National Water Reuse Action Plan

Improving the Security, Sustainability, and Resilience of Our Nation's Water Resources

Collaborative Implementation (Version 1)

February 2020

Disclaimer

This National Water Reuse Action Plan: Collaborative Implementation (Version 1) describes 37 actions—with over 200 implementation milestones—to be taken by various water partners to support consideration of water reuse, which can improve the portfolio of available fresh water. All of these actions are at the will and discretion of the action leaders and partners and implemented in the spirit of collaboration and partnership.

This is not a budget document and does not imply approval for any specific action under Executive Order 12866 or the Paperwork Reduction Act. All federal government activities included herein are subject to budgetary constraints, interagency processes, stakeholder input, and other approvals, including the weighing of priorities and available resources by the Administration in formulating its annual budget and by Congress in legislating appropriations.

This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. This document does not impose legally binding requirements. Mention of public, private, or nonprofit entities, trade names, or commercial products or services in this document does not and should not be construed to constitute an endorsement or recommendation of any such product or service for use in any manner.

While the EPA will maintain and update an online platform of the actions and provide transparent, routine progress updates, the Agency is not responsible for the conduct of other action leaders/partners or any implications of their actions.

On the Cover

Clockwise from top left:

- The Gates Foundation's 2 million gallon stormwater reuse system in Seattle, Washington collects and treats water from its central plaza and non-vegetative roof for flushing toilets, irrigation, and replenishing central plaza ponds.
- Irrigated using recycled water, artichokes are a common crop grown in the Castroville Seawater Intrusion Project area—12,000 acres of fertile farmland located in the "Salad Bowl of the World."
- Heating, ventilation, and air conditioning (HVAC) condensate captured from Rice University's BioScience Research Collaborative building is discharged into the cooling tower of the University's South Power Plant via the HVAC condensate harvesting system.
- Eastern Municipal Water District delivers recycled water to more than 575 customers for use in agriculture, irrigation, and industrial processes.
- Denver Water's Russ Plakke and Austa Parker give a toast to water that was purified for drinking through the PureWater Colorado Demonstration Project in 2018.
- At the Bertschi School in Seattle, Washington, wall-mounted micron filters and UV disinfection treat reused water to a potable standard. The school also treats its graywater using a green wall that is shown in the background.

EPA-820-R-20-001

Foreword: Advancing Water Reuse to Support Water Security, Sustainability, and Resilience

Our economy, environment, and way of life depend on reliable supplies of clean and affordable water. With aging infrastructure, a growing population, and new challenges that stress our water supply, there is a growing urgency to secure our nation's water future. That is why I am excited to be issuing the National Water Reuse Action Plan: Collaborative Implementation (Version 1) on behalf of and with our federal, state, tribal, local and water sector partners. The Action Plan adopts a proactive approach to enhance and grow our partnerships with organizations across the country to improve the security, sustainability, and resilience of our nation's water resources.

The Action Plan builds on more than four decades of water reuse experience and practice in the United States. It frames the business case that water reuse is a viable and growing means of supporting our economy and improving the freshwater portfolio of farmers, industry, communities, and ecosystems. The Action Plan identifies 37 specific actions across 11 strategic themes to be led by a spectrum of federal, state, local, and private sector interests. It reflects new partnerships, generates action through more than 200 initial implementation milestones, and provides accountability through transparency and routine progress updates.

Over the past year, the EPA has focused its efforts on catalyzing action related to water reuse, promoting strong collaboration across the water user community, and continuing an intentional dialogue surrounding water reuse. Twenty-eight different organizations have volunteered to lead and facilitate critical actions to advance the viability of water reuse, often with an array of partners.

As we move forward to address the challenges of this and future generations, the EPA and our federal partners pledge to continue to lead and facilitate implementation of the Action Plan with state, tribal, and local partners, recognizing that long-term implementation will continue to adapt and evolve through robust collaboration.

We thank all the action leaders, partners, and collaborators and encourage others to join the effort. This document release is not an end but rather another important step toward securing our water future. Together, we can make considerable progress as we move into a new era of collaborative action and accountability and ensure the security, sustainability, and resilience of our nation's water resources.

Andrew R. Wheeler

Administrator
U.S. Environmental Protection Agency

Acknowledgements

The journey of developing and implementing a National Water Reuse Action Plan (WRAP) has been, and continues to be, unique. This print product and the complementary online platform represents the first version of an integrated and collaborative workplan that has catalyzed partnerships and action across the entire water user community. This effort builds on the draft Action Plan released on September 10, 2019, with an emphasis on action implementation, partnerships, and collaboration. It continues the call for collaborative and coordinated engagement around water reuse to help ensure safe and reliable water supplies critical to our nation's communities and economy.

> **"This Action Plan promotes a growing collaboration among federal, state, local and private sector reuse efforts. It seeks to identify and address the critical technology, policy, and programmatic issues we face as a nation to enhance the security, sustainability, and resilience of our water resources through enhanced consideration of reuse."**
>
> –David Ross, Assistant Administrator for Water, U.S. EPA

Many people, organizations, and historical experiences have contributed to the WRAP. We extend special thanks to:

- The water reuse pioneers who, over the last 50 years, have built the foundation of science, technology, policy, and experience for water reuse.
- Agencies, organizations, and individuals that answered the call to action and have contributed time, ideas, and energy to foster and enhance this collaborative effort.
- Action leaders and partners who have demonstrated their willingness to lead and facilitate actions across the 11 strategic themes.
- Federal agency partners who have taken leadership on specific actions and helped champion this collaboration.
- State and tribal partners across the country who have the lead role in implementing water resource management programs. Special acknowledgement to the following partners for their cooperation: Association of Clean Water Administrators (ACWA), Association of State Drinking Water Administrators (ASDWA), Association of State and Territorial Health Officials (ASTHO), Environmental Council of the States (ECOS), Ground Water Protection Council (GWPC), National Tribal Caucus (NTC), and National Tribal Water Council (NTWC).
- Water utility sector and associations for their coordination, leadership, and support of many actions, including the Association of Metropolitan Water Agencies (AMWA), American Water Works Association (AWWA), National Association of Clean Water Agencies (NACWA), U.S. Water Alliance, Water Environment Federation (WEF), WateReuse Association (WateReuse), and Water Research Foundation (WRF).
- Israel and the U.S. Department of State for their actions, which led to the creation of the eleventh strategic theme: International Collaboration.
- Partners and stakeholders who submitted thoughtful written comments to the public docket. We have incorporated your feedback and suggestions throughout this document and acknowledged the examples of the relevant comments in the implementation plans for individual actions.
- PG Environmental and Eastern Research Group, Inc. (which provided support under EPA Contract No. EP-C-17-041) and ICF International, Inc. (which provided support under EPA Contract No. EP-C-16-011).

Table of Contents

Appendices

SECTION 1

Building the National Water Reuse Action Plan

Water is critical to our nation's health, strength, security, and resilience, yet the solutions available to manage water and its availability and quality are often complex. Water reuse can be a valuable tool to enhance the sustainability and effective use of water resources. Water reuse is a well-established practice in some areas of the United States and internationally, yet substantial opportunities exist to expand its consideration and application for many different purposes and benefits.

The process of developing the National Water Reuse Action Plan (WRAP) required substantial stakeholder involvement, including communication of an early vision for the plan's development, public engagement, review of existing relevant literature, and release of a draft Action Plan with 46 proposed actions and a "call to action" for involvement across the water user community. To transition proposed actions into developed actions, the EPA worked with action leaders and partners to create action implementation plans that identify implementation milestones with target completion dates to ensure progress. This effort has engendered a broad collaboration, which currently includes 28 action leaders, more than 80 partners, and more than 200 implementation milestones across 37 developed actions.

Appendix A provides a list of action leaders and partners, as well as an index identifying the development status of all actions: the 46 in the draft Action Plan and new actions with developed implementation plans. Inset 1 defines the key terms used for the WRAP as a whole, and in this document.

Inset 1. WRAP Terms

National Water Reuse Action Plan (WRAP): The coordinated and collaborative effort to advance consideration of water reuse to ensure the security, sustainability, and resilience of our nation's water resources.

Draft Action Plan: A draft document, released in September 2019, that outlines the business case for water reuse and proposed key actions that support consideration and implementation of water reuse across the nation.

Action Plan (Version 1): This February 2020 release describes the full array of collaborative action by various water partners to support consideration of water reuse as an important water resource management strategy.

WRAP Online Platform: A web-based domain that houses all of the developed and undeveloped action implementation plans, communicates progress, and facilitates communication and collaboration.

Water User Community: The full spectrum of those who depend on water (e.g., communities, agriculture, industry, utilities) and serve as stewards of public health and the environment, including healthy ecosystems.

"Successfully implementing and expanding on the identified actions will serve to accelerate implementation of innovative water management and infrastructure."
—WaterNow Alliance and National League of Cities

1.1 Brief Review: How We Got Here

The year-long journey to develop the WRAP has been marked by collaboration, accountability, and focus—elements that will help drive a safe, sustainable, and resilient water future. Figure 1 shows the key milestones and accomplishments of the last 365 days. A more detailed summary follows.

Figure 1. WRAP development key milestones: February 27, 2019, to February 27, 2020.

"As an island state, Hawaii is particularly aware of the need to diversify our water sources in order to meet the increasing demands of a growing population while maintaining adequate natural flows to sustain environmental and cultural water needs. Coupled with the concerns over the negative environmental impacts related to the disposal of treated wastewater and polluted runoff, water reuse is an obvious yet underutilized and undervalued resource."

—State of Hawaii Department of Land and Natural Resources

1.1.1 Developing the Draft Action Plan

On February 27, 2019, David Ross, Assistant Administrator of Water at the U.S. Environmental Protection Agency (EPA), announced that EPA and federal partners would facilitate development of a national plan in close collaboration with water stakeholders. The EPA and federal partners developed a "Discussion Framework" and launched the first of two public comment periods to help inform the conversation about scope and content. Over 150 literature sources were considered and extensive outreach, including two national expert convenings, took place. On September 10, 2019, the federal partners released the draft Action Plan before an audience of approximately 1,000 at the 34th Annual WateReuse Symposium.

> **"Our goal is to issue a[n]…Action Plan that includes clear commitments and accountability for actions that will further water reuse and help [ensure] the sustainability, security, and resilience of the nation's water resources. Water quantity, supply, and quality decision-makers have historically worked through independent management regimes. Addressing future water resource challenges will require more holistic thinking that embraces the 'convergence of water' through more integrated action.[1]"**
>
> –David Ross, Assistant Administrator for Water, U.S. EPA

The draft Action Plan enveloped nearly four decades of water reuse experience and practice and identified 46 potential actions across 10 thematic areas (e.g., policy coordination, technology development, outreach/communication, workforce) to accelerate the consideration of water reuse as a tool to help ensure the security, sustainability, and resilience of the nation's water resources. The draft Action Plan made the business case for water reuse and recognized five major sources of water for potential reuse (agriculture, industry, municipal wastewater, stormwater, and oil and gas produced water) that could be treated to meet "fit-for-purpose specifications" for a variety of end uses (e.g., potable water supplies, non-potable uses, agriculture and irrigation, industrial processes).

Federal representatives from Army Corps of Engineers, U.S. EPA, White House Council on Environmental Quality, U.S. Department of Agriculture, U.S. Department of Energy, and U.S. Department of the Interior with WateReuse Association representatives after the draft Action Plan launch at the WateReuse Symposium held in San Diego, California, on September 10, 2019.

> "Water reuse should be a critical part of the water supply strategy for the United States going forward, as demand for this vital resource continues to expand, while communities and water agencies grapple with increasing restrictions on limited available supplies."
>
> —The City of San Diego Public Utilities Department

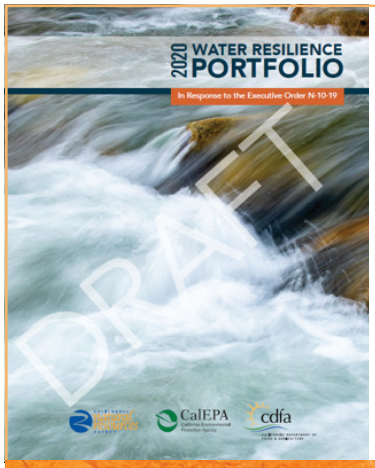
1.1.2 Developing Action Plan (Version 1): Collaborative Action Implementation

Following release of the draft Action Plan in September 2019, a second public docket was opened for 90 days seeking interest from the entire water user community to help lead, partner, and collaborate on actions.[2] The public input and comments served several critical purposes:

- Identification of the actions with the greatest interest.
- Identification of the specific implementation milestones to implement actions.
- Identification of willing leaders and partners.
- Identification of potential new actions.
- Contribution of rich perspective and commentary to inform specific actions.

Table 1, below, presents the predominant themes from the public comments. Appendix B summarizes the comments. Example comments are incorporated throughout this document and in the relevant action-specific implementation plans. Several commenters noted clarifications and corrections to the draft Action Plan, which are identified in Appendix C. The public comments also identified several new literature references. For example, Florida and California have taken recent steps (see Insets 2 and 3) to improve water sustainability with key considerations of water reuse.

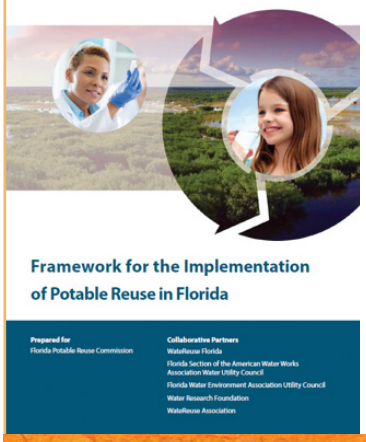
Nearly every commenter expressed support for federal leadership of the WRAP development as well as the value of water reuse as a tool—ideally when considered in the context of integrated water resources management at the local, watershed, or basin-wide scale. Further, stakeholders responded to the "call to action" by indicating willingness to lead or collaborate on many proposed actions and also offering ideas for additional new actions, identified in Section 3.



"California is projected to add another 10 million residents by 2050. This growth could increase water demand in communities in that period by one to six million acre-feet, according to state estimates."

Inset 2. California's Water Resilience Portfolio

State agencies in California released a *draft 2020 Water Resilience Portfolio* in January 2020. The *Portfolio* includes more than 100 recommended actions to help the state cope with more extreme droughts and floods, rising temperatures, declining fish populations, aging infrastructure, and other challenges.



"By 2035, Florida will need an additional 1.1 billion gallons of fresh water per day to meet projected needs. The development of alternative sustainable water sources is critical to meet projected water needs as well as to support Florida's economic success and status as a world-class travel destination."

Inset 3. Florida's Potable Reuse Report

In January 2020, the Florida Potable Reuse Commission published its *Framework for the Implementation of Potable Reuse in Florida* to provide lawmakers, policymakers, and regulators with strategies to overcome obstacles and address challenges to potable reuse.

"We believe it is important that the next steps in the plan promote multi-benefit projects and approaches to enhance stakeholder cooperation."

—The American Society of Civil Engineers

Table 1. Thematic Highlights of the Public Docket Comments

Widespread Support for the WRAP and Water Reuse as a Tool for Water Security, Sustainability, and Resilience
Nearly every commenter expressed support for federal leadership in the development of the WRAP and noted the value of water reuse as a tool, considered in the context of integrated water resource management at the local or watershed scale.
Affirmation That Water Reuse Is One Tool in the Water Resource Toolbox
Many commenters reinforced a common theme and principle in the draft Action Plan: water reuse is one tool, out of many, for managing water resources, and that reuse is not appropriate in all circumstances.
Acknowledgement of Incorporating Prior Public Comments
Several commenters acknowledged that the draft Action Plan effectively addressed their prior comments.
Defining and Reconciling Key Terms
Some commenters insisted it is important to harmonize and reconcile differing definitions of key terms such as "water reuse." However, the breadth of public comments demonstrate that distinctions of terms vary based on region, state and locality. In acknowledgment of regional differences, trying to reconcile all the definitions, or impose single common ones, would be inappropriate at this time.
Emphasis on and Identification of Priority Actions
Many commenters expressed the need for WRAP implementation to focus on a smaller set of high-priority actions. Table 2 lists the actions that were most often mentioned in a positive context.
Spectrum of Perspectives on the Potential for Reuse of Oil and Gas Produced Wastewater
The single most divergent and conflicting views pertained to the potential reuse of oil and gas produced wastewater. Comments fell into three broad perspectives: • Oil and gas produced wastewater can never be suitable for (offsite) reuse and should not be part of the WRAP. • Substantial unknowns exist on the types and concentrations of various chemical constituents. More research must be done before offsite reuse can be considered. • Produced water can be treated to meet fit-for-purpose specifications for certain uses. (In Inset 9, page 10, the draft Action Plan included specific reference to and summary of the GWPC report describing the uncertainties associated with oil and gas produced wastewater.)
Recognition of Barriers/Challenges to Water Reuse
Many commenters acknowledged the case-by-case considerations that can present challenges to water reuse implementation, including regulatory barriers, uncertain water availability, and a changing climate.
Public Commitments to Lead or Support Actions
Many commenters expressed a desire to lead or support particular actions. The action implementation plans in the WRAP Online Platform identify potentially interested collaborators on specific actions, based on their comments in the public docket.
Identification of New Proposed Actions
One question posed for public comment was to identify other potential WRAP actions that would facilitate or improve consideration of water reuse. In some cases, leaders and partners have come together to transform ideas for new actions into fully developed action implementation plans. In most cases, however, there was insufficient time to consider many of the new ideas suggested in the public docket comments. Table 3 lists the new proposed actions organized by strategic theme. These will be considered and potentially developed in subsequent versions of the WRAP.
Setting Goals for Water Reuse
Several commenters urged that the WRAP should not set goals for water reuse, nationally or for specific end uses, as this would be inconsistent with the need to carefully consider the appropriateness of water reuse based on many factors. This is an example of a case in which an action has not been pursued at this time based on specific public input.

"[The] Plan offers a long overdue statement and appropriate actions that the federal government's many agencies and departments can take to better coordinate and advance our shared goal of improved water supply and water quality."
—Xylem, Inc.

1.2 Water Reuse: Opportunities and Key Terms

A comprehensive approach to water resources management is critical to ensuring long-term sustainability of the water supply in the face of concern about the United States' vulnerability to increasing water challenges. Water reuse can be a valuable, perhaps necessary component of integrated water resources planning to ensure safe and reliable sources of water at the federal, state, and local levels well into the future.

In the United States, various sources discharge nearly 340 billion gallons of water per day,[3] including municipal wastewater, industry process water and cooling water, agriculture runoff and return flows, oil and gas produced wastewater, and stormwater (including rainwater capture). Available information indicates that a very small percentage of that water is reclaimed for further use. Similarly, current estimates[4] suggest that less than 1 percent of U.S. water demand is met through water reuse. The U.S. Geological Survey (USGS) approximates Americans withdraw about 322 billion gallons per day[5] from surface water and groundwater sources. While reclaimed water cannot be used to meet all needs, there is great opportunity to increase water reuse to enhance the availability and effective use of water resources. Examples of reuse applications include agriculture and irrigation, potable and non-potable water supplies, groundwater storage and recharge, industrial processes, onsite non-potable use, saltwater intrusion barriers, and environmental restoration.

A central tenet of water reuse is that the source of water for potential reuse must be appropriately treated and verified to meet applicable fit-for-purpose specifications to protect public health, the environment, and any other particular end user needs or quality endpoint.

Insets 4, 5, and 6, which follow, capture relevant key terms, slightly revised from the draft Action Plan based on suggestions from the public docket.

> **"It is a critical time for federal agencies, states, tribes, local governments, non-governmental organizations, academic institutions and the private sector to tackle water reuse opportunities with new energy, targeted solutions and dedicated resources."**
>
> –New Mexico Environment Department

West Basin Municipal Water District's Edward C. Little Water Recycling Facility in El Segundo, California, produces and delivers five different types of customer-specific recycled waters.

Inset 4. Water Reuse Objectives

Water security: The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development.[6]

Water sustainability: Ensuring an adequate, reliable, and continual supply of clean water for human uses and ecosystems.

