in urban areas. ([Action 3.3](#), output led by EPA, JFW, NMSA, ReNUWI, WaterReuse, WEF, ACWA, and AMWA)
- **Illustrating integration of stormwater capture and use in urban settings.** Two infographics, covering reuse at the [building](#) and [community](#) scales, can help practitioners garner support for new projects by explaining how stormwater can help meet different water quality and supply goals. ([Action 3.3](#), output led by EPA)
- ★ **New action:** Evaluate the Potential of Urban Stormwater Capture and Use in Colorado ([Action 5.8](#), led by Pacific Institute)

## Agricultural Reuse



- **Uncovering new opportunities for agricultural reuse.** The [treWAG](#) conference brought top reuse experts together to focus on potential risks of using treated wastewater in agriculture and identify new opportunities for expanding agricultural reuse; a white paper based on technical roundtable discussions is forthcoming. ([Action 1.6](#), led by Pacific Institute, EPA, FDA, University of Arizona, USDA, and Volcani Institute)
- **Supporting infrastructure for water conservation, reuse, and drought resilience.** USDA's EQUIP program made \$25 million in [funding](#) available for WaterSMART investments. A project funded in Tulare County, California, will save 11,660 acre-feet of water on 230 farms by using treated wastewater effluent to augment groundwater supplies. ([Action 2.12](#), led by USDA)
- **Assessing low-input solutions for treating irrigation water.** The [report](#) *Cotton Gin Waste and Walnut Shells Derived Biochar for the Removal of Pharmaceuticals and Humic Acids from Aqueous Solutions* evaluates pharmaceutical residue removal efficiencies for reuse of treated wastewater in irrigation. ([Action 4.7](#), output led by USDA and Penn State)
- ★ **New action:** Address Barriers to Water Reuse in Agriculture Through Improved Communication and Partnerships ([Action 1.6](#), led by Pacific Institute, EPA, FDA, USDA, University of Arizona, and Volcani Institute)

## INTERNATIONAL PARTNERSHIPS

### U.S. - Israel Exchange on Water Reuse

The WRAP's emphasis on knowledge sharing is exemplified by recent international exchanges on water reuse experiences and best practices. A delegation of 39 representatives from the U.S. water sector (pictured right) traveled to Israel in fall 2022 as part of a science, technology, and policy information exchange focused on agricultural water reuse practices as part of [Action 11.1](#). U.S. and Israeli water sector leaders discussed reuse strategies for U.S. communities in a recent [webinar](#), and a [summary report](#) captures key takeaways from the trip.



Photo: Israel Ministry of Economy and Industry

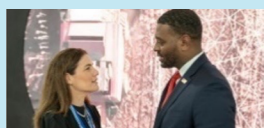


Photo: Bradley DeCoutho

Immediately following the trip to Israel, EPA Administrator Michael Regan joined Israel's Environment Minister Tamar Zandberg at COP 27 in Sharm El-Sheikh, Egypt (pictured left) to highlight water reuse as a key climate adaptation strategy. During the session, Administrator Regan communicated EPA's commitment to international collaboration, including the development of tools and partnerships, as part of the WRAP.



## RENEWED COMMITMENT TO RESILIENT WATER INFRASTRUCTURE

Federal investments in water infrastructure have reached unprecedented levels with the passage of the [Bipartisan Infrastructure Law](#) (BIL) and the [Inflation Reduction Act](#). These acts and investments can provide significant support to communities seeking climate-resilient water strategies to address stressors ranging from water quality to drought.

The government's focus on resilient management approaches is reinforced by the formal establishment of a federal [Water Reuse Interagency Working Group](#) in May 2022. Under the BIL, this group is tasked to "develop and coordinate actions, tools, and resources to advance water reuse across the United States, including through the implementation of the [WRAP]."

## CELEBRATING RECENTLY COMPLETED WRAP ACTIONS

Congratulations to the eight WRAP teams that [successfully completed](#) actions during the past year! Thank you for your leadership, collaboration, and dedication to creating a secure water future for all.