Water resilience: The ability of a water supply (e.g., a community water system or an asset of a community water system) to adapt to or withstand the effects of rapid hydrologic change or a natural disaster.[7]

> **"This important document will help integrate policy across key federal agencies, enhance communications among state and local governments, stimulate private industry technology, and inform financial institutions."**
>
> —Maryland Department of the Environment

Inset 5. Water Reuse—Broadly Framed

Discussions of **water reuse** commonly include terms such as "recycled water," "reclaimed water," "purified water," "alternative water supplies," "improved water reliability," and "water resource recovery."

Sources of water for potential reuse can include municipal wastewater, industry process and cooling water, stormwater (including captured rainwater), agriculture runoff and return flows, and oil and gas produced wastewater.

These sources are considered "reused" after they are assessed for a new use and treated and verified to meet the appropriate and applicable fit-for-purpose specifications (e.g., protection of public health) for the end use application. These fit-for-purpose specifications may be established by a regulatory or management entity (e.g., a state) or by the end user.

Examples of **reuse applications** include agriculture and irrigation, potable water supplies, groundwater storage and recharge, industrial process and cooling, onsite non-potable use, saltwater intrusion barriers, and environmental restoration.

Note: While Action Plan (Version 1) considers treatment and use of brackish groundwater and other sources, seawater/ocean desalination and atmospheric water generation technologies are outside its scope.

Inset 6. Fit-for-Purpose Treatment Specifications

Fit-for-purpose treatment specifications describe and quantify the water quality characteristics necessary to meet end use needs, including public health protection and environment/ecosystem protection. Appropriate monitoring (e.g., using applicable methods, happening at the right frequency) will verify whether fit-for-purpose specifications are being met.

1.3 WRAP Guiding Principles

The draft Action Plan articulated eight "guiding principles" for development of the WRAP. These foundational tenets are worthy of restatement, as they were broadly affirmed through public comments, with three additions and some improvements included in this Action Plan (Version 1).

> **"The US EPA is to be commended for collaborating effectively with water utility sector experts to develop a truly comprehensive and visionary document that will undoubtedly benefit water recycling and reuse nationwide."**
>
> –Inland Empire Utilities Agency (California)

1. **Protect public health.** The paramount need is to ensure protection of public health, given the array of contaminants (e.g., chemicals, pathogens) that may exist in sources of water for potential reuse. Protection of public health is central to all potential end uses.
2. **Protect the environment and ecosystem health.** Protect the environment and recognize water reuse can have both positive (e.g., ecosystem restoration) and negative (e.g., diminished in-stream flows) impacts on aquatic ecosystems.
3. **Promote action based on leadership, partnership, and collaboration.** Rely on the expertise and leadership at all levels of a diverse range of water partners to lead and support actions.
4. **Build on past experiences.** Rely and build upon the decades of existing research, policy, technology, practice, and experience as the foundation of the WRAP.
5. **Identify the most impactful actions.** Implement actions that will have the greatest value and impact on consideration of water reuse.
6. **Recognize distinct challenges posed by water reuse.** Recognize that water reuse has limitations and can create challenges, which often demand new levels of technology, monitoring, and workforce expertise given the characteristics and variability of sources of water for potential reuse.

> "Water reuse is emerging as one of several key strategies for creating greater resilience for our systems by augmenting existing water supplies and helping reduce flooding and combined sewer overflows in capacity constrained areas of our drainage and wastewater systems."
>
> —Seattle Public Utilities

7. **Consider water reuse in an integrated water resources management framework.** 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.
8. **Defer to state (cooperative federalism) and local issues and considerations.** Recognize there are important factors which are beyond the scope of a national plan, that may need to be addressed at the state, local, or watershed level. Among these are state and/or tribal prerogative and policy, equity, affordability, water rights, and environmental justice considerations.
9. **Commit to implementation through transparency and shared accountability.** Shared commitment to action, transparency, and accountability will foster collaborations and partnerships, which in turn will build capacity, complement and leverage expertise and resources, and institutionalize water reuse into our water resource portfolio.
10. **Communicate effectively.** Commit to providing regular updates on action progress, potential new actions, changes to actions or collaborators, and other developments related to WRAP implementation.
11. **Apply adaptive management and governance.** Apply sound principles of integrated and adaptive management which facilitate the effective evolution of WRAP implementation, including ongoing consideration of governance models that enhance the contributions of many collaborators.

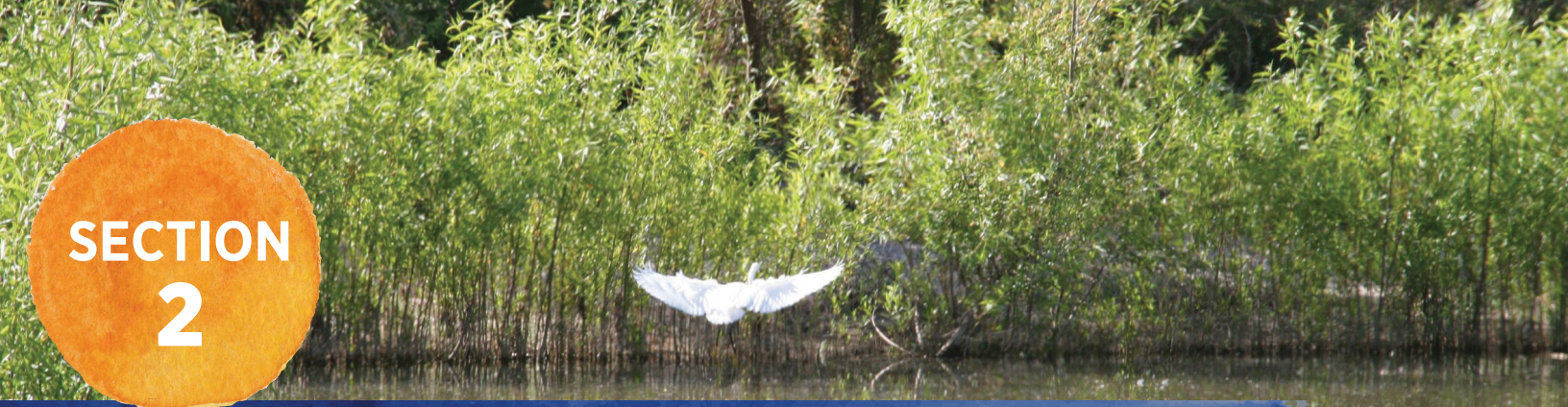
1.4 WRAP Strategic Themes and Organizing Framework

The WRAP is organized around 11 strategic themes, which are based on the framework from the draft Action Plan. One theme has been added (International Collaboration) to reflect the opportunity to share experiences with and learn from international leaders in water reuse. The draft Action Plan provided context and a basis for these strategic themes, which this document will not repeat. For brevity, Action Plan (Version 1) also uses the relevant short titles of the strategic themes, noted in bold:

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.

Public landscapes throughout Northern California's City of Roseville are irrigated with recycled water.

> "We agree that a thorough understanding of the nature and quality of sources of water for potential reuse and end user needs can help inform the decision-making process for a reuse strategy that considers public and environmental health."
>
> — Colorado Department of Public Health and Environment



SECTION 2

Water Reuse Collaborative Action Implementation

The WRAP seeks to promote the consideration of water reuse by implementing actions that will help communities, policymakers, water resource planners and practitioners, and other stakeholders match potential sources of water that can be provided at a quantity and quality needed for identified applications. The WRAP's unique features include creating action implementation plans, fostering new partnerships, collaborating within and across actions, maintaining transparency, and ensuring routine updates on implementation progress. Action Plan (Version 1) aims to leverage the talent and expertise of the water user community and immediately take actions across the spectrum of strategic themes to consider how water reuse can support secure, sustainable, and resilient water resources.

At the time of this release, there are 37 actions with developed implementation plans, with at least one action in each of the 11 WRAP strategic theme areas. As shown in Figure 2, these actions will be led by 28 entities, involve more than 80 partnering organizations, and represent over 200 distinct implementation milestones with target completion dates. Table 2 shows the proposed actions from the draft Action Plan that received the greatest support in the public docket. Currently, more than three-quarters of these have action implementation plans, each with an action leader, partners, implementation milestones, and target completion dates.

Figure 2. Action Plan (Version 1) by the numbers.

Three highly mentioned actions are not being developed at this time for varied reasons:

- Action 2.3.2 (Develop Frameworks for Public and Environmental Health Risk-Based Targets) was the most frequently mentioned action in the public docket. It is not yet developed in this Action Plan (Version 1) as it will benefit from progress on Action 2.2.1 (Compile State Policies and Approaches to Implement Water Reuse Programs) and Action 2.3.1 (Compile Existing Fit-for-Purpose Specifications).
- Action 2.1.3 (Incorporate Water Reuse and Capture Concepts into Integrated Planning Efforts at the Local Level) lacks substantial experience and applications at the local level to develop this action at this time.
- Action 2.4.1 (Integrate, Coordinate, and Enhance Technology Demonstration and Validation Programs to Provide Reliable Performance Information to Support Water Reuse) lacks an action leader with the capacity to build on initial steps and milestones.

"Water reuse efforts present the opportunity for regional, state, international and tribal collaboration."
—Western Urban Water Coalition

The current action commitments represent significant positive momentum and have already prompted some important partnerships and collaborations. As primary facilitator of the WRAP, the EPA will maintain the full set of actions and track them over time on the WRAP Online Platform. A list of the actions, their development status, and corresponding leaders and partners is presented in Appendix A.

Table 2. Most Frequently Mentioned (Supported) Actions Identified in the Public Docket

Action	Supportive Commenters	Developed Action? (Yes/No)
Action 2.3.2: Develop frameworks for public and environmental health risk-based targets	19	No
Action 2.1.3: Incorporate water reuse and capture concepts into integrated planning efforts at the local level	17	No
Action 2.4.1: Integrate, coordinate, and enhance technology demonstration and validation programs to provide reliable performance information to support water reuse	16	No
Action 2.6.2: Promote eligibility of existing State Revolving Fund (SRF) and Water Infrastructure Finance and Innovation Act (WIFIA) funding for water reuse	16	Yes
Action 2.2.1: Compile state policies and approaches to implement water reuse programs	16	Yes
Action 2.1.2: Prepare case studies of successful applications of water reuse within an integrated water resources management framework	15	Yes
Action 2.8.1: Compile and develop water reuse program outreach and communication materials	15	Yes
Action 2.3.3: Convene experts to address challenges related to stormwater capture and reuse	14	Yes
Action 2.8.3: Pursue a national branding campaign for water reuse	13	Yes
Action 2.2.4: Enhance wastewater source control through local pretreatment programs to support water reuse opportunities for municipal wastewater	13	Yes
Action 2.2.2: Enhance state collaboration on water reuse	12	Yes
Action 2.2.6: Develop informational materials to better enable water reuse in Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES) permits	12	Yes
Action 2.6.1: Compile existing federal funding sources for water reuse	11	Yes
Action 2.3.1: Compile existing fit-for-purpose specifications	11	Yes

> **"Over the course of many months working with partners and members, it is clear that federal leadership will be critical in helping to leverage non federal resources to realize the full potential envisioned by the WRAP."**
>
> —WateReuse Association

Anatomy of an Action: Leadership, Collaboration, Implementation, and Accountability

This Action Plan (Version 1) fostered the development of action implementation plans to:

- Demonstrate leadership for action.
- Promote partnerships and collaborative actions that leverage the resources and expertise of many stakeholders.
- Implement a means of demonstrating progress and accountability for the integrated actions.
- Begin to create an enduring, dynamic, and iterative approach that will lead to subsequent versions of the WRAP.

For the purposes of Action Plan (Version 1), actions fall into two categories:

- **Developed Actions.** Actions with developed action implementation plans that have identified action leaders, partners, implementation milestones, and target completion dates. These actions represent initial momentum and serve as a catalyst for additional partnerships and subsequent actions.
- **Undeveloped Actions.** Actions that do not yet have developed action implementation plans and currently lack clear leaders, partners, implementation milestones, and target completion dates. In the WRAP Online Platform, undeveloped actions have limited information provided, including the action title, strategic theme area, brief description, interested collaborators, and relevant public docket comments. Action titles and descriptions are unchanged from the draft Action Plan.

For several undeveloped actions, collaborative efforts to form teams, brainstorm implementation milestones, and draft action implementation plans are underway. The process for assessing the development of actions and leadership for implementation to meet the WRAP objectives will remain dynamic and iterative.

While summarized in this print version, full information on the developed actions and their corresponding action implementation plans will reside and be updated on an accessible online platform (the WRAP Online Platform, further described in Section 3). This platform will be the means of achieving transparency; providing routine updates on progress; and ensuring commitment, accountability, and access to action outputs.

The Bullitt Center in Seattle, Washington, is the first commercial living building. It collects and treats rooftop water for potable reuse and treats greywater in a constructed wetland planter on the side of the building.

El Paso's Advanced Water Purification Facility, which is under design, will be the first pipe-to-pipe direct potable reuse facility of its scale in the United States.

> "Though the drivers for adoption of water reuse techniques in our region may vary from those in other areas of the country, our states have valuable experience and information to contribute and we consider geographic representation an important aspect of a national plan."
>
> —New England Interstate Water Pollution Control Commission

The key elements of a fully developed action are listed below.

ACTION ATTRIBUTES:

- **Action title:** Brief descriptive title of the action.
- **Action origin and number:** Indication of whether the action is among the original 46 proposed actions from the draft Action Plan, has been modified (i.e., has undergone substantive change) from the representation in the draft, or is new.
- **Strategic theme area:** The strategic theme to which the action most closely aligns.
- **Brief description of the action:** A summary of what will be done.
- **Background:** Brief context for the action.
- **Opportunities to be gained:** The impact, results, and/or outcomes desired.

ROLES AND CONTACTS:

- **Action leader(s):** The entity and person with the critical role of facilitating/convening/organizing to ensure implementation of the action and routine reporting of progress.
- **Partner(s):** The name of the organization(s) collaborating with the action leader(s) to complete this action.
- **Interested collaborators:** The names of organizations that expressed specific interest in the action through the public docket and/or communication with action leader(s) or partner(s). These are provided to help the action leader(s) and partner(s) seek other perspectives and participation, as warranted.

IMPLEMENTATION INFORMATION:

- **Implementation milestones:** The explicit steps to be taken to initiate, convene, and support the action.
- **Lead(s):** The organization and person who will lead and facilitate completion of the particular implementation milestone.
- **Partner(s):** The organizations that will work with the lead to help complete the action.
- **Target completion dates:** The date by which the lead for the implementation milestone expects to complete the milestone. This is a target to be updated as needed. Generally, implementation milestones and target completion dates reflect near-term efforts (up to about a year).
- **Status and updates:** Routine updates on progress as well as actual completion dates of implementation milestones. The EPA will add these updates to the WRAP Online Platform based on feedback from the action and milestone leads.

OUTPUTS AND REFERENCES:

- **Outputs:** Attachments or links to relevant products (e.g., whitepapers, presentations, case studies) resulting from the completion of implementation milestones.
- **References:** Relevant information or citations for the action, where applicable.

Developed Actions: Implementation Plan Highlights

This release of Action Plan (Version 1) includes 37 developed actions with implementation plans across the spectrum of the 11 strategic theme areas. The creation of a new strategic theme (International Collaboration) builds on the draft Action Plan, which recognized international partners and their experience, the potential for international collaboration, and opportunities for global awareness and applications.[8] This entire suite of actions will be led by 28 action leaders at all levels of government and across the water user community, who will be critical to the success of the WRAP. These action leaders have agreed to a series of important tasks and responsibilities to ensure the success of this national collaborative undertaking (Inset 7).

Inset 7. Action Leader Roles

- Coordinating among the action team.
- Facilitating implementation of the milestones.
- Seeking and including new partners to collaborate with, where appropriate.
- Providing updates on progress and outputs.
- Validating action leader responsibilities with subsequent versions of the WRAP.

> "As the silos of water management converge, states appreciate coordinated federal leadership as a means of supporting state and local governments' water-related activities and tools, which align with or are moving towards integrated water management paradigms."
>
> —ASDWA and ACWA

2.1 Integrated Watershed Action

Water reuse, as a water management tool, is most successful when viewed as part of the entire water portfolio at the watershed scale.

Develop a Federal Policy Statement to Support and Encourage Consideration of Water Reuse in a Watershed-Scale Planning Context (Action 2.1.1)

DESCRIPTION:
This action articulates the federal government's support of water reuse as a tool, when considered as part of integrated water resources management at the state, basin, or watershed scale to enhance water resilience, security, and sustainability through a diverse water portfolio.

ACTION LEADER(S):
EPA—Roger Gorke

PARTNER(S):
Federal Agencies

> "Water reuse projects often span multiple jurisdictions, watersheds, and/or sewer-shed boundaries. Federal policies should recognize this complexity and support integrated regional water management planning."
>
> –San Diego County Water Authority

Building on the language in the draft Action Plan, the partnering federal agencies are issuing a statement of policy supporting the consideration of water reuse (Inset 8).

Inset 8. Federal Policy Statement on Water Reuse

Water is critical to our 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.

> "We support this plan because it integrates water reuse opportunities across multiple sectors including drinking water, agriculture, industry, recreation, and environmental protection."
>
> — State of Oklahoma, Office of the Secretary of Energy & Environment

2.1 Integrated Watershed Action

Prepare Case Studies of Successful Water Reuse Applications Within an Integrated Water Resources Management (IWRM) Framework (Action 2.1.2)

DESCRIPTION:
Efforts will initially focus on compilation and dissemination of pertinent projects, taking advantage of existing information. This may be followed by development of new case studies to fill gaps in geography, reuse application, and/or source water.

ACTION LEADER(S):
WateReuse—Greg Fogel

PARTNER(S):
NGWA, ACWA, AWWA

> "Clearly documented case study examples can play a critical role in furthering integrated water management."
>
> –National Wildlife Federation

April 2020
Convene representatives of collaborating organizations to participate in initial planning conversations.

May 2020
Facilitate amongst collaborating organizations to identify roles, responsibilities, funding sources, and processes.

March 2021
Hold workshop(s) in collaboration with existing meeting(s) to highlight IWRM and relevant case studies in depth.

2019 — 2020 — 2021 — 2022

Identify an approach for identifying, collating, and hosting information. This process could involve filtering case studies against a set of criteria to determine inclusion.
May 2020

Develop a list of case studies based on a review of literature and outreach to willing collaborators.
December 2020

See 1 more milestone in the WRAP Online Platform

Leverage EPA's Water Partnership Programs to Consider Water Reuse in the Context of Integrated Water Resources Management at the Watershed Scale (Action 2.1.4)

DESCRIPTION:
The utility and value of water reuse projects will be considered and implemented locally in the Urban Waters Program (UW) and the National Estuary Program (NEP) partnership locations (all watershed based) in collaboration with the broad network of public and private sector stakeholders maintained by each partnership program.

ACTION LEADER(S):
EPA—Bob Benson

PARTNER(S):
ACWA, AMWA, NEP, Urban Waters Partnership locations, EPA, UWFP, RN, Groundwork USA, WateReuse, Water utilities in UW and/or NEP locations, RAE, CSO

Rainwater catchment project near Pennington Creek, California, installed in partnership with the Morro Bay National Estuary Program, stores up to 296,000 gallons of rainwater for cattle troughs in the dry season.

March 2020
Present Water Reuse Action Plan at EPA-NEP National Workshop.

May 2020
Develop the Urban Waters Utilities and Infrastructure Project (that will identify water reuse needs and opportunities in UW partnership locations).

September 2020—distribution ongoing
Develop information materials on best practices, lessons learned, and available resources for water reuse, and distribute widely through the Urban Waters Learning Network and NEP communications platforms.

2019 — 2020 — 2021 — 2022

Identify partners for all implementation milestones for this Action.
May 2020

Create inventory of existing water reuse and integrated water resource management activities within UW and NEP.
May 2020

See 3 more milestones in the WRAP Online Platform

> "The District believes that recycled water is a key component of both California's and the nation's water supply portfolio and, especially in times of drought, can be the most readily available "new" supply of water."
>
> —Irvine Ranch Water District

2.2 Policy Coordination

Federal, state, tribal, and local programs and policies can be aligned and coordinated to encourage consideration of water reuse.

Compile Existing State Policies and Approaches to Water Reuse (Action 2.2.1)

DESCRIPTION:
This compilation will build on prior efforts by Western Resource Advocates, Western States Water Council, EPA, WateReuse Association, and others.

ACTION LEADER(S):
- EPA—Jeff Lape
- WateReuse—Greg Fogel
- ACWA—Jake Adler
- ASDWA—Wendi Wilkes

PARTNER(S):
ASTHO, ECOS, WSWC, GWPC

> "Exploring why resources, policies, and approaches vary (for example, across states or between federal programs), or how differences in seemingly-similar scenarios came to be (for example, what are the scientific bases of different fit for purpose specifications among similar types of reuse?), provide important contexts for end-users."
>
> –ASDWA and ACWA

See 1 more milestone in the WRAP Online Platform

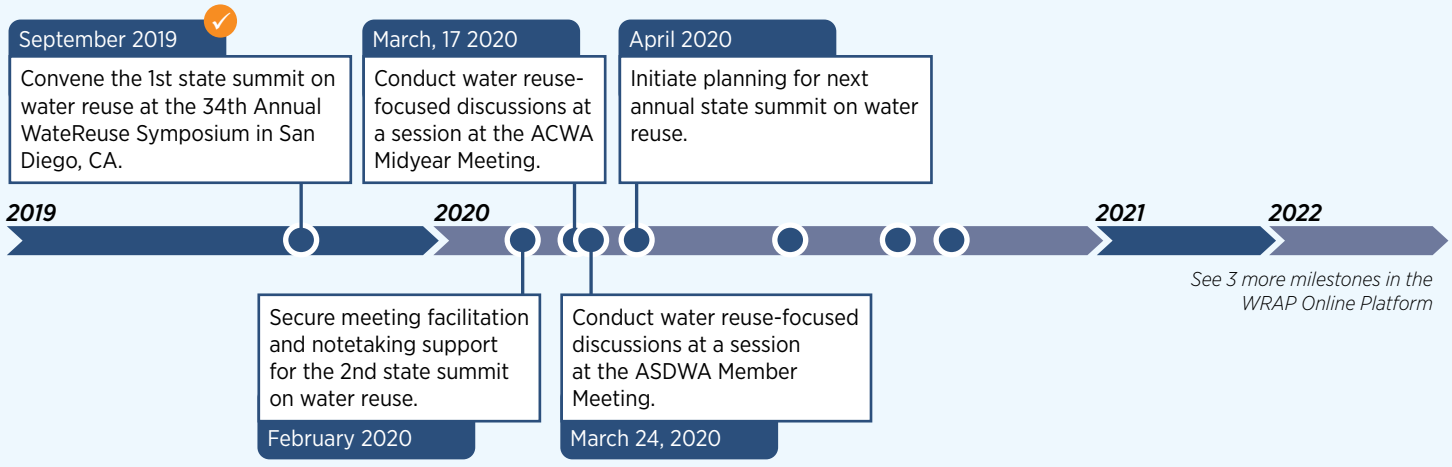
Enhance State Collaboration on Water Reuse (Action 2.2.2)

DESCRIPTION:
Provide forums and opportunities for states to discuss and share information and experiences on programs and approaches for the management of water reuse.

ACTION LEADER(S):
- EPA—Jeff Lape
- ACWA—Jake Adler
- ASDWA—Wendi Wilkes

PARTNER(S):
ASTHO, ECOS, GWPC, WateReuse

> "Water reuse is an emerging topic in the Northeast and our member states will benefit from the information generated and collected and from the relationships developed among our regional partners and with states across the country that result from implementation."
>
> –New England Interstate Water Pollution Control Commission



See 3 more milestones in the WRAP Online Platform

> "San Diego believes in the power of water reuse to provide local, sustainable water supplies for American communities as we move into the future."
>
> —The City of San Diego Public Utilities Department

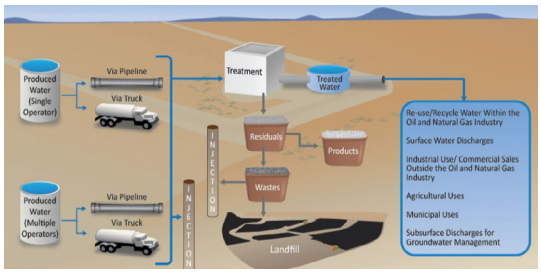
2.2 Policy Coordination

Complete the EPA Study of Oil and Gas Extraction Wastewater Management (Action 2.2.3)

DESCRIPTION:
The final study will inform the EPA's consideration of potential regulatory and nonregulatory approaches for management of produced water under the CWA, including the potential for greater reuse opportunities.

ACTION LEADER(S):
EPA—Jesse Pritts

PARTNER(S):
None identified at this time



Produced water can be treated for a variety of end uses, including onsite reuse, agricultural and municipal uses, and discharges for groundwater management.

April 2020
Finalize EPA's *Study of Oil and Gas Extraction Wastewater Management Under the Clean Water Act.*

2019 | 2020 | 2021 | 2022

See 1 more milestone in the WRAP Online Platform

Enhance Wastewater Source Control through Local Pretreatment Programs to Support Water Reuse Opportunities for Municipal Wastewater (Action 2.2.4)

DESCRIPTION:
Develop case studies of examples of how local pretreatment programs can mitigate and reduce problematic pollutants discharged into publicly owned treatment works and enhance reuse opportunities for reclaimed wastewater.

ACTION LEADER(S):
- NACWA—Cynthia Finley
- WEF—Claudio Ternieden

PARTNER(S):
ACWA, AMWA, AWWA, NWRI, WateReuse, EPA

Denver Water's Recycling Plant treats and delivers billions of gallons of water every year for industrial and outdoor irrigation uses.

May 2020
Engage NACWA Pretreatment Committee to identify and develop project strategies.

May 2020
Host a session on Pretreatment and Water Reuse at the National Pretreatment meeting and workshop.

2019 | 2020 | 2021 | 2022

Engage WEF Industrial Wastewater Committee.
May 2020

See 1 more milestone in the WRAP Online Platform

"[We urge] States and their respective public agencies to seek alignment with the Draft National Water Reuse Action Plan targets, and our members stand ready to support this effort."
—The American Society of Civil Engineers

2.2 Policy Coordination

Develop Informational Materials to Address How CWA NPDES Permits Can Facilitate Water Reuse/Capture (Action 2.2.6)

DESCRIPTION:
Develop guidance for National Pollutant Discharge Elimination System (NPDES) permit writers to help inform them of water reuse. Enable consideration and implementation of water reuse practices within the appropriate authority of NPDES permits.

ACTION LEADER(S):
- EPA—David Smith and Kevin Weiss
- ACWA—Sean Rolland

PARTNER(S):
NACWA, NMSA, WateReuse, WEF

> "A significant benefit of the Reuse Action Plan would be to identify the flexibilities that could be utilized within the context of the National Pollutant Discharge Elimination System (NPDES) permitting framework to provide true incentives for stormwater capture and use projects."
>
> –California Stormwater Quality Association

See 1 more milestone in the WRAP Online Platform

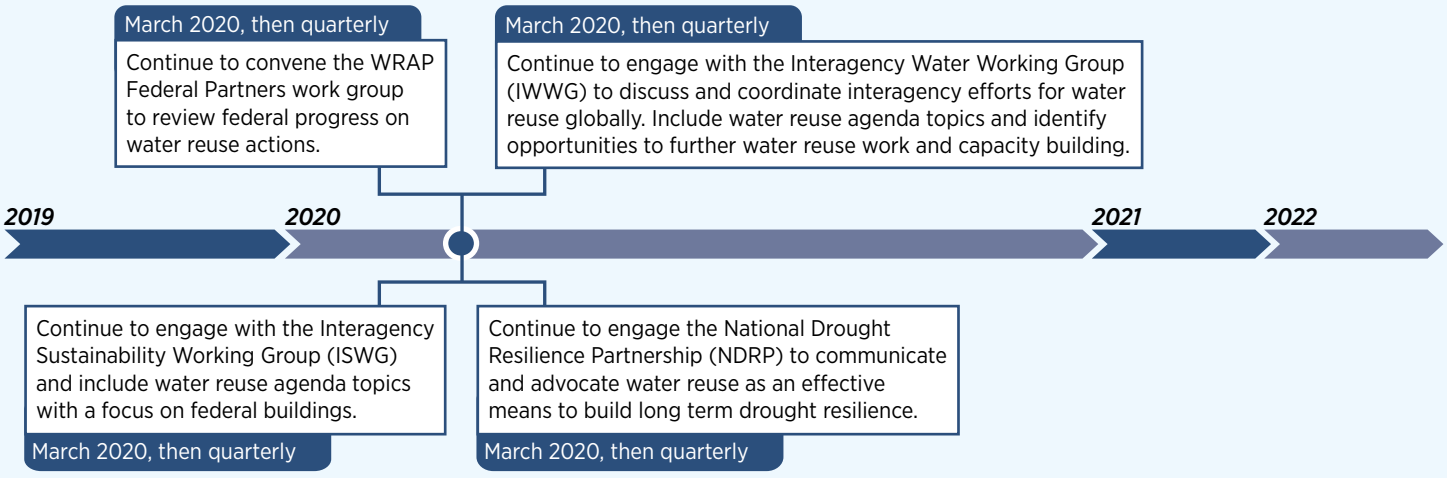
Utilize Existing Multi-Agency Federal Working Groups to Serve as Forums for Coordinated Federal Engagement on Water Reuse (Action 2.2.7)

DESCRIPTION:
Optimize existing federal working groups to serve as forums for discussion and work to aid in the integration of water reuse (where appropriate), including in federal installations and buildings.

ACTION LEADER(S):
EPA—Jeff Lape

PARTNER(S):
WRAP Federal Partner Working Group, IWWG, GSA, ISWG, NDRP

> "[This action] is an important building block to provide for sustained federal leadership on water reuse. We recommend this action item be expanded to include formation of a federal water reuse technical support team to directly assist states, tribes and municipalities in development and implementation of reuse plans, policies and projects."
>
> –New Mexico Environment Department



> "We are heartened to see the recognition in the draft document of the critical need to consider the implications of water reuse on environmental water needs, both for riverine flows and for estuarine inflows, and for aquatic systems overall."
>
> —National Wildlife Federation

2.2 Policy Coordination

Align Policies and Communication Tools to Promote Best Management of Unused and Expired Pharmaceuticals to Support Water Reuse and Recycling (Action 2.2.9)

DESCRIPTION:
Recommend consistent messaging used by federal agencies and key stakeholders regarding the safe and proper disposal of unwanted pharmaceuticals by household consumers. Updated communication tools will be created with the dual goals of preventing diversion of leftover medications, while protecting the quality of recycled water by preventing pollution of surface and groundwater.

ACTION LEADER(S):
Sanitation Districts of Los Angeles County (LACSD)—Sharon Green

PARTNER(S):
AWWA, NACWA, NSAC, EPA, FDA, WateReuse

As part of the "Don't Rush to Flush" campaign, pills are collected in a pharmaceutical drop box and properly disposed instead of entering the wastewater system.

March 2020
Update the Flush 3Ps website to be used as a communication tool to provide information: 1) on drug-take back programs and 2) problems with pharmaceutical flushing.

December 2020
Identify workgroup of entities (local utilities, states, NGOs, Agency Representatives) to fully scope action.

2019 — 2020 — 2021 — 2022

May 2020
Engage states and local agencies on this action at the NACWA Pretreatment workshop in May 2020.

December 2020
Engage the existing Federal Interagency Workgroup to begin developing a plain language communications document (i.e., Office of National Drug Control Policy (ONDCP) Workgroup or Pharmaceutical in Water Workgroup).

Leverage Existing U.S. Department of Agriculture Programs to Encourage Consideration and Integration of Agricultural Water Reuse (Action 2.2.12)

DESCRIPTION:
Identifying U.S. Department of Agriculture (USDA) programs that could lend themselves to water reuse to enhance the integration of agricultural reuse. USDA commits to leveraging these programs to achieve water reuse advances and improvements by providing financing and grants, technical assistance, and conservation initiatives.

ACTION LEADER(S):
USDA—Clarence Prestwich

PARTNER(S):
None identified at this time

A Natural Resources Conservation Service employee discusses operation of a drop inlet leading to an underground drainage pipe capturing run-off from terraced fields.

March 2020
Consider inclusion of water reuse strategies in the USDA/NRCS Conservation Innovation Grants (CIG) Program.

September 2020
Consider inclusion of water reuse strategies in the USDA/NRCS Conservation Stewardship Program (CSP).

September 2020
Consider expanding water reuse strategies in the USDA/NRCS Environmental Quality Incentives Program (EQIP).

2019 — 2020 — 2021 — 2022

July 2020
Consider inclusion of water reuse strategies in the USDA/NRCS Regional Conservation Partnership Program (RCPP).

September 2020
Consider inclusion of water reuse strategies in the USDA/NRCS Watershed and Flood Prevention Operations Program (WFPO).

See 1 more milestone in the WRAP Online Platform

"Recent droughts in California have highlighted the value of water and the need for a diverse portfolio of water sources and strategies to provide sufficient water resources for beneficial uses into the future."
—California Stormwater Quality Association

2.2 Policy Coordination

Conduct Outreach and Training with Tribes to Build Water Reuse Capacity (Action 2.2.15)

DESCRIPTION:
Following initial outreach to tribes to identify reuse opportunities and needs to advance reuse in Indian country, we will develop and deliver initial training tailored for tribes that discusses technical, managerial, and financial capabilities necessary to successfully pursue different types of water reuse and capture.

ACTION LEADER(S):
EPA—David Smith

PARTNER(S):
NTC, NDRP, NTWC, RTOCs

> "New Mexico is home to 23 federally recognized tribes, pueblos and nations. When drought hits non-tribal lands, it also hits tribal lands. Aquifers and surface water features do not stop at jurisdictional boundaries. It is imperative that solutions for water reuse support tribal communities, many of which are located in some of the most drought-prone regions of New Mexico."
>
> –New Mexico Environment Department

December 2019 ✓
Prepare a 1-page outreach document regarding water reuse to distribute to tribal organizations.

April 2020
Conduct initial outreach presentations to NTWC, NTC, Regional Indian Coordinators, and RTOCs in Regions 5, 6, 8, 9, and 10. As resources allow, conduct outreach with additional organizations.

2019 — 2020 — 2021 — 2022

See 4 more milestones in the WRAP Online Platform

Assemble existing tribal reuse examples and expressions of interest/needs identified through initial outreach engagements with tribal organizations.
April 2020

March 2020
Identify a "working group" of 4 to 5 interested tribal representatives to work with EPA to assess tribal interests and needs. These representatives may be from individual tribes and national/regional associations.

Support Local and Regional Reuse Projects by Identifying Challenges, Opportunities, and Models for Interagency Collaboration (Action 2.2.16)

DESCRIPTION:
Identify institutional challenges to water reuse, assess opportunities for interagency collaboration, and publicize agreements and other legal models that support implementation of water reuse and other integrated water management projects among "water cycle" utilities.

ACTION LEADER(S):
- Eric Rosenblum
- WateReuse—Greg Fogel
- EPA—David Smith

PARTNER(S):
Bahman Sheikh, Robert S. Raucher, Felicia Marcus, Regional and State Sections of WateReuse

> "The Action Plan cannot overlook the opportunity to support collaboration on a regional and local level between water and wastewater utilities."
>
> –E. Rosenblum, R. Raucher, B. Sheikh

July 2020
Develop the project implementation approach, consisting of: 1) technical approach to be used for assessing interagency governance issues/models and developing the project report; and 2) post-report outreach and education plan, including WateReuse Symposium session, webinar, and other platforms.

September 2020
Prepare and submit a proposal for a session at the 2021 WateReuse Symposium.

January 2021
Prepare a report to be submitted to EPA and posted on the WateReuse Association website and the EPA Water Reuse Action Plan website summarizing institutional challenges, innovative governance structures and models, and critical factors to consider in selecting among available interagency collaboration models. Draft report will be reviewed by external reviewers identified by the action leads prior to submittal.

2019 — 2020 — 2021 — 2022

See 4 more milestones in the WRAP Online Platform

Perform a literature review of institutional challenges to water reuse projects, innovative governance structures that support or incentivize enhanced cooperation; and agreement models that allow agencies to work together as "virtual utilities" acting in a coordinated manner.
August 2020

With the active support of the WateReuse Association regional and state sections and EPA, identify examples of water reuse governance models and interagency agreements used successfully by water agencies and communities. Select at least four case studies of different kinds of interagency agreements. Analyze their advantages, constraints, similarities, differences, and adaptability to different settings.
November 2020

> "It challenges each of us in the water policy and management sector to reimagine the way we tackle 20th century water quantity and water quality challenges, relying on integrated water resources management principles to steer our collective and individual efforts towards a more sustainable future."
>
> —New Mexico Environment Department

2.2 Policy Coordination

Propose U.S. Army Corps of Engineers Nationwide Permit Addressing Reuse (Action 2.2.17)

DESCRIPTION:
Propose a new nationwide permit to clarify the U.S. Army Corps of Engineers general permitting of certain activities associated with water reuse projects. If such a nationwide permit were finalized, certain activities associated with construction of facilities and infrastructure related to water reuse projects could be approved at a more rapid rate, pending adherence to standard criteria for being minimally impactful to the environment.

ACTION LEADER(S):
USACE—Jennifer Moyer

PARTNER(S):
None identified at this time

U.S. Army Corps of Engineers employees evaluate vegetation and record data in a riparian area.

January 2020 ✓
Identify reference criteria or standards by which water reuse facilities and water reuse infrastructure projects must comply in order to be considered minimally impactful to the environment.

March 2020
Conduct a national scale cumulative impact assessment in accordance with the National Environmental Policy Act (NEPA) definition of "cumulative impact" at 40 CFR part 1508.7

April 2020
Post draft nationwide permit for public review.

June 2020
Review public comments and make any necessary modifications.

August 2020
Publish final nationwide permit.

2019 — 2020 — 2021 — 2022 — 2023 — 2024

See 1 more milestone in the WRAP Online Platform

At the Hawks Prairie Ponds in Lacey, Washington, reclaimed water flows through several wetland ponds before entering groundwater recharge basins.

> "While water reuse is primarily a local issue driven by the local demand compared to the locally available supply, GCA believes that need for improvement in the underlying science and technology associated with reuse of water is necessary and more effectively addressed on the federal level."
>
> —Gulf Coast Authority

2.3 Science and Specifications

A compilation of existing fit-for-purpose treatment specifications and a focused effort to develop new specifications for all potential end uses of reclaimed water would facilitate a better understanding and consideration of potential sources and use applications.

Compile Existing Fit-for-Purpose Specifications (Action 2.3.1)

DESCRIPTION:
Compile existing fit-for-purpose specifications (e.g., chemical and microbial) for different sources of water for potential reuse and end-use applications. The compilation will rely on federal, state, and international sources to inform water reuse best practices and facilitate broader implementation of reuse projects.

ACTION LEADER(S):
EPA—Sharon Nappier

PARTNER(S):
ACWA, AMWA, ASDWA, WRF, WateReuse

> "States agree that any water reuse aspiration or action must be evaluated with risks to public health, which states and EPA are charged to protect, as the central consideration..."
> –ASDWA and ACWA

March 2020
Coordinate with Action 2.2.1 (compilation of state policies) to ensure the state compilation methodology identifies and extracts fit-for-purpose specifications.

September 2020
Assemble/convene representatives to collaborate on the design approach for the compilation, including combining the state compilation with identified federal and international specifications.

March 2021
Prepare interim product for peer review to ensure all sources have been considered in the compilation.

2019 — 2020 — 2021 — 2022

Secure contractor support to facilitate the compilation design and execution.
April 2020

Identify all documents needed and define/organize how information will be displayed.
December 2020

See 1 more milestone in the WRAP Online Platform

Convene Experts to Address Opportunities and Challenges Related to Urban Stormwater Capture and Use (Action 2.3.3)

DESCRIPTION:
Convene a small group of approximately 25 national experts to review potential for urban stormwater capture for use; assess institutional, legal, financial, and technical barriers to advancing stormwater capture for use; and recommend key actions to address these challenges. The convening will involve representatives from states, local stormwater programs, NGOs, and other expert organizations.