- **Align Tools to Promote Best Management of Unused/Expired Pharmaceuticals** ([Action 2.9](#), led by LACSD)
- **Support Local and Regional Reuse Projects by Identifying Challenges, Opportunities, and Models for Interagency Collaboration** ([Action 2.16](#), led by *Envirospectives, WaterReuse, and EPA*)
- **Propose U.S. Army Corps of Engineers Nationwide Permit Addressing Reuse** ([Action 2.17](#), led by USACE)
- **Convene Experts to Address Opportunities and Challenges Related to Urban Stormwater Capture and Use** ([Action 3.3](#), led by EPA, JFW, NMSA, ReNUWIt, WaterReuse, and WEF)
- **Support Water Reuse Through the U.S. Department of Energy's Water Security Grand Challenge** ([Action 4.3](#), led by DOE)
- **Compile Existing Federal Sources for Water Reuse and Develop an Interagency Decision Support Tool** ([Action 6.1](#), led by EPA)
- **Clarify and Communicate the Eligibility of Water Reuse Under the Clean Water and Drinking Water State Revolving Fund Programs** ([Action 6.2A](#), led by EPA)
- **Coordinate and Promote Water Reuse Technology in Federal Small Business Innovation Research Programs** ([Action 7.5](#), led by EPA)

## KEY RESOURCES

- **WRAP Online Platform with action information:**  
<https://www.epa.gov/waterreuse/wraponline>
- **Information library compiling WRAP outputs:**  
<https://www.epa.gov/waterreuse/water-reuse-information-library>
- **Water Reuse Resource Hub with materials by end use:**  
<https://www.epa.gov/waterreuse/hub>
- **REUSExplorer tool with state policies and regulations:**  
<https://www.epa.gov/reuseexplorer>
- **Recent and upcoming activities:**  
<https://www.epa.gov/waterreuse/recent-and-upcoming-water-reuse-activities>

RN  
ICC  
NPS  
SAWS  
**Volcani**  
EDF | MoEI  
Commerce  
NGWA | NMSU  
WSWC | NACWA  
Parker Groundwater  
WaTr | AMWA | HUD  
Reclamation | MoEP | FDA  
**Wright Water Engineers** | TTU  
**GHD** | NDRP | GCE | CA SWRCB  
NMED | AHA and ASHE | ECOS  
IWA | USAID | ASTHO | **CESPM** | Purdue  
GWPC | MWD | **BIER** | DOT | **CILA** | USGS | IWMI  
U.S. Water Alliance | SBIR Programs | RTOCs  
FEMA | **Water Innovation Services** | WW | SCCWRP  
**One Water Econ** | Valley Water | JCI | USWP | NSU  
NTWC | Groundwork USA | DOD | WTA | AWWA | **SRE**  
Rice University | NYC DEP | NREL | EPA | USACE | SWAN | DOI  
**Conagua** | WRF | **SEPROA** | NTC | NSF | Penn State | **CWCB**  
USGBC | **Northwest Biosolids** | EPRI | University of California  
NAWI | **Trussel Technologies** | USDA | Austin Water Utilities | CDC  
WEF | NeoTech Aqua | CIFA | **Cambrian Innovation** | CSO | Tyson  
GSA | Pacific Institute | GreenBiz Group | CDPHE | DOS | **CESPT**  
Stantec | UWFP | ASHRAE | **IBWC** | The World Bank | ACWA  
**Veolia** | Jacobs | Columbia Water Center | **NADB** | LADWP  
NRWA | RCAP | ORNL | JFW | Wahaso | DOE | NM-PWRC  
LACSD | IAPMO | Design Aire | **PepsiCo, Inc** | CDM Smith  
Embassy of Israel | **APHC** | GCCI | NMSA | ASDWA | ISPE  
NBRC for ONWS | WaterReuse | NWRI | ReNUWIt  
**UPenn Water Center** | Xylem  
**University of Arizona**

*The growing WRAP collaborative is helping to build capacity for water reuse. Action leaders and partners that have joined since February 2022 are noted in **bold italics**.*