ACTION LEADER(S):
- EPA—David Smith and Chris Kloss
- JFW—Danielle Johnson
- NMSA—Seth Brown
- ReNUWIt—Dr. Richard Luthy
- WateReuse—Greg Fogel
- WEF—Claudio Ternieden

PARTNER(S):
ACWA, AMWA

Landscape view of the Johnson Foundation's conference center, Wingspread, which will host the stormwater capture and use convening.

April 2020
Secure third-party facilitation support for meeting planning, implementation, and report writing.

April 2020
Identify and invite participants (25 max.).

June 2020
Develop meeting agenda and roles of the participants.

2019 — 2020 — 2021 — 2022

Frame meeting concept and approach.
April 2020

Query meeting participants to identify stormwater capture opportunities and challenges and summarize information for use at the meeting.
May 2020

See 7 more milestones in the WRAP Online Platform

> "[The] federal support is particularly relevant as communities look to better include water reuse options in developing integrated planning and one water frameworks."
> —National Association of Clean Water Agencies

2.3 Science and Specifications

Develop Research and Tools to Support the Implementation of Onsite Non-Potable Water Reuse Systems (ONWS) (Action 2.3.4)

DESCRIPTION:
Conduct research and develop training programs, planning approaches, and decision support tools to support the implementation of onsite non-potable water systems that are protective of public health. The National Blue Ribbon Commission for Onsite Non-potable Water Systems will lead this action and is committed to developing research to refine and expand risk-based water quality standards for use in onsite non-potable water systems.

ACTION LEADER(S):
National Blue Ribbon Commission (NBRC) for ONWS—Paula Kehoe

PARTNER(S):
California State Water Resources Control Board, USACE, EPA, U.S. Water Alliance, WRF, WateReuse

The San Francisco Public Utilities Commission building irrigates exterior vegetation using onsite water reuse.

April 2020
Publish training manual on how to design and permit onsite non-potable water systems (ONWS).

December 2021
Develop and release decision support calculator tool to quantify the availability of alternative water sources for building scale reuse.

2019 — 2020 — 2021 — 2022 — 2023

See 3 more milestones in the WRAP Online Platform

Hold annual meetings for commissioners.
September 2020

Refine and expand fit-for-purpose specifications for alternative onsite sources of water and non-potable end uses.
December 2022

Assess Specifications for Potential Reuse of Wastewater in Food Animal Protein Processing Facilities (Action 2.3.5)

DESCRIPTION:
Establish a process for potential reuse of onsite animal protein processing wastewater for all food processing applications (including food contact) that maintains protection of food quality and consumer health. Specific objectives are to characterize the quality of animal protein processing wastewater, determine the treatment requirements necessary to achieve public health benchmarks, and identify potential treatment train configurations to meet treatment targets.

ACTION LEADER(S):
EPA—Jay Garland

PARTNER(S):
National Tyson Foods Inc. (Tyson), USDA, AMWA

The Tyson Fresh Meats beef plant in Holcomb, Kansas, represents a high risk area for water stress. With water usage at 1.5 billion gallons per year, this location represents a prime potential candidate for water reuse.

May 2019 ✓
Establish Cooperative Research and Development Agreement (CRADA) to enable collaboration between EPA and Tyson Foods.

March 2021
Determine the fit-for-purpose specifications for this source of water and potential use applications.

2019 — 2020 — 2021 — 2022

Characterize the quality of animal protein processing wastewater with a focus on the occurrence and density of zoonotic pathogens and relevant chemicals of concern.
December 2020

Identify potential treatment train configurations to meet treatment targets to be made available via reports and journal articles.
July 2021

> "The Metro Water District recognizes that water reuse has a critical role in developing a resilient region and has developed region-specific policies and plans that focus on reuse applications that are most appropriate to our watersheds, our water supply needs, and the role the U.S. Army Corps of Engineers' reservoirs play in our reuse systems."
>
> —Metropolitan North Georgia Water Planning District

2.4 Technology Development and Validation

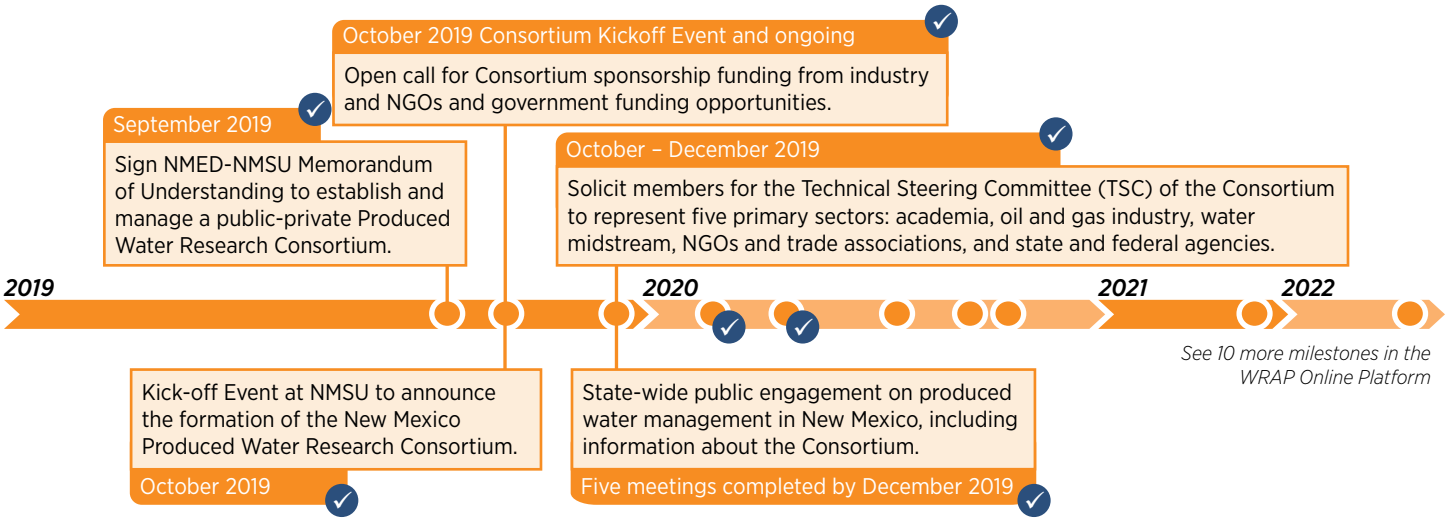
Advances in treatment technologies and corresponding information on technology performance can accelerate water reuse opportunities.

Implement New Mexico Produced Water Research Consortium to Identify and Fill Science and Technology Gaps for Off-Field Use of Treated Produced Water (Action 2.4.2)

DESCRIPTION:
Based on a Memorandum of Understanding between the New Mexico Environment Department (NMED) and New Mexico State University (NMSU), NMSU will lead and manage the New Mexico Produced Water Research Consortium (Consortium) with participation from dozens of research, regulatory agency, oil and gas, NGO, and midstream experts. The Consortium will build on existing and emerging science and technology research, development, and demonstration to address current science and technology gaps to better inform regulations and policies for the use of treated produced water outside the oil and gas industry. Such regulations and policies will protect the environment and public health and safety while reducing fresh water use.

ACTION LEADER(S):
NMED—Rebecca Roose

PARTNER(S):
NMSU, NM-PWRC



See 10 more milestones in the WRAP Online Platform

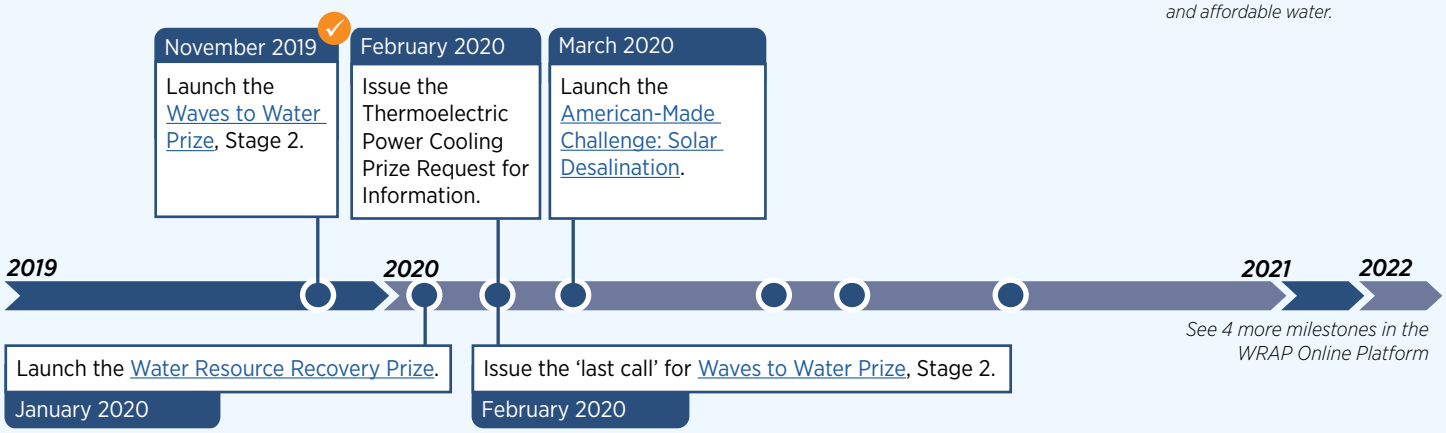
Support Water Reuse Through the U.S. Department of Energy's Water Security Grand Challenge (Action 2.4.3)

DESCRIPTION:
The Water Security Grand Challenge is a White House initiated, U.S. Department of Energy (DOE) led framework to advance transformational technology and innovation to meet the global need for safe, secure, and affordable water. Using a coordinated suite of prizes, competitions, early-stage research and development, and other programs, the Grand Challenge has set five goals for the United States to reach by 2030. DOE is supporting several prize competitions related to water reuse.

ACTION LEADER(S):
DOE—Diana Bauer

PARTNER(S):
EPA, DOI, USDA, DoD, EPRI

DOE's Water Security Grand Challenge consists of five challenges that aim to advance technology and innovation to meet the global need for safe, secure, and affordable water.



See 4 more milestones in the WRAP Online Platform

> "Governments at all levels and non-governmental organizations should draw on the sound science and long history of water reuse in different parts of the country that can provide the basis for greater acceptance of this water management approach."
>
> —National Ground Water Association

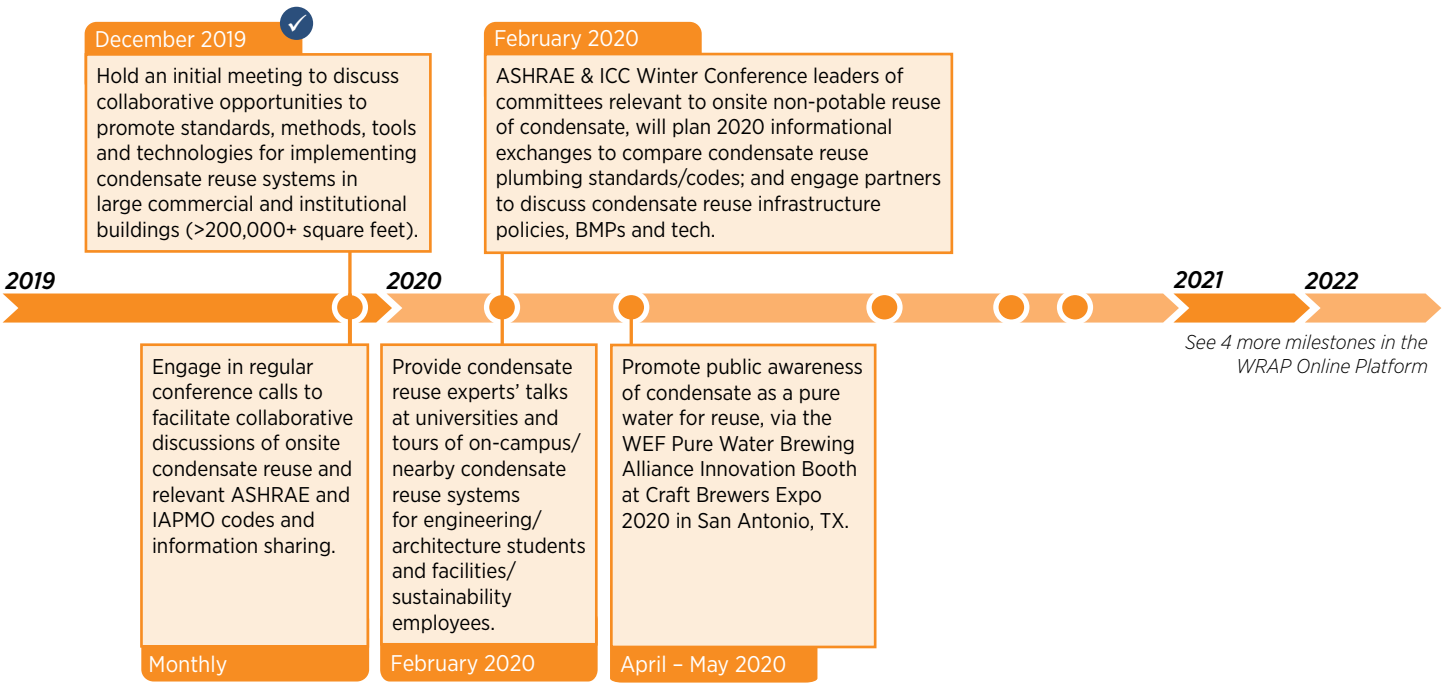
Promote Air-Cooling Condensate Water Reuse Standards, Methods, Tools and Technologies for Implementing Systems in Large Buildings (Action 2.4.5)

DESCRIPTION:
To promote the water efficiency of large commercial and institutional buildings via onsite reuse of air-cooling (A/C) condensate (a significant alternative water resource safe for irrigation, cooling towers, and other non-potable purposes), experts will engage in professional events, teaching, and cooperative activities to interest colleagues, students, and stakeholders in implementing condensate reuse systems. Outcomes will include integrating condensate reuse technical standards and safety guidance, as well as promoting use of new tools and technologies (e.g., smart meters and data analytics digital cloud/broadband platforms) as best management practices (BMPs).

ACTION LEADER(S):
- ASHRAE—Thomas Lawrence and Fred Betz
- IAPMO—Pete DeMarco
- EPA—Greg Eades and Jay Garland
- WW—John Wammes
- WTA—Gaby Schubert

PARTNER(S):
AWU, USGBC, ASLA, AHA and ASHE Sustainability Program, ICC, GCCI, LADWP, PHASC, ISPE, MWD, NBRC for ONWS, NSU, NeoTech Aqua, IU, Rice University, SAWS, SWAN, GCE, GlaxoSmithKline, JCI, UC Merced, Wahaso, WEF, Xylem (Sensus), WateReuse

GlaxoSmithKline (Upper Providence, Pennsylvania) air handler condensate is reused by their cooling towers, resulting in 9 million gallons water savings in 2019, equivalent to $140,000 in cost savings and a 14.3 percent reduction in water use.



See 4 more milestones in the WRAP Online Platform

> "Without recycled water, these lands, located in northern Monterey County—known to many as the salad bowl of the world, would have become unusable rather than valuable, world-wide distributors of delicious produce."
>
> —Monterey One Water

2.5 Water Information Availability

Data and information on the quality and quantity of available water can improve opportunities for water reuse.

Foster U.S. Department of Agriculture Watershed-Scale Pilot Projects to Share Water Information to Support Water Reuse Actions (Action 2.5.1)

DESCRIPTION:
The U.S. Department of Agriculture (USDA) will foster watershed-scale projects to share water information to support water reuse actions. The Natural Resources Conservation Service's (NRCS) Conservation Innovation Grants (CIG) program is a competitive grants program that drives public and private sector innovation in resource conservation. CIG projects inspire creative problem-solving that boosts production on farms, ranches, and private forests—ultimately improving water quality, soil health, and wildlife habitat.

ACTION LEADER(S):
USDA—Clarence Prestwich

PARTNER(S):
None identified at this time

Terraces, buffers, and conservation tillage are among the practices being used by Shelby County, Iowa, farmers in a water quality improvement project to benefit a nearby lake.

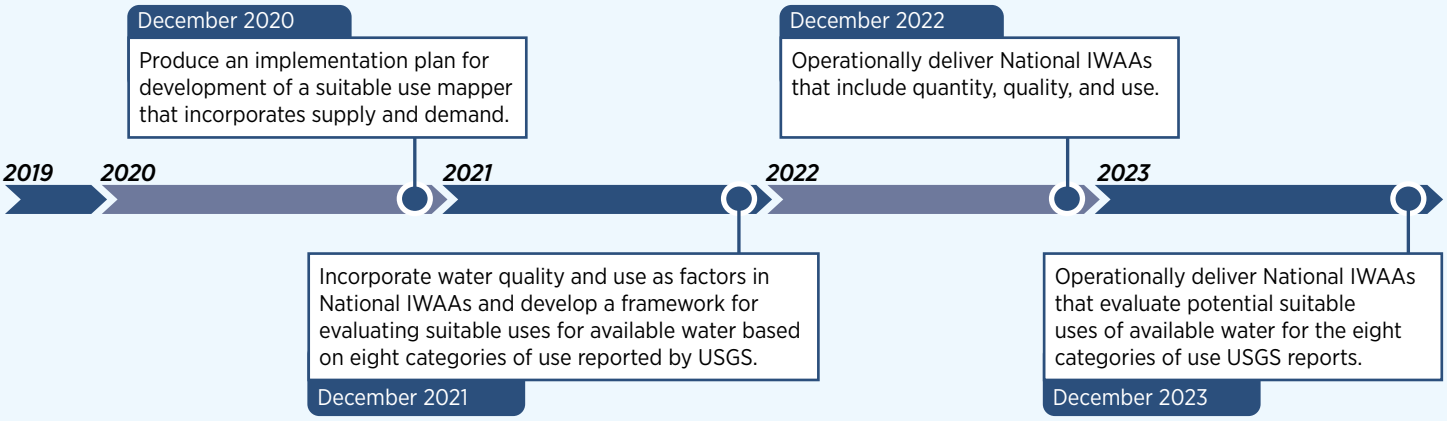
Develop National Integrated Water Availability Assessments (Action 2.5.4)

DESCRIPTION:
The USGS, through Integrated Water Availability Assessments (IWAAs), is developing the capacity to understand current and future water availability in terms of quantity, quality, and use. By the end of calendar year 2023, a phased development plan will provide operational reporting of integrated water availability and potential suitable uses for all eight categories of use currently reported by USGS.

ACTION LEADER(S):
USGS—Mindi Dalton

PARTNER(S):
None identified at this time

> "Using data to target watersheds with reuse potential could provide for more efficient use of state resources."
>
> –New Mexico Environment Department



> "The Chamber recommends that EPA continue to cooperate with leading organizations and countries (e.g., Israel) to ensure implementation of the most effective reuse solutions and associated funding options."
>
> —U.S. Chamber of Commerce

At the Bertschi School in Seattle, Washington, wall-mounted micron filters and UV disinfection treat reused water to a potable standard. The school also treats its graywater using a green wall that is shown in the background.

2.6 Finance Support

Improved understanding of water reuse finance options can enable water reuse projects.

Compile Existing Federal Funding Sources for Water Reuse and Develop an Interagency Decision Support Tool (Action 2.6.1)

DESCRIPTION:
Federal agencies' sources of funding will be compiled and analyzed to inform the development of an interagency decision support tool to assist organizations with navigating funding options and application processes. Showcased on the EPA Water Finance Clearinghouse website, the tool will include resources or funding sources to scale up impact and availability of assistance for water reuse efforts.

ACTION LEADER(S):
EPA—Sonia Brubaker, Stephanie Santell, and David Smith

PARTNER(S):
USDA, FEMA, Reclamation, DOE, USACE, HUD, DOT

> "Ensuring states and local governments have access to federal water infrastructure funding to support water reuse projects will help spur innovative water supply solutions at the local, state, or regional levels."
>
> –National Association of Home Builders

April 2020
Identify federal funding agency leads for project, define decision support criteria, and initially review federal funding sources for water reuse projects.

June 2020
Define and prioritize requirements to develop the functionality of the tool. Conduct user engagement exercises to inform and calibrate tool specifications based on user needs.

2019 — 2020 — 2021 — 2022

See 3 more milestones in the WRAP Online Platform

May 2020
Host a workshop with EPA and federal partners to identify the highest priority funding or financing programs to include in the tool.

May 2020
Develop a decision support tree that will form the foundation of the tool, based on information gathered during both the review and workshop.

Clarify and Communicate the Eligibility of Water Reuse Under the Clean Water and Drinking Water State Revolving Fund Programs (Action 2.6.2a)

DESCRIPTION:
Work with states to clarify the extent of reuse projects' eligibility by evaluating how EPA and individual states' Clean Water and Drinking Water State Revolving Fund (SRF) materials currently consider eligibility of reuse projects for funding. This will clarify eligibility for the full range of potential sources of water for reuse and different end use applications.

ACTION LEADER(S):
EPA—Kelly Tucker, Kiri Anderer, and Mark Mylin

PARTNER(S):
CIFA, ACWA, ASDWA

> "Communities are seeking funding for projects that address the impacts of climate change and diversify their water portfolios to include sustainable sources of water, such as recycled water. These are often complex projects that require significant investment."
>
> –Santa Clara Valley Water District

February 2020
Prepare a simple matrix of the five major sources of water for potential reuse and their potential end uses to identify those that are eligible for SRF funding.

April 2020
Present the WRAP and the progress on this action at the CIFA Water Infrastructure and Investment Summit, April 15-16, 2020 in Washington D.C.

June 2020
Compile and maintain a cumulative tally of SRF funding for water reuse, summarizing the number and dollar value of funded reuse projects.

2019 — 2020 — 2021 — 2022

See 3 more milestones in the WRAP Online Platform

March 2020
Provide water reuse project highlights in CIFA newsletters.

June 2020
Compile list of water reuse projects funded through CWSRF and update the CWSRF Benefits Reporting (CBR) database. Update the CBR sorting criteria to identify reuse projects more easily.

> "Technology validation processes can be complicated and variable between individual states; this issue presents an opportunity for EPA to assist in streamlining and standardizing technology validation processes to enable faster adoption of new technologies."
>
> —Denver Water

2.6 Finance Support

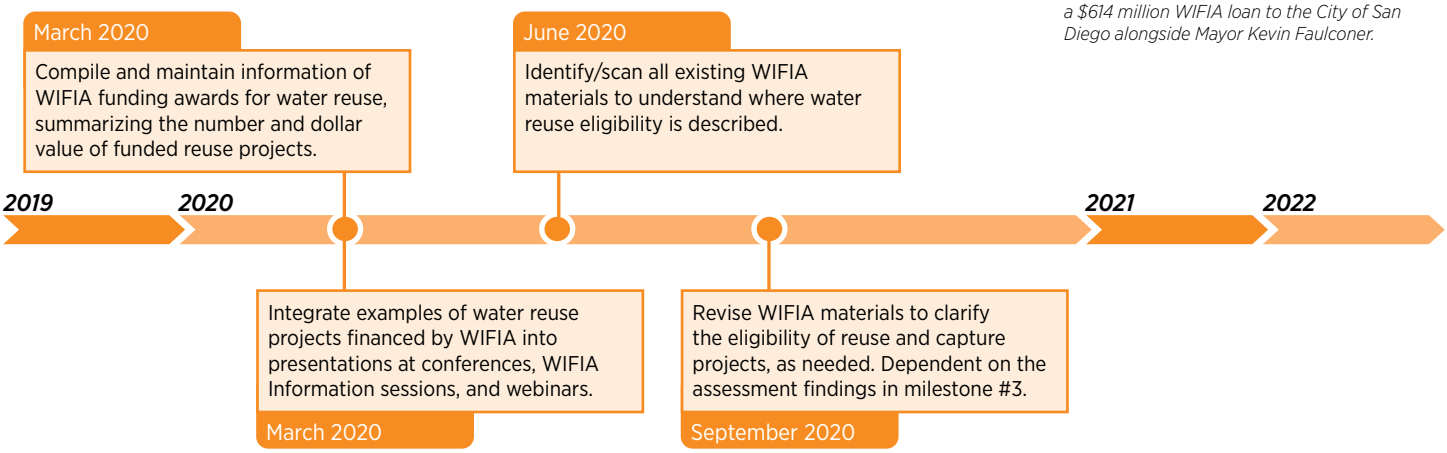
Continue to Actively Support and Communicate the Eligibility of Water Infrastructure and Financing Innovation Act Funding for Water Reuse (Action 2.6.2b)

DESCRIPTION:
Promote the eligibility of Water Infrastructure and Financing Innovation Act (WIFIA) financing for water reuse projects. EPA will review existing WIFIA outreach materials to assess the extent water reuse is mentioned in the materials and work to clarify and communicate the eligibility of WIFIA funding for water reuse projects.

ACTION LEADER(S):
EPA—Jorianne Jernberg

PARTNER(S):
None identified at this time

Acting EPA Administrator Andrew Wheeler signs a $614 million WIFIA loan to the City of San Diego alongside Mayor Kevin Faulconer.



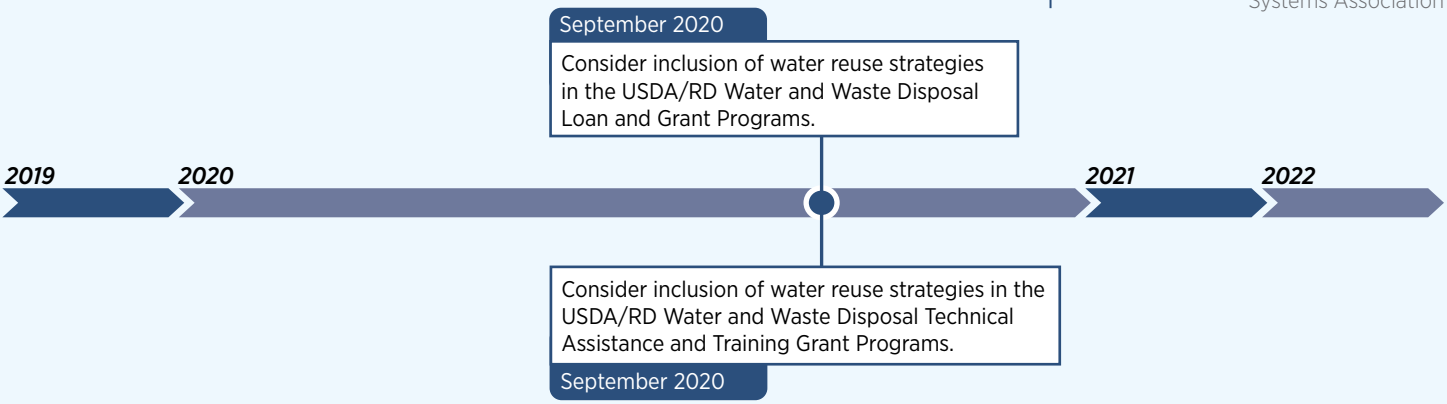
Compile and Promote Existing U.S. Department of Agriculture Funding and Resources for Rural Communities (Action 2.6.4)

DESCRIPTION:
Identify, compile, and promote U.S. Department of Agriculture (USDA) funding opportunities for water and wastewater infrastructure projects that can advance reuse and conservation, such as the Rural Development's Water and Waste Disposal Loan and Grant Program and NRCS' Conservation Innovation Grant. Provide information and technical assistance to both rural communities and farmers on assessing opportunities for water reuse.

ACTION LEADER(S):
USDA—Edna Primrose

PARTNER(S):
EPA, NRWA, RCAP

> "Key agencies at USDA, such as NRCS and Rural Development, are uniquely positioned to promote the consideration and integration of agricultural reuse through financing and grants, technical assistance, and conservation initiatives."
>
> –American Rainwater Catchment Systems Association



> "... stakeholders across Kansas have identified water reuse as a priority both from a water conservation planning standpoint as well as a potential additional source of water supply."
>
> —Kansas Water Office

2.7 Integrated Research

Enhanced coordination of past and future water reuse research can optimize its value, better identify critical gaps, and speed delivery to users.

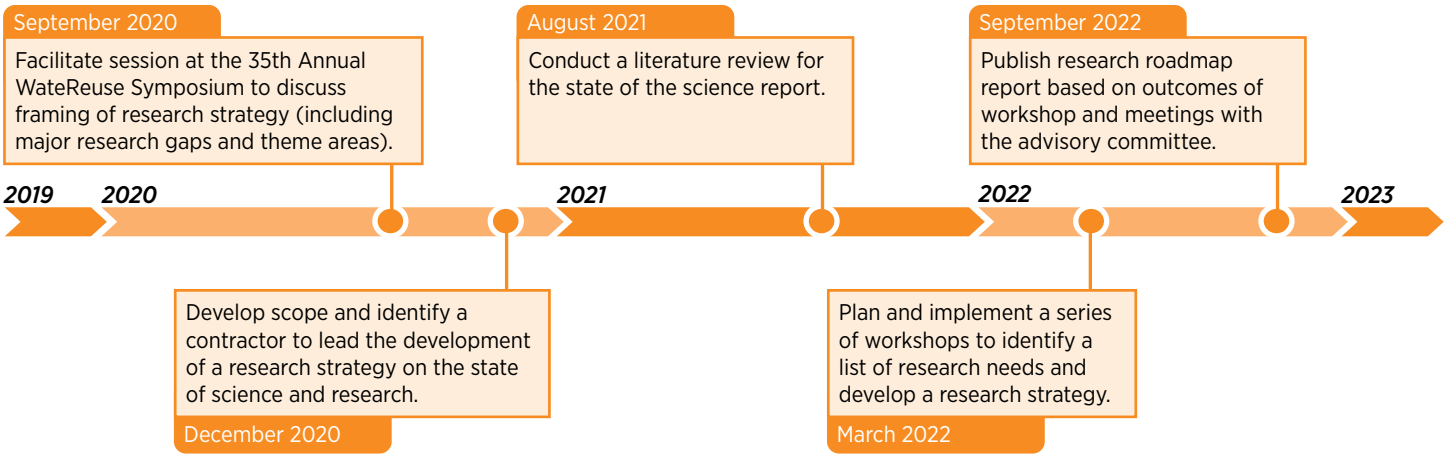
Develop a Coordinated National Research Strategy on Water Reuse (Action 2.7.2)

DESCRIPTION:
In order to best leverage water reuse research efforts, a coordinated national water reuse research strategy should be developed. The strategy should include a prioritized list of research needs across various water reuse applications and sources of water for potential reuse, including those specific through public input.

ACTION LEADER(S):
WRF—Julie Minton

PARTNER(S):
EPA, WateReuse, WEF

> "Developing a coordinated research strategy on water use and reuse could provide a starting point from which future efforts to expand water reuse could be compared. A common research strategy could also help to inform potential water reuse approaches at the state and municipal levels."
>
> –National Association of Home Builders



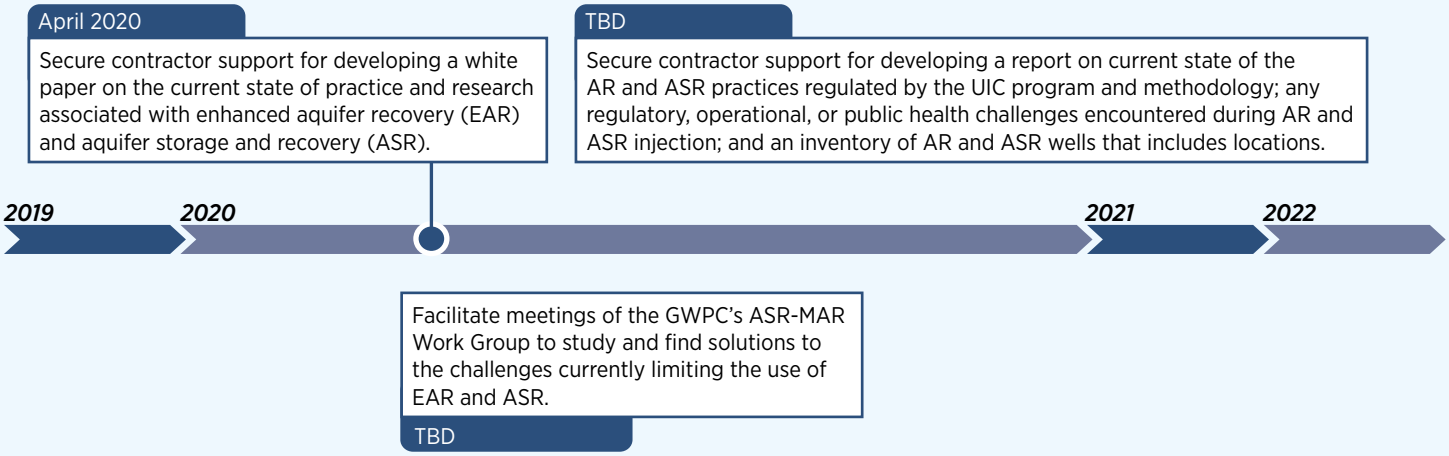
Increase Understanding of Current Aquifer Storage and Recovery Practices (Action 2.7.4)

DESCRIPTION:
Aquifer recharge is a growing practice in response to water scarcity concerns, yet there are apparent differences in how it is described, implemented and managed. This action seeks to better understand the range of aquifer storage and recovery practices and corresponding efforts to ensure the protection and sustainability of ground water resources.

ACTION LEADER(S):
- GWPC—Mike Paque
- EPA—Jeff Lape and Kara Goodwin

PARTNER(S):
USDA, NGWA

> "To fully utilize [aquifer storage and recovery/ managed aquifer recharge systems], collaboration is needed between all interested parties (e.g., local, state, tribal, and federal) to conduct research that will provide additional information for planners to consider."
>
> –Ground Water Protection Council



> "The GWPC agrees that water reuse represents a major opportunity to supplement existing water supplies and can be obtained from many potential sources such as industrial process water, agricultural return flows, municipal wastewater, oil and gas produced water, and stormwater."
>
> —Ground Water Protection Council

2.7 Integrated Research

Coordinate and Promote Water Reuse Technology in Federal Small Business Innovation Research Programs (Action 2.7.5)

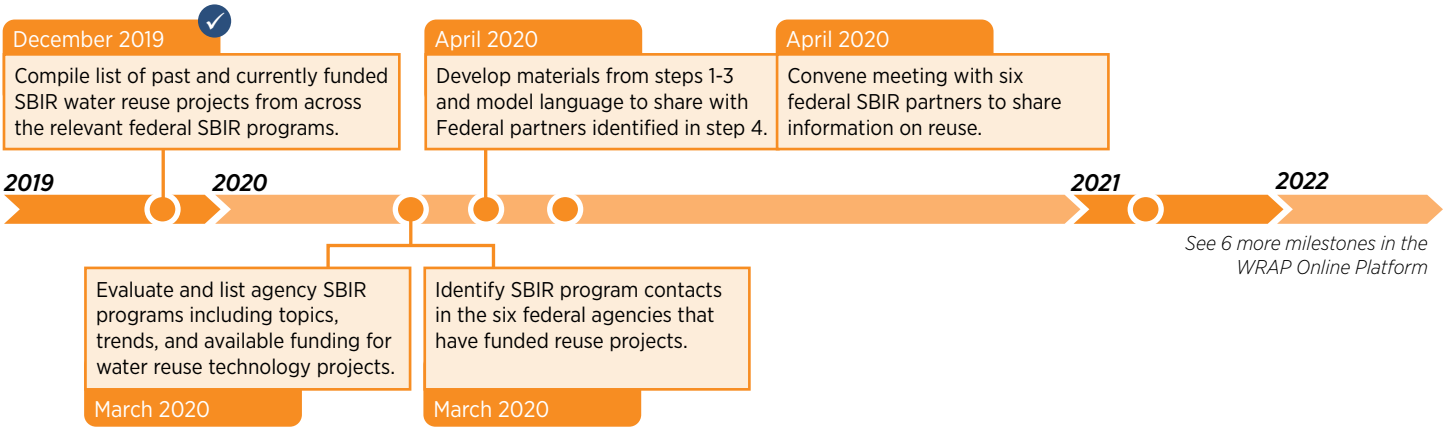
DESCRIPTION:
This action will seek opportunities to optimize water reuse technology development through Federal Small Business Innovation Research (SBIR) solicitations. This action will also evaluate past and current water reuse projects funded through SBIR to evaluate technology gaps and help inform development of common language for reuse technology priority areas for SBIR solicitations.

ACTION LEADER(S):
EPA—April Richards

PARTNER(S):
Federal Small Business Innovation Research (SBIR) Programs

EPA SBIR
AMERICA'S SEED FUND FOR ENVIRONMENTAL INNOVATION

EPA's Small Business Innovation Research Program, established in 1982, provides financial support for small businesses in the development and commercialization of environmental technologies.



See 6 more milestones in the WRAP Online Platform

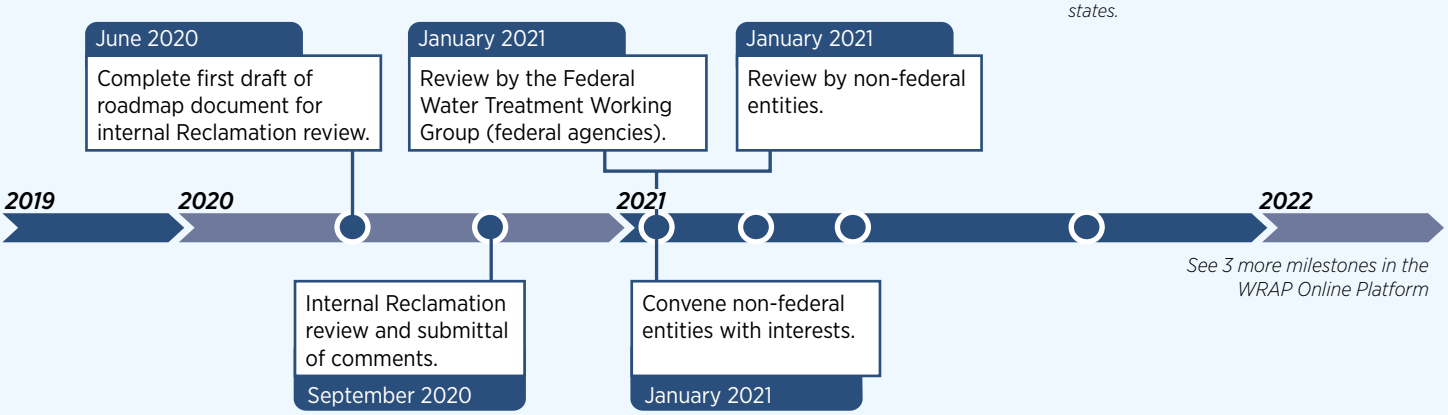
Develop U.S. Bureau of Reclamation Advanced Water Treatment Research Roadmap (Action 2.7.6)

DESCRIPTION:
Through development of an Advanced Water Treatment Research Roadmap, the U.S. Bureau of Reclamation will identify research needs in the area of advanced water treatment. Opportunities should be of importance to the U.S. Bureau of Reclamation, other federal agencies, and the non-federal water treatment experts in order to increase collaboration and partnership opportunities and leverage research across agencies. This new Roadmap will update the decade old Reclamation Desalination Roadmap and capture the research needs where other federal and non-federal experts have similar needs.

ACTION LEADER(S):
Reclamation—Yuliana Porras-Mendoza

PARTNER(S):
WaTr

The Brackish Groundwater National Desalination Research Facility develops technologies for the desalination of brackish and impaired groundwater found in the inland states.



See 3 more milestones in the WRAP Online Platform

"We applaud the development of this document as the actions align with our goal to pursue technology innovation in water reuse."
—City of Roseville

2.8 Outreach and Communications

A critical aspect of implementing a successful water reuse program across applications is public acceptance and user confidence.

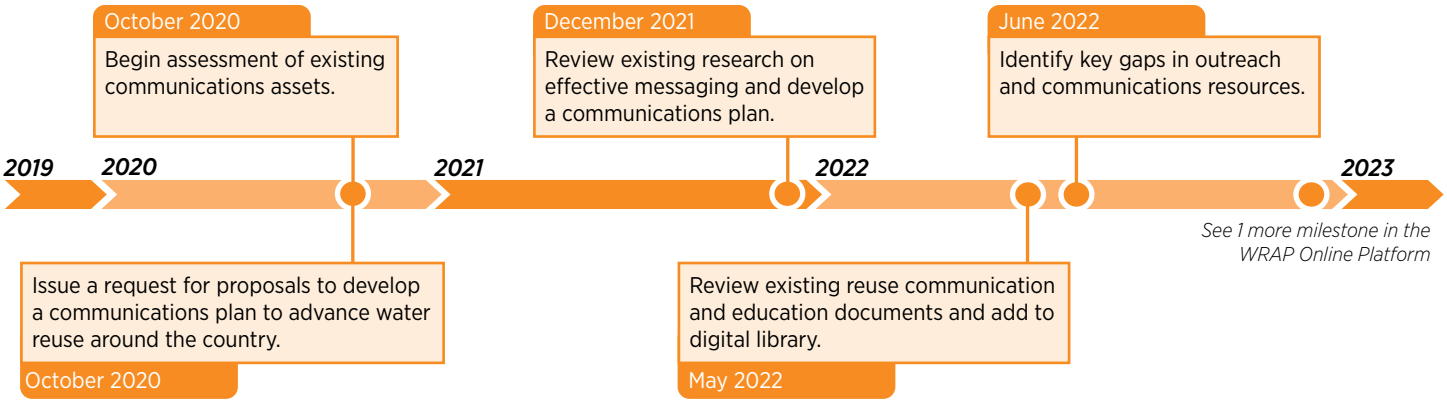
Compile and Develop Water Reuse Program Outreach and Communication Materials (Action 2.8.1)

DESCRIPTION:
Develop a water reuse communications strategy and develop new outreach and communications materials based on the needs articulated by stakeholders. Materials could address programmatic themes with the overarching goal to educate key audiences, such as the public, decision makers, and key message carriers.

ACTION LEADER(S):
WateReuse—Pat Sinicropi and Greg Fogel

PARTNER(S):
WEF

El Paso's TecH2O Learning Center hosts thousands of students for field trips every year, helping next generation water customers appreciate the value of water.



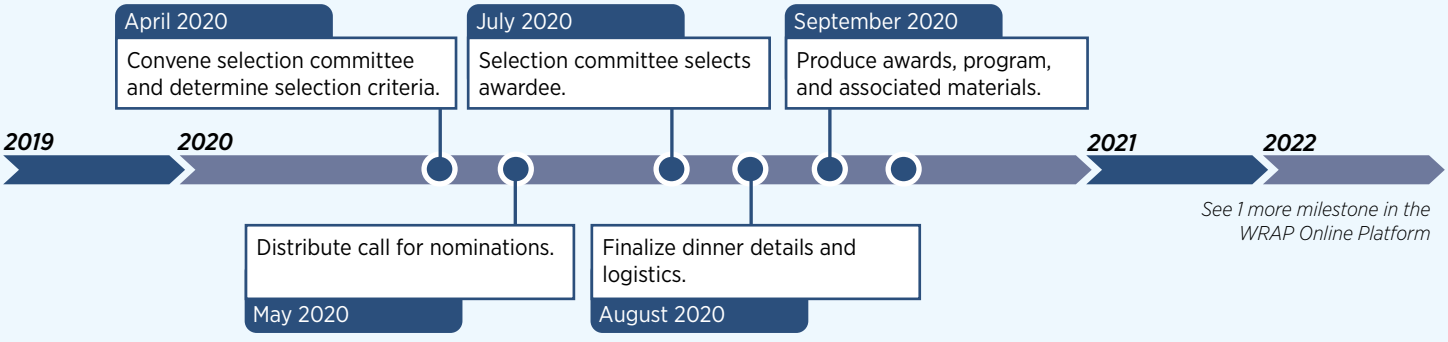
See 1 more milestone in the WRAP Online Platform

Establish a Water Reuse Champion Award Program for Private Sector Companies (Action 2.8.4)

DESCRIPTION:
GreenBiz and the WateReuse Association will partner to develop and present an awards program at VERGE 20, a conference and expo dedicated to advancing the clean economy. The Water Reuse Champion award will be provided by peers to peers among American corporations to showcase that water recycling is helping companies achieve their stewardship values and water management goals.

ACTION LEADER(S):
- GreenBiz Group—Pete May
- WateReuse—Greg Fogel

PARTNER(S):
None identified at this time



See 1 more milestone in the WRAP Online Platform

> "With proper implementation, it will also help promote infrastructure investment, regulatory certainty; and climate resilience through more effective use of the nation's water resources, without compromising public health or environmental protection."
>
> —Maryland Department of the Environment

2.9 Workforce Development

Water reuse is driving a new generation of treatment technologies, monitoring, and operations and maintenance needs that, in general, exceed existing workforce capabilities.

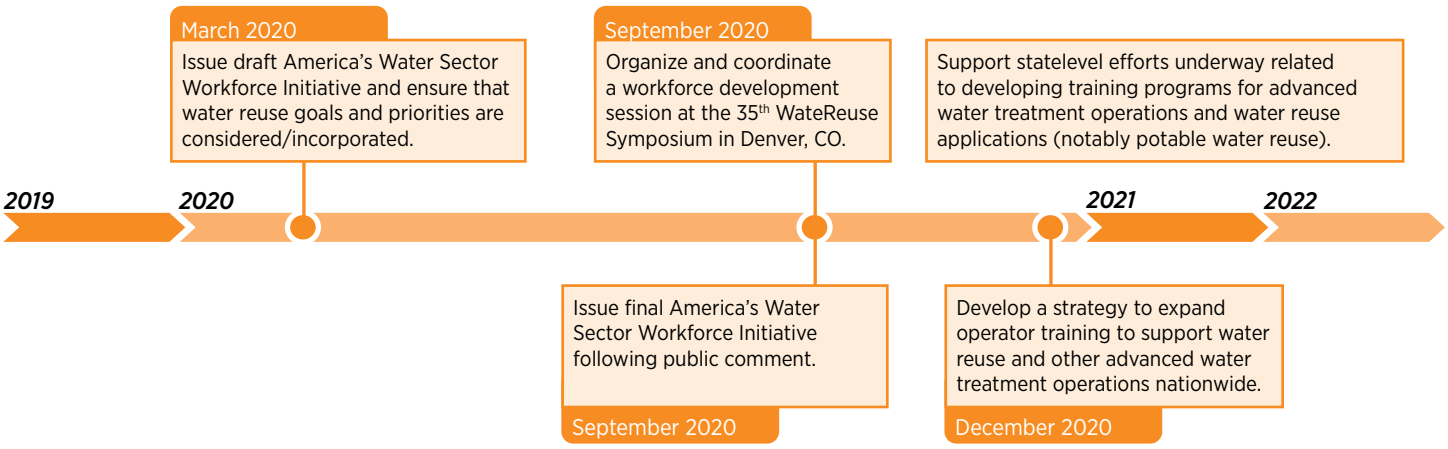
Support and Promote Opportunities for Creating a Skilled Workforce for Water Reuse Applications (Action 2.9.2)

DESCRIPTION:
This action will explore early steps to help prepare the water workforce for the increasingly complex and expansive role that water reuse will play in the coming years. For example, enhanced operator training and other workforce education may be needed to address the design, operation, and regulatory requirements related to various reuse applications and technologies.

ACTION LEADER(S):
- EPA—Jim Horne
- WateReuse—Greg Fogel
- AWWA—Barb Martin
- WEF—Claudio Ternieden

PARTNER(S):
None identified at this time

> "EPA looks forward to capturing innovative ideas and collaborative actions through our Water Workforce Initiative so that we can take meaningful steps to ensure we have a strong water sector workforce for generations to come."
>
> –David Ross, Assistant Administrator for Water, U.S. EPA



Denver Water contractors install a purple pipe used to deliver recycled water in northeast Denver, Colorado.

> "As a key component of a water resilience portfolio, reuse is beneficial from an economic, environmental, and quality of life standpoint."
>
> —Irvine Ranch Water District

2.10 Metrics for Success

Setting goals and accountability for implementation of the actions in the WRAP can help ensure progress and results.

Facilitate Implementation of the National Water Reuse Action Plan (Action 2.10.3)

DESCRIPTION:
Provide the leadership, management systems, expertise, and capacity necessary to institutionalize water reuse and ensure effective long-term implementation of the National Water Reuse Action Plan (WRAP). This includes assuring the managing framework for the WRAP supports the principles of transparency, accountability, and collaboration. An online WRAP platform will serve as a main element, providing visual reporting of progress, and access to information. In the longer term, the WRAP Online Platform could become a dynamic space for interaction and collaboration among the water reuse community. Longer term governance will be considered.

ACTION LEADER(S):
EPA—Jeff Lape

PARTNER(S):
All WRAP Action Leaders

February 2020 ✓
Publish WRAP: Collaborative Implementation (Version 1) print product and launch the WRAP Online Platform.

March 2020
Establish EPA POCs for each active action and connect them with the action teams to help facilitate communication and updates to the WRAP Online Platform.

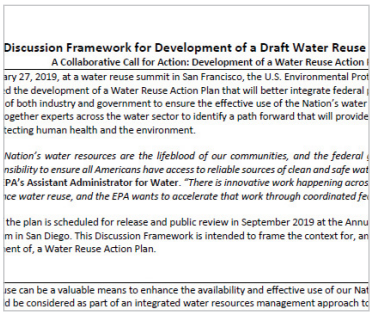
2019 — 2020 — 2021 — 2022

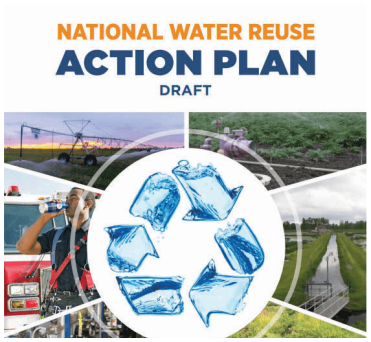
See 7 more milestones in the WRAP Online Platform

Establish water reuse points of contact (POCs) in each EPA Region and post list to EPA's website.
February 2020

Issue a request for proposals for a Cooperative Agreement to provide support to EPA's National Water Program for Innovation, Water Infrastructure, and Water Reuse.
May 2020

Update the WRAP Online Platform to reflect the progress of actions and implementation milestones.
July 2020


Discussion Framework for Development of a Draft Water Reuse
A Collaborative Call for Action: Development of a Water Reuse Action



This release of the WRAP: Collaborative Implementation (Version 1) is catalyzing partnerships and collaboration and launching specific actions (e.g. milestones, leads, partners and target dates) in a transparent and collaborative online platform. These actions and subsequent versions of WRAP implementation will be the basis for continued engagement and progress over time to meet the overall WRAP objectives.

> "Working together, we have more opportunities than ever before to leverage ground-breaking science and technological advancements."
>
> —New Mexico Environment Department

2.11 International Collaboration

Many international partners have substantial experience and demonstrated success with water reuse practices while other countries may benefit from the work begun under the WRAP.

Facilitate U.S.-Israel Collaboration on Technology, Science, and Policy of Water Reuse (Action 2.11.1)

DESCRIPTION:
Continue to engage in international activities (e.g., water technology transfers) that build capacity and strengthen bilateral, intergovernmental, and water stakeholder cooperation on water reuse and innovation. Because Israel is a global leader in water reuse, it is well-positioned to share lessons learned on developing expertise (engineers, scientists, and policy experts), technology, and infrastructure.

ACTION LEADER(S):
- EPA—Jeff Lape
- MoEP—Adam Schalimtzek

PARTNER(S):
DOS, Embassy of Israel, IWA, U.S. Embassy, WateReuse

EPA Administrator Andrew Wheeler toured the Shafdan Water Recycling Plant in Israel in 2019.

September 2019 ✓
Hold an initial Israel-U.S. government-to-government meeting to explore opportunities to collaborate on reuse policy, technology, and science.

March 2020 ✓
Develop draft itinerary for U.S. Delegation mission to Israel.

March 2020
Identify spectrum of U.S. interests/ delegates representative of municipal, industrial, and agricultural sectors to comprise the U.S. delegation.

2019 — 2020 — 2021 — 2022

See 4 more milestones in the WRAP Online Platform

Convene stakeholders to coordinate an initial plan for a U.S. Delegation mission to Israel.
December 2019 ✓

Conduct conference calls to facilitate discussions on reuse and obtain continuous feedback from Israel on action development.
At least quarterly

Raise Global Awareness and Preparedness for Water Reuse and the Water Reuse Action Plan (Action 2.11.2)

DESCRIPTION:
Seek opportunities to raise global awareness of water reuse and the Water Reuse Action Plan (WRAP) through our embassies and consulates using existing public diplomacy tools and resources. Identify new opportunities to message water reuse and the WRAP as an example of a whole-of-government effort to increase water reuse and promote water security.

ACTION LEADER(S):
DOS—Allie Davis

PARTNER(S):
DOI, USAID, USDA, EPA, USGS, Reclamation, DOE, USWP, WEF, WateReuse

The 2019 water management project in Kyrgyzstan is part of the Ambassador's Water Experts Program, which supports the U.S. Government's Global Water Strategy priorities.

January 2020
Incorporate water reuse into Department of State Environment, Science, Technology, and Health (ESTH) officer quarterly calls and annual trainings, if appropriate.

February 2020
Identify a list of priority countries to focus initial water reuse capacity building efforts.

February 2020
At the Interagency Water Working Group (IWWG), discuss and coordinate interagency efforts for water reuse globally and identify opportunities to further water reuse work and capacity building.

2019 — 2020 — 2021 — 2022

See 11 more milestones in the WRAP Online Platform

Organize a side event at Stockholm World Water Week 2020 to highlight WRAP and U.S. efforts for water reuse.
January 19, 2020

Host a global water reuse live webchats for World Water Day with watch parties at embassies and consulates.
March, 19 2020

> "While New York City does not share the same water scarcity concerns as many of our colleagues in other US cities, DEP regards water reuse, especially non-potable onsite water reuse, as an integral part of our emerging efforts to promote integrated and sustainable water resources management and to help address water quality issues in our coastal waters."
>
> —New York City Department of Environmental Protection

SECTION 3

Communicating Progress and Managing Forward

3.1 Launch of the WRAP Online Platform

This release of the Action Plan (Version 1) includes the launch of an online platform, which provides a repository to house and gain access to the full spectrum of actions—developed and undeveloped (Inset 9). It is intended to foster partnerships and collaboration across the water user community. The WRAP Online Platform is also intended to communicate the progress toward the implementation of actions that enhance water reuse consideration within the scope of the WRAP. It also aims to help interested parties identify opportunities to join in collective action and contribute their expertise to the effort.

The primary aspirations for the WRAP Online Platform are to:

- Identify actions, action leaders, implementation milestones, and target completion dates.
- Provide routine updates on progress for each of the actions.
- Create accountability for action progress.
- Illustrate and communicate ongoing activity.
- Provide a forum to highlight collaboration and partnership.
- Celebrate successes.
- Develop connections among diverse groups of stakeholders.

Inset 9. Maintaining a Pipeline for Future Actions

The WRAP Online Platform maintains information on all actions from the draft Action Plan, including those that are not developed at this time (i.e., do not have confirmed action leaders, partners, and implementation milestones). Some of these actions have undergone additional scoping and team building but are not yet moving forward. The online platform identifies the original action title and brief description of each of the undeveloped actions from the draft Action Plan. It also includes relevant quotes and interested collaborators identified in the public docket for each of these actions to help engender future collaboration. These actions (plus new ideas) will help form the pipeline of potential actions to be taken as part of subsequent WRAP versions and help ensure continued progress.

The WRAP Online Platform allows the water user community to see information about actions and their status. Through communication with action leaders, the information it presents will be updated routinely (e.g., quarterly) to maintain a relatively current reflection of each action's implementation. These routine action-specific updates will convey progress, including progress on implementation milestones. In addition, as established and communicated by action leaders, updates will incorporate:

- New implementation milestones for developed actions.
- New entities collaborating on implementation of actions.
- Links to relevant action outputs.
- Other expanded information for existing action implementation plans.
- Action implementation plans for newly developed actions.

> "...the EPA's extensive and ongoing outreach to a wide range of stakeholders will be critical to ensuring the final WRAP is comprehensive and implementable."
>
> —Western Resource Advocates

The EPA expects to play a substantial role in facilitating communication with and among action leaders, organizing information on action progress, and updating the WRAP Online Platform. As indicated in the action implementation plan for Action 2.10.3 ("Facilitate Implementation of the National Water Reuse Action Plan"), the EPA will assign a point of contact to help facilitate updates to the WRAP Online Platform.

Future iterations of the WRAP Online Platform may have more advanced features that increasingly serve the water user community in achieving the objectives of the WRAP.

3.2 Identification of New Ideas for Actions

The formal public comment period sought to identify other possible actions that are consistent with the objectives of the WRAP and will facilitate or improve consideration and implementation of water reuse. More than 25 new ideas for additional actions across nine strategic themes were identified through review of public docket comments and continued engagement with stakeholders. Table 3, below, lists suggested actions, organized by the relevant strategic theme. These suggested actions have not yet been developed and can be considered in subsequent versions of the WRAP.

Table 3. New Proposed Actions

Integrated Watershed Action
• Develop a water availability hierarchy to assist water users in assessing alternative water supplies • Research and develop tools to estimate watershed flow changes associated with reuse projects
Policy Coordination
• Incentivize collaboration between water, wastewater, and/or stormwater agencies to encourage integrated water reuse projects • Investigate institutional barriers to interagency recycled water projects and recommend solutions to facilitate their implementation • Research existing water laws, policy, and related practices to evaluate their flexibility in addressing long-term water demands, including reuse • Establish guidance, tools, and/or regulations for water reuse and treatment standards, including consistent terminology • Develop white paper outlining minimum requirements for implementing a water reuse project • Encourage water reuse considerations in all federally funded construction projects • Conduct a liability analysis for reuse projects to support subsequent regulatory and market activities • Support reuse projects with infrastructure to transport water to areas with high water demand • Leverage plumbing codes and standards to promote water reuse
Science and Specifications
• Develop a list of constituents of concern and acceptable levels (or ranges) in potable water reuse • Develop guidelines for reviewing and permitting fit-for-purpose reuse applications • Research fit-for-purpose specifications and data gaps for oil and gas produced wastewater • Develop a plan to manage and regulate high salt loads and disposal options from reuse water
Technology Development
• Develop consistent approval processes and standards for new treatment technologies • Research science and technology gaps for onsite urban and stormwater reuse • Research management and use for brine from reuse projects
Water Information Availability
• Create an online monitoring tool and evaluate use of surrogates to evaluate treatment technology performance • Develop tools to help local water managers evaluate requirements, resources, and benefits associated with implementing reuse projects

"Over the course of many months working with our members, it is clear that leadership by the federal family will be critical in helping to leverage and inspire action by non-federal actors."

—WateReuse, NACWA, AWWA, WEF, AMWA, and WRF

Finance Support
• Document financial requirements to fully implement potable water projects to ensure long-term protection of public health • Encourage financial incentives, including mitigation credits, for facilities using reuse water • Document and provide resources to encourage reuse projects, including regulatory support • Develop a risk-based framework to determine return on investment and feasibility of reuse projects
Outreach and Communications
• Incorporate water reuse provisions into private sector product certification and labeling programs
Workforce Development
• Credit military experience toward water reuse certification programs on a national basis
Metrics for Success
• Launch an industry challenge for Water Reuse

Ideas listed in this table have been compiled, consolidated, and revised based on suggestions received through the public docket and continued engagement with stakeholders.

3.3 Adaptive and Iterative Management—Imagining Version 2

Going forward, federal partners and the EPA will continue to facilitate action implementation among the broad group of leaders and partners, recognizing that this endeavor represents a new level of integrated action across the spectrum of water interests. Together, we will learn, experiment, adapt, and manage this important collaborative. We anticipate that it will be appropriate to perform an annual cycle of review and updates to the WRAP with subsequent releases. A working schedule for development of Version 2 might entail:

> **"The WRAP presents a unique opportunity for the water sector, policy-makers, and the broader public to collaborate on a set of specific activities that collectively can result in significant progress toward advancing the adoption of water recycling practices across the [United States]."**
>
> –WateReuse, NACWA, AWWA, WEF, AMWA, and WRF

- **February 2020 to September 2020:** Implement Action Plan (Version 1) actions and provide routine updates.
- **September 2020:** Issue a *Federal Register* notice seeking specific input on development of Action Plan (Version 2).
- **September 2020:** Optimize opportunities at the 35th Annual WateReuse Symposium (Denver, Colorado) to report on action implementation progress, gain input on the adaptive and iterative management of the WRAP, and initiate development of Action Plan (Version 2).
- **April 2021:** Release Version 2 during Water Week.

Discussion questions at the 35th Annual WateReuse Symposium and in the *Federal Register* notice might include:

- How do we create an adaptive management structure to ensure that short-term progress is routinely updated, and that longer strategic analysis of actions, progress, and results are effectively incorporated?
- What does the ideal governance structure for long-term implementation of the WRAP look like? How is this endeavor managed in the long term to optimize progress and results?
- While there is relatively robust action around water reuse in municipal water resource recovery, how do we better extend the potential application of water reuse to agriculture, industry, and other areas of opportunity?
- Is the WRAP effort a potential model for collaborative and integrated action in other contexts? How might this be applied to other ventures involving many partners and stakeholders with both common and diverse interests but a broadly common goal (e.g., security, sustainability, and resilience of the nation's water resources)?

> **"Water security and sustainability are tied integrally to other essential environmental elements such as air quality and the water-energy nexus."**
>
> — American Petroleum Institute, American Exploration & Production Council, Domestic Energy Producers Alliance, Independent Petroleum Association of America

As the WRAP continues to evolve, collaboration across the water user community will be essential to achieving the WRAP's objectives. Current action leaders and partners will be critical not only in implementing actions but also being ambassadors who communicate with others about the collective effort. Ongoing dialogues and iterative management of the overall WRAP will enable additional organizations to lead and/or collaborate on future actions.

3.4 Building an Enduring Legacy of Watershed-Based Action

Our hope is to enhance and stimulate watershed-based collaborations where business, finance and policy leaders, communities, nonprofits, and others come together to solve local water resource (quantity and quality) challenges. Reuse applications provide an opportunity for this level of collaboration and foster holistic thinking through more integrated action.

> **"The time to fully utilize recycled water is now, and this plan will facilitate that advancement."**
>
> –Eastern Municipal Water District

Thank you for contributing to the security, sustainability, and resilience of our most precious resource: water.

> **"With several reuse options available, utilities can regionally optimize a combination of water reuse strategies for local conditions, to produce an effective "fit-for-community" reuse strategy."**
>
> —Inland Empire Utilities Agency

SECTION 4

Notes and References

[1] See draft Action Plan's Call to Action (page iii; https://www.epa.gov/sites/production/files/2019-09/documents/water-reuse-action-plan-draft-2019.pdf).

[2] Ross, D. (2019). Testimony of David Ross, Assistant Administrator, Office of Water, U.S. Environmental Protection Agency, before the House Committee on Transportation & Infrastructure, Subcommittee on Water Resources & Environment. September 18, 2019. https://www.epa.gov/sites/production/files/2019-09/documents/epa_final_test.sept_18_hti_hearing_on_water_programs.pdf

[3] See draft Action Plan, Figure 2 (page 6; https://www.epa.gov/sites/production/files/2019-09/documents/water-reuse-action-plan-draft-2019.pdf).

[4] National Research Council. (2012). Water reuse: Potential for expanding the nation's water supply through reuse of municipal wastewater. Washington, DC: The National Academies Press. https://www.nap.edu/catalog/13303/water-reuse-potential-for-expandingthe-nations-water-supply-through

[5] Dieter, CA; Maupin, MA; Caldwell, RR; Harris, MA; Ivahnenko, TI; Lovelace, JK; Barber, NL; Linsey, KS. (2018). Estimated use of water in the United States in 2015. U.S. Geological Survey Circular 1441. https://doi.org/10.3133/cir1441

[6] UN-Water. (2013). Water security and the global water agenda. https://www.unwater.org/publications/water-security-global-water-agenda/

[7] U.S. Congress. (2018). America's Water Infrastructure Act of 2018. (S. 2800). https://www.govtrack.us/congress/bills/115/s2800

[8] See draft Action Plan's Acknowledgements and Appendix G (pages ii and G-1); Inset 3 (page 3); and Inset 18 (page 20) (https://www.epa.gov/sites/production/files/2019-09/documents/water-reuse-action-plan-draft-2019.pdf).

Photo Credits

Cover: Gates Foundation, Monterey One Water, Rice University, Eastern Municipal Water District, Denver Water, Tom Marks Photography; Pg. ii: U.S. EPA; Pg. 2: San Francisco Public Utilities Commission; Pg. 3: Suez Water Technology & Solutions, U.S. EPA; Pg. 4 U.S. EPA; Pg. 7: West Basin Municipal Water District; Pg. 9: City of Roseville, Environmental Utilities; Pg. 10: Eastern Municipal Water District; Pg. 12: Nic Lehoux for the Bullitt Center, El Paso Water; Pg. 15: Morro Bay National Estuary Program; Pg. 17: U.S. EPA, Denver Water; Pg. 19: California Product Stewardship Council, Bob Nichols; Pg. 21: www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/, Washington Ecology; Pg. 22: The Johnson Foundation at Wingspread; Pg. 23: San Francisco Public Utilities Commission, Google earth imagery (coordinates 37-59-55, 101-01-55); Pg. 24: U.S. Department of Energy; Pg. 25: Nick Crist, GSK Global Lead, Energy & Sustainability; Pg. 26: Tim McCabe; Pg. 27: Tom Marks Photography; Pg. 29: U.S. EPA; Pg. 31: U.S. EPA, https://www.usbr.gov/research/bgndrf/; Pg. 32: El Paso Water; Pg. 33: Denver Water; Pg. 34: Suez Water Technology & Solutions, Environmental Protection Agency; Pg. 35: U.S. Embassy, Stephen Kolk; Pg. 36: Tom Marks Photography; Pg. 39: Eastern Research Group/Sargon De Jesus; Pg. 40: Denver Water; Pg. 41: City of Phoenix, Arizona; Pg. A-1: Jim G. Maloney; Pg. B-1: Idaho Department of Environmental Quality; Pg. C-1: Eastern Municipal Water District.

"No one water reuse strategy will work for every community across the nation."
—Western Urban Water Coalition

The Tres Rios Environmental Restoration Project in Arizona pumps treated wastewater effluent through 700 acres of Salt River wetlands, creating wildlife habitat and reducing flood risk.

APPENDIX A

Index of Action Leaders, Partners, and Development Status

The September 2019 draft Action Plan proposed 46 actions to support consideration and implementation of water reuse. Since release of the draft, more actions have been identified through stakeholder engagement. In some cases, these newly identified actions were accompanied by substantial interest from an action leader, along with implementation milestones and target dates.

For Action Plan (Version 1), actions fall into two categories:

- **Developed Actions.** Actions with developed action implementation plans that have identified action leaders, partners, implementation milestones, and target completion dates. These actions represent initial momentum and serve as a catalyst for additional partnerships and subsequent actions.
- **Undeveloped Actions.** Actions that do not yet have developed action implementation plans and currently lack clear leaders, partners, implementation milestones, and target completion dates. In the WRAP Online Platform, undeveloped actions have limited information provided, including the action title, strategic theme area, brief description, interested collaborators, and relevant public docket comments. Action titles and descriptions are unchanged from the draft Action Plan.

The process for assessing the development of actions and leadership for implementation to meet the WRAP objectives will remain dynamic and iterative.

Table A-1 below lists the action leaders and partners who have pledged their willingness to support the actions with developed action implementation plans. Table A-2 below lists all the actions, along with each one's category of implementation. It provides an index of all of the 46 actions in the draft Action Plan as well as new actions with developed action implementation plans.

Table A-1. Action Leaders and Partners

Organization Name	Acronym/Short Version, Where Applicable
American Hospital Association	AHA
American Society of Heating, Refrigeration and Air-conditioning Engineers	ASHRAE
American Society of Hospital Engineers	ASHE
American Society of Landscape Architects	ASLA
American Water Works Association	AWWA
Association of Clean Water Administrators	ACWA
Association of Metropolitan Water Agencies	AMWA
Association of State and Territorial Health Officials	ASTHO
Association of State Drinking Water Administrators	ASDWA
Austin Water Utilities	AWU
California State Water Resources Control Board	CA State Water Board

Organization Name	Acronym/Short Version, Where Applicable
Coastal States Organization	CSO
Council of Infrastructure Financing Authorities	CIFA
Ecolab	—
Electric Power Research Institute	EPRI
Embassy of Israel	—
Environmental Council of the States	ECOS
Federal Emergency Management Agency	FEMA
Federal Water Treatment Working Group	Federal WaTr
Galaxy Consulting Engineers	GCE
GlaxoSmithKline	—
Global Center for Cleantech Innovation	GCCI
GreenBiz Group	GreenBiz
Ground Water Protection Council	GWPC
Groundwork USA	—
International Association of Plumbing and Mechanical Officials	IAPMO
International Code Council	ICC
International Society of Pharmaceutical Engineers	ISPE
Isle Utilities	IU
Israel Water Authority	IWA
Israeli Ministry for Environmental Protection	MoEP
Johnson Controls International	JCI
Johnson Foundation at Wingspread	JFW
Los Angeles Department of Water and Power	LADWP
Metropolitan Water District	MWD
National Association of Clean Water Agencies	NACWA
National Blue Ribbon Commission for Onsite Non-potable Water Systems	NBRC for ONWS
National Drought Resilience Partnership	NDRP
National Estuaries Program Executive Directors	NEP
National Ground Water Association	NGWA
National Municipal Stormwater Alliance	NMSA
National Rural Water Association	NRWA
National Stewardship Action Council	NSAC
National Tribal Caucus	NTC
National Tribal Water Council	NTWC

Organization Name	Acronym/Short Version, Where Applicable
National Water Research Institute	NWRI
National Tyson Foods Inc.	Tyson
Natural Systems Utilities	NSU
NeoTech Aqua	NeoTech
New Mexico Environment Department	NMED
New Mexico State University	NMSU
New Mexico Produced Water Research Consortium	NM-PWRC
Public Health Alliance of Southern California	PHASC
Regional Tribal Operations Committees	RTOCs
Renewing our Nation's Urban Water Infrastructure	ReNUWIt
Restore America's Estuaries	RAE
Rice University	—
River Network	RN
Rural Community Assistance Partnership	RCAP
San Antonio Water Systems	SAWS
Sanitation Districts of Los Angeles County	LACSD
Smart Water Networks Forum	SWAN
University of California, Davis	UC Davis
University of California, Merced	UC Merced
Urban Waters Federal Partnership	UWFP
U.S. Army Corps of Engineers	USACE
U.S. Department of Agriculture	USDA
U.S. Department of Commerce	DOC
U.S. Department of Defense	DOD
U.S. Department of Energy	DOE
U.S. Department of Housing and Urban Development	HUD
U.S. Department of the Interior	DOI
U.S. Department of the Interior, Bureau of Reclamation	Reclamation
U.S. Department of State	DOS
U.S. Department of Transportation	DOT
U.S. Department of Veterans Affairs	VA
U.S. Embassy in Israel	U.S. Embassy
U.S. Environmental Protection Agency	EPA
U.S. Food and Drug Administration	FDA

Organization Name	Acronym/Short Version, Where Applicable
U.S. Forest Service	USFS
U.S. General Services Administration	GSA
U.S. General Services Administration and U.S. Department of Energy – Federal Energy Management Program – Interagency Sustainability Working Group	GSA and DOE-FEMP-ISWG
U.S. Geological Service	USGS
U.S. Green Building Council	USGBC
U.S. Water Alliance	—
U.S. Water Partnership	USWP
Wahaso	—
Water Environment Federation	WEF
Water Research Foundation	WRF
Water Tech Alliance	WTA
Water Works, Inc.	WW
WateReuse Association	WateReuse
Western State Water Council	WSWC
Xylem	—

Table A-2. Identified Actions and Development Status

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Integrated Watershed Action				
Develop a federal policy statement to support and encourage consideration of water reuse in a watershed-scale planning context	2.1.1	Yes	EPA	Partnering federal agencies
Prepare case studies of successful water reuse applications within an integrated water resources management framework	2.1.2	Yes	WateReuse	NGWA; ACWA; AWWA
Incorporate water reuse and capture concepts into integrated planning efforts at the local level	2.1.3	No	—	—

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Leverage EPA's water partnership programs to consider water reuse in the context of integrated water resources management at the watershed scale	2.1.4 (New)	Yes	EPA	ACWA; AMWA; NEP; UWFP; EPA; Member agencies of the UWFP; RN; Groundwork USA; Water utilities in UW and/or NEP locations; RAE; CSO; WateReuse
Policy Coordination				
Compile existing state policies and approaches to water reuse	2.2.1	Yes	EPA; WateReuse; ACWA; ASDWA	ASTHO; ECOS; WSWC; GWPC
Enhance state collaboration on water reuse	2.2.2	Yes	EPA; ACWA; ASDWA	ASTHO; ECOS; GWPC; WateReuse
Complete the EPA study of oil and gas extraction wastewater management	2.2.3	Yes	EPA	—
Enhance wastewater source control through local pretreatment programs to support water reuse opportunities for municipal wastewater	2.2.4	Yes	NACWA; WEF	ACWA; AMWA; AWWA; NWRI; WateReuse; EPA
Compile and develop protection strategies for different sources of waters for potential reuse	2.2.5	No	—	—
Develop informational materials to address how CWA NPDES permits can facilitate water reuse/capture	2.2.6	Yes	EPA; ACWA	NACWA; NMSA; WateReuse; WEF
Utilize existing multi-agency federal working groups to serve as forums for coordinated federal engagement on water reuse	2.2.7	Yes	EPA	WRAP Federal Partner Working Group; DOS-IWWG; GSA and DOE-FEMP-ISWG; NDRP
Advance alternative water use in federal operations through the Federal Energy Management Program	2.2.8	No	—	—
Align policies and communication tools to promote best management of unused and expired pharmaceuticals to support water reuse and recycling	2.2.9	Yes	LACSD	NACWA; NSAC; EPA; FDA; WateReuse; AWWA
Incorporate water reuse considerations in the development of civil works projects through the U.S. Army Corps of Engineers Civil Works Program	2.2.10	No	—	—

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Incorporate stormwater capture considerations in assessment of stormwater finance needs and opportunities	2.2.11	No	—	—
Leverage existing U.S. Department of Agriculture programs to encourage consideration and integration of agricultural water reuse	2.2.12	Yes	USDA	—
Enhance combined sewer overflow/ sanitary sewer overflow abatement strategies	2.2.13	No	—	—
Promote water reuse through the Federal Emergency Management Agency's Hazard Mitigation Programs	2.2.14	No	—	—
Conduct outreach and training with tribes to build water reuse capacity	2.2.15	Yes	EPA	NDRP; NTC; NTWC; RTOCs
Support local and regional reuse projects by identifying challenges, opportunities, and models for interagency collaboration	2.2.16 (New)	Yes	Eric Rosenblum; WateReuse; EPA	Bahman Sheikh; Robert S. Raucher; Felicia Marcus; Regional and State Sections of WateReuse
Propose U.S. Army Corps of Engineers Nationwide Permit Addressing Reuse	2.2.17 (New)	Yes	USACE	—
Science and Specifications				
Compile existing fit-for-purpose specifications	2.3.1	Yes	EPA	ACWA; AMWA; ASDWA; WRF; WateReuse
Develop frameworks for public and environmental health risk-based targets	2.3.2	No	—	—
Convene experts to address opportunities and challenges related to urban stormwater capture and use	2.3.3	Yes	EPA; NMSA; JFW; ReNUWIt; WateReuse; WEF	ACWA; AMWA
Develop research and tools to support the implementation of ONWS	2.3.4 (Previously 2.6.5)	Yes	NBRC for ONWS	CA State Water Board; USACE; EPA; U.S. Water Alliance; WRF; WateReuse
Assess specifications for potential reuse of wastewater in food animal protein processing facilities	2.3.5 (New)	Yes	EPA	Tyson, USDA; AMWA

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Technology Development and Validation				
Integrate, coordinate, and enhance technology demonstration and validation programs to provide reliable performance information to support water reuse	2.4.1	No	—	—
Implement New Mexico Produced Water Research Consortium to identify and fill science and technology gaps for off-field use of treated produced water	2.4.2	Yes	NMED	NMED; NMSU Department of Engineering; NM-PWRC
Support water reuse through the U.S. Department of Energy's Water Security Grand Challenge	2.4.3	Yes	DOE	EPA; DOI; USDA; DOD; EPRI
Provide case examples and identify candidates for water reuse system implementation in federally owned facilities	2.4.4	No	—	—
Promote air-cooling condensate water reuse standards, methods, tools, and technologies for implementing systems in large buildings	2.4.5 (New)	Yes	ASHRAE; IAPMO; EPA; WW; WTA	AWU; USGBC; ASLA; AHA and ASHE Sustainability Program; ICC; Ecolab; GCCI; LADWP; PHASC; ISPE; MWD; NSU; NeoTech; IU; Rice University; SAWS; SWAN; GCE; GlaxoSmithKline; JCI; UC Davis; UC Merced; Wahaso; WEF; Xylem; WateReuse
Water Information Availability				
Foster U.S. Department of Agriculture watershed-scale pilot projects to share water information to support water reuse actions	2.5.1	Yes	USDA	—
Identify monitoring best practices for various sources of water and reuse applications	2.5.2	No	—	—
Use National Oceanic and Atmospheric Administration/U.S. Geological Survey water forecast and prediction network to target watersheds with reuse potential	2.5.3	No	—	—
Develop national integrated water availability assessments	2.5.4 (New)	Yes	USGS	—

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Finance Support				
Compile existing federal funding sources for water reuse and develop an interagency decision support tool	2.6.1	Yes	EPA	USDA; FEMA; Reclamation; DOE; USACE; HUD; DOT
Clarify and communicate the eligibility of water reuse under the Clean Water and Drinking Water State Revolving Fund (SRF) Programs	2.6.2A	Yes	EPA	CIFA; ACWA; ASDWA
Continue to actively support and communicate the eligibility of Water Infrastructure and Financing Innovation Act (WIFIA) funding for water reuse	2.6.2B	Yes	EPA	—
Compile resources concerning non-traditional funding mechanisms	2.6.3	No	—	—
Compile and promote existing USDA funding and resources for rural communities	2.6.4	Yes	USDA	EPA; NRWA; RCAP
Integrated Research				
Develop and maintain a comprehensive, accessible, and searchable inventory of water reuse research	2.7.1	No	—	—
Develop a coordinated national research strategy on water reuse	2.7.2	Yes	WRF	EPA; WateReuse; WEF
Coordinate federal water reuse research to address Action Plan priorities	2.7.3	No	—	—
Increase understanding of current aquifer storage and recovery practices	2.7.4	Yes	GWPC; EPA	USDA; NGWA
Coordinate and promote water reuse technology in federal Small Business Innovation Research programs	2.7.5 (New)	Yes	EPA	—
Develop U.S. Bureau of Reclamation Advanced Water Treatment Research Roadmap	2.7.6 (New)	Yes	Reclamation	Federal WaTr
Outreach and Communications				
Compile and develop water reuse program outreach and communication materials	2.8.1	Yes	WateReuse	WEF
Develop a community of practice around water reuse	2.8.2	No	—	—
Pursue a national branding campaign for water reuse	2.8.3	No	—	—

Strategic Theme & Action Title	Action Number	Developed Action? (Yes/No)	Action Leader(s)	Partner(s)
Establish a water reuse champion award program for private sector companies	2.8.4 (New)	Yes	GreenBiz; WateReuse	—
Workforce Development				
Support state(s) development of a pilot operator certification program for water reuse applications	2.9.1	No	—	—
Support and promote opportunities for creating a skilled workforce for water reuse applications	2.9.2	Yes	EPA; WateReuse; AWWA; WEF	—
Support water reuse training networks	2.9.3	No	—	—
Metrics for Success				
Compile national estimates of available water and water needs	2.10.1	No	—	—
Establish goals for extent and types of water reuse in the United States	2.10.2	No	—	—
Facilitate implementation of the National Water Reuse Action Plan	2.10.3	Yes	EPA	All WRAP action leaders
International Collaboration				
Facilitate U.S.-Israel collaboration on technology, science, and policy of water reuse	2.11.1 (New)	Yes	EPA; MoEP	DOS; Embassy of Israel; IWA; U.S. Embassy; WateReuse
Raise global awareness and preparedness for water reuse and the Water Reuse Action Plan	2.11.2 (New)	Yes	DOS	DOI; USAID; USDA; EPA; USGS; Reclamation; DOE; USWP; WEF; WateReuse

APPENDIX B

Highlights of Public Comments

B.1 Request for Public Comments and Commitments

With release of the draft Action Plan on September 10, 2019, a *Federal Register* notice was issued, opening a 90-day public comment period that ended on December 16, 2019. A public docket was opened (EPA-HQ-OW-2019-0174) to collect input and ideas to inform continued development of the National Water Reuse Action Plan (WRAP). The EPA also posted the draft Action Plan on its website to provide context and details for reference during the comment period. The public docket and the comments submitted will remain accessible and viewable by external parties.

During the comment period, potential commenters were encouraged to provide specific feedback on a variety of topics, such as:

- The proposed actions identified and other suggested actions that can enhance implementation of water reuse.
- The key attributes, implementation steps, and milestones to successfully implement the proposed actions.
- Potential action leaders to champion the proposed actions.
- Potential contributing organizations to serve as partners/collaborators in implementing the proposed actions.
- Additional information or recommendations to inform these or other proposed actions.

The EPA received 101 distinct comments from a variety of entities. The organizations that submitted comments through the public docket are listed below. Asterisks (*) mark comments that multiple organizations submitted jointly.

Water Utilities/Districts/Local Government

- City of Nampa Public Works Department
- City of Roseville, California
- City of Santa Monica, Office of Sustainability and the Environment, Watershed Section
- Denver Water
- Department of Water, County of Kaua'i
- Eastern Municipal Water District
- Gulf Coast Authority
- Harris County Engineering Department
- Inland Empire Utilities Agency
- Irvine Ranch Water District
- LA Sanitation and Environment
- Metropolitan North Georgia Water Planning District
- Metropolitan Water District of Southern California
- Metropolitan Water Reclamation District of Greater Chicago

- Monterey One Water
- New York City Department of Environmental Protection
- San Diego County Water Authority
- Sanitation Districts of Los Angeles County
- Santa Clara Valley Water District
- Seattle Public Utilities
- City of San Diego Public Utilities Department
- Water Replenishment District of Southern California

Water Associations

- American Rainwater Catchment Systems Association
- American Water Works Association
- Association of Metropolitan Water Agencies, American Water Works Association, National Association of Clean Water Agencies, WateReuse Association, Water Environment Federation, and Water Research Foundation*
- Association of Metropolitan Water Agencies
- California Association of Sanitation Agencies and Bay Area Clean Water Agencies*
- California Stormwater Quality Association
- National Ground Water Association
- National Municipal Stormwater Alliance
- Water Environment Association of Texas, WateReuse Texas, and Texas Association of Clean Water Agencies*
- Water Environment Federation
- WateReuse Association
- Western Urban Water Coalition

States

- Colorado Department of Public Health and Environment, Water Quality Control Division
- Kansas Water Office
- Maryland Department of the Environment
- Minnesota Department of Health
- New Mexico Environment Department
- Hawaii Department of Land and Natural Resources, Commission on Water Resource Management
- Oklahoma Office of the Secretary of Energy and Environment
- Utah's Governor's Office: Public Lands Policy Coordinating Office
- Washington Department of Ecology

State Associations

- Association of State Drinking Water Administrators and Association of Clean Water Administrators*
- Ground Water Protection Council
- National Association of Clean Water Agencies
- New England Interstate Water Pollution Control Commission
- Western Coalition of Arid States
- Western States Water Council

Non-governmental Organizations

- Common Ground Community Trust
- Common Ground Community Trust and not specified
- Environmental Defense Fund
- Hawaii Community Foundation
- Hawaii Fresh Water Initiative
- National Wildlife Federation
- Sierra Club Wastewater Residuals Team
- WaterNow Alliance and National League of Cities
- Western Resource Advocates
- WildEarth Guardians

Industry and Other Associations

- American Chemistry Council
- American Petroleum Institute, American Exploration and Production Council, Domestic Energy Producers Alliance, and Independent Petroleum Association of America*
- Association of Public Health Laboratories
- Hilmar Cheese Company, Inc.
- IDEXX
- International Code Council
- National Association of Home Builders
- NSF International
- ProChemTech International, Inc.
- Sloan Valve Company
- The American Society of Civil Engineers
- Trojan Technologies
- U.S. Chamber of Commerce Business Task Force on Water Policy
- Xylem

Consulting Firms

- One World One Water
- Sustainable Water
- Water Management, Inc.

Individuals

- Darlene Schanfald
- David Dow
- David J. Rigby (Century Engineering, Inc.; Electro-Chemistry, LLC; Electro-Chemistry Texas, Inc.; George Washington University)
- Eric Rosenblum, Bahman Sheikh, and Robert S. Raucher
- R. Rubin (North Carolina State University, Biological and Agricultural Engineering)
- Anonymous (19 submittals)

In several notable cases, multiple organizations collaborated and submitted integrated comments. Table B-1 provides examples of jointly submitted comments.

Table B-1. Examples of Jointly Submitted Public Comments

Commenter/Affiliation	Docket ID Number
WaterNow Alliance and National League of Cities	EPA-HQ-OW-2019-0174-0092
American Petroleum Institute, American Exploration and Production Council, Domestic Energy Producers Alliance, and Independent Petroleum Association of America	EPA-HQ-OW-2019-0174-0112
Association of State Drinking Water Administrators and Association of Clean Water Administrators	EPA-HQ-OW-2019-0174-0114
Association of Metropolitan Water Agencies, American Water Works Association, National Association of Clean Water Agencies, WateReuse Association, Water Environment Federation, and Water Research Foundation	EPA-HQ-OW-2019-0174-0115
California Association of Sanitation Agencies and Bay Area Clean Water Agencies	EPA-HQ-OW-2019-0174-0120
Water Environment Association of Texas, WateReuse Texas, and Texas Association of Clean Water Agencies	EPA-HQ-OW-2019-0174-0125

B.2 Thematic Highlights of the Public Comments

Several predominant and notable themes emerged from the public comments, which are highlighted below. The public comments also identified several new literature references.

- **Widespread support for the WRAP and water reuse as a tool for water sustainability, resilience, and security.** Nearly every commenter expressed support for federal leadership of the WRAP's development and expressed the value of water reuse as a tool in the context of integrated water resource management at the local or watershed scale. This version of the WRAP contains example statements from the public comments.
- **Affirmation that water reuse is one tool in the water resource toolbox.** Many commenters reinforced a common theme and principle in the draft Action Plan: water reuse is one tool, out of many, for managing water resources, and that reuse is not appropriate in all circumstances.
- **Acknowledgement that prior public comments were incorporated.** Many prior commenters on development of the draft Action Plan acknowledged that the federal partners had adequately addressed their prior comments.
- **Recognition of variations when defining and reconciling key terms.** Some commenters advocated for the need to harmonize and reconcile differing definitions of key terms. However, the breadth of public comments demonstrated that distinctions of terms varied based on region, state, and locality and that any attempt to reconcile and impose single or common definitions would be difficult.
- **Emphasis on and identification of priority actions.** Many commenters expressed the need for WRAP implementation to focus on a smaller set of high-priority actions. Many commenters also expressed their view and rationale of the highest-priority actions.
- **Recognition of the spectrum of perspectives on the potential for reuse of oil and gas produced water.** The single most divergent and conflicting views pertained to oil and gas produced water. Comments fell into three broad perspectives: 1) oil and gas produced water is not suitable for (offsite) reuse and should not be part of the WRAP; 2) unknowns exist and more research should be completed before offsite reuse can be considered; and 3) produced water can be treated to meet fit-for-purpose specifications for certain uses.

- **Acknowledgement of public commitments to lead or support actions.** Many commenters expressed a desire to lead or support particular actions. We are grateful to those entities who will lead actions. Within each of the action implementation plans in the WRAP Online Platform, potential collaborators on specific actions are identified.
- **Recognition of barriers/challenges to water reuse.** Many commenters acknowledged case-by-case considerations that can present challenges to water reuse implementation, including regulatory barriers, uncertain water availability, and a changing climate.
- **Identification of new potential actions.** One question posed for public comment was to identify other potential WRAP actions that would facilitate or improve consideration of water reuse. More than 25 suggested actions were identified. These will be considered in subsequent versions of the WRAP.
- **Setting Goals for Water Reuse.** Several commenters urged that the WRAP should not set goals for water reuse, nationally or for specific end uses, as this would be inconsistent with the need to carefully consider the appropriateness of water reuse based on many factors. This is an example of a case in which an action has not been pursued at this time based on specific public input.

B.3 Index of Comments from the Public Docket

The public docket, which was open from September 16 to December 16, 2019, received 101 unique submissions, many of which were very thoughtful and detailed. On aggregate, 513 pages of material were shared, averaging slightly over five pages per submission.

This appendix provides an index to navigate public comments. To gain a full appreciation for the depth of thinking behind each input, readers are encouraged to review the relevant comment in the docket. The full comment submittals are available for review online at the following location: https://www.regulations.gov/docket?D=EPA-HQ-OW-2019-0174.

The comments and other information included below are not listed in order of significance. The commenters and other information provided below are included for illustrative purposes only and are not intended to be exhaustive.

Table B-2, below, presents public comments in order by docket ID number and includes the comment category for a sampling of comments. The comment category was parsed out from the actual comment. The docket ID numbers begin at EPA-HQ-OW-2019-0174-0060 because they continue from the comments received prior to release of the draft Action Plan. Each full comment can be accessed by clicking the docket ID number.

Table B-2. Public Comments by Docket Number

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0060	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0061	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0062	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0063	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0064	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0065	10/4/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0066	10/15/2019	**T. Keister/ProChemTech International, Inc.**	Industry and Other Association
EPA-HQ-OW-2019-0174-0067	11/7/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0068	11/7/2019	**Shivaji Deshmukh/Inland Empire Utilities Agency**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0069	11/21/2019	**Natalie Mamerow/The American Society of Civil Engineers**	Industry and Other Association

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0070	11/29/2019	**Brian A. Perkovich/Metropolitan Water Reclamation District of Greater Chicago**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0071	11/29/2019	**Anonymous/Not Specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0072	12/05/2019	**John Blount/Harris County Engineering Department**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0073	12/05/2019	**Sharon Green/Sanitation Districts of Los Angeles County**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0074	12/05/2019	**Susan Sullivan/New England Interstate Water Pollution Control Commission**	State Associations
EPA-HQ-OW-2019-0174-0075	12/12/2019	**Hawaii Department of Land and Natural Resources Commission on Water Resource Management**	States
EPA-HQ-OW-2019-0174-0076	12/12/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0077	12/12/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0078	12/12/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0079	12/12/2019	**A. R. Rubin/North Carolina State University-Biological and Agricultural Engineering**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0080	12/17/2019	**Thomas Canute/Department of Water, County of Kaua'i**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0081	12/17/2019	**Gabe Maser/International Code Council**	Industry and Other Association
EPA-HQ-OW-2019-0174-0082	12/17/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0083	12/17/2019	**Christin Reynolds/One World One Water**	Consulting Firm
EPA-HQ-OW-2019-0174-0084	12/17/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0085	12/17/2019	**Eric Rosenblum, Bahman Sheikh, and Robert S. Raucher/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0086	12/18/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0087	12/18/2019	**Darlene Schanfald/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0088	12/18/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0089	12/19/2019	**Brandi Honeycutt/Colorado Department of Public Health and Environment-Water Quality Control Division**	States
EPA-HQ-OW-2019-0174-0090	12/19/2019	**Bob Salvatelli/Sustainable Water**	Consulting Firm
EPA-HQ-OW-2019-0174-0091	12/19/2019	**Russell Horner/Water Management, Inc.**	Consulting Firm

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0092	12/19/2019	**Cynthia Koehler and Clarence Anthony/WaterNow Alliance and National League of Cities**	NGOs
EPA-HQ-OW-2019-0174-0093	12/19/2019	**Sandeep Burman and James Kelly/Minnesota Department of Health**	States
EPA-HQ-OW-2019-0174-0094	12/19/2019	**Joseph Vesey/Xylem**	Industry and Other Association
EPA-HQ-OW-2019-0174-0095	12/19/2019	**Elaine Cimino/Common Ground Community Trust**	NGOs
EPA-HQ-OW-2019-0174-0096	12/19/2019	**Elaine Cimino and Patricia Reda/ Common Ground Community Trust and Not Specified**	NGOs
EPA-HQ-OW-2019-0174-0097	12/19/2019	**Ben Grumbles/Maryland Department of the Environment**	States
EPA-HQ-OW-2019-0174-0098	12/19/2019	**Michael Wood/Hilmar Cheese Company, Inc.**	Industry and Other Association
EPA-HQ-OW-2019-0174-0099	12/19/2019	**James Lochhead/Denver Water**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0100	12/19/2019	**Sierra Club Wastewater Residuals Team**	NGOs
EPA-HQ-OW-2019-0174-0101	12/19/2019	**Scott Becker and Kathryn Wangsness/Association of Public Health Laboratories**	Industry and Other Association
EPA-HQ-OW-2019-0174-0102	12/19/2019	**Scott Bindner/Trojan Technologies**	Industry and Other Association
EPA-HQ-OW-2019-0174-0103	12/19/2019	**Emily Remmel/NACWA**	State Associations
EPA-HQ-OW-2019-0174-0104	12/19/2019	**Enrique Zaldivar/LA Sanitation and Environment**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0105	12/19/2019	**Nichole Saunders/Environmental Defense Fund**	NGOs
EPA-HQ-OW-2019-0174-0106	12/19/2019	**Kenneth Wagner/Oklahoma, Office of the Secretary of Energy & Environment**	States
EPA-HQ-OW-2019-0174-0107	12/19/2019	**Mami Hara/Seattle Public Utilities**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0108	12/19/2019	**Tony Willardson/Western States Water Council**	State Associations
EPA-HQ-OW-2019-0174-0109	12/19/2019	**Diane VanDe Hei/Association of Metropolitan Water Agencies**	Water Associations
EPA-HQ-OW-2019-0174-0110	12/19/2019	**Mike J. Paque/Ground Water Protection Council**	State Associations

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0111	12/19/2019	**Stan Hazan/NSF International**	Industry and Other Association
EPA-HQ-OW-2019-0174-0112	12/19/2019	**Amy Emmert, Anne Bradbury, J. Roger Kelley, Lee Fuller/API, AXPC, DEPA, and IPAA**	Industry and Other Association
EPA-HQ-OW-2019-0174-0113	12/19/2019	**Patricia Sinicropi/WateReuse Association**	Water Associations
EPA-HQ-OW-2019-0174-0114	12/19/2019	**J. Alan Roberson and Julia Anastasio/Association of State Drinking Water Administrators and Association of Clean Water Administrators**	State Associations
EPA-HQ-OW-2019-0174-0115	12/19/2019	**Pat Sinicropi, Adam Krantz, G. Tracy Mehan, Tim Williams, Diane VanDe Hei, and John Albert/AMWA, AWWA, NACWA, WateReuse, WEF, and WRF**	Water Associations
EPA-HQ-OW-2019-0174-0116	12/19/2019	**J. Russell Horner/Water Management, Inc.**	Consulting Firm
EPA-HQ-OW-2019-0174-0117	12/19/2019	**G. Tracy Mehan/American Water Works Association**	Water Associations
EPA-HQ-OW-2019-0174-0118	12/19/2019	**Pinar Balci/New York City Department of Environmental Protection**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0119	12/19/2019	**Daniel Timmons/WildEarth Guardians**	NGOs
EPA-HQ-OW-2019-0174-0120	12/19/2019	**Roberta Larson and David Williams/California Association of Sanitation Agencies and Bay Area Clean Water Agencies**	Water Associations
EPA-HQ-OW-2019-0174-0121	12/19/2019	**Tom Points/City of Nampa Public Works Department**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0122	12/19/2019	**Laura Belanger/Western Resource Advocates**	NGOs
EPA-HQ-OW-2019-0174-0123	12/19/2019	**Gregory Walch/Western Urban Water Coalition**	Water Associations
EPA-HQ-OW-2019-0174-0124	12/19/2019	**David J. Rigby/Century Engineering, Inc.; Electro-Chemistry, LLC; Electro-Chemistry Texas, Inc.; George Washington University**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0125	12/19/2019	**Julie Nahrgang/WEAT, WRT, and TACWA**	Water Associations

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0126	12/19/2019	**Paul Cook/Irvine Ranch Water District**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0127	12/19/2019	**Shauna Lorance/The City of San Diego Public Utilities Department**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0128	12/19/2019	**Melanie Richardson/Santa Clara Valley Water District**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0129	12/19/2019	**Susan Asmus/National Association of Home Builders**	Industry and Other Association
EPA-HQ-OW-2019-0174-0130	12/19/2019	**Diane Gatza/Water Replenishment District of Southern California**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0131	12/19/2019	**Earl Lewis/Kansas Water Office**	States
EPA-HQ-OW-2019-0174-0132	12/19/2019	**Daniel Apt/CASQA**	Water Associations
EPA-HQ-OW-2019-0174-0133	12/19/2019	**Paul D. Jones/Eastern Municipal Water District**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0134	12/19/2019	**Kelley Gage/San Diego County Water Authority**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0135	12/19/2019	**Claudio Ternieden/Water Environment Federation**	Water Associations
EPA-HQ-OW-2019-0174-0136	12/19/2019	**Patrick Boyle/Sloan Valve Company**	Industry and Other Association
EPA-HQ-OW-2019-0174-0137	12/19/2019	**Emily Scheller/American Chemistry Council**	Industry and Other Association
EPA-HQ-OW-2019-0174-0138	12/19/2019	**Charles Job/National Ground Water Association**	Water Associations
EPA-HQ-OW-2019-0174-0139	12/20/2019	**Dana Okano/Hawaii Community Foundation**	NGOs
EPA-HQ-OW-2019-0174-0140	12/20/2019	**David Dow**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0141	12/20/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0142	12/20/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0143	12/20/2019	**Jody Frymire/IDXX**	Industry and Other Association
EPA-HQ-OW-2019-0174-0144	12/20/2019	**Anonymous/Not specified**	Individuals or Not Specified
EPA-HQ-OW-2019-0174-0145	12/20/2019	**Neal Shapiro/City of Santa Monica, Office of Sustainability, & The Environment, Watershed Section**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0146	12/20/2019	**David Crawford/ARCSA**	Water Associations
EPA-HQ-OW-2019-0174-0147	12/20/2019	**Anonymous/Not specified**	Individuals or Not Specified

Organization Name	Date Posted	Commenter/Affiliation	Organization Type
EPA-HQ-OW-2019-0174-0148	12/20/2019	**Chuck Chaitovitz/U.S. Chamber of Commerce**	Industry and Other Association
EPA-HQ-OW-2019-0174-0149	12/20/2019	**Lori Traweek/Gulf Coast Authority**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0150	12/20/2019	**Kaeo Duarte and Yvonne Izu/ Hawaii Fresh Water Initiative**	NGOs
EPA-HQ-OW-2019-0174-0151	12/26/2019	**Seth P. Brown/ Executive Director, National Municipal Stormwater Alliance**	Water Associations
EPA-HQ-OW-2019-0174-0152	12/26/2019	**Rebecca Roose/New Mexico Environment Department**	States
EPA-HQ-OW-2019-0174-0153	12/26/2019	**Susan Kaderka/National Wildlife Federation**	NGOs
EPA-HQ-OW-2019-0174-0154	12/26/2019	**Marisa Tricas/City of Roseville, California**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0155	12/26/2019	**Kathleen Clarke/Utah's Governor's Office: Public Lands Policy Coordinating Office**	States
EPA-HQ-OW-2019-0174-0156	12/26/2019	**Heather Bartlett/Washington Department of Ecology**	States
EPA-HQ-OW-2019-0174-0157	12/26/2019	**Steve Bigley/Western Coalition of Arid States**	State Associations
EPA-HQ-OW-2019-0174-0158	12/26/2019	**Brad Coffey/Metropolitan Water District of Southern California**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0159	12/27/2019	**Katherine Zitsch/North Georgia Water Planning District**	Water Utilities/Districts/Local Government
EPA-HQ-OW-2019-0174-0160	1/16/20	**Paul A. Scuito/Monterey One Water**	Water Utilities/Districts/Local Government

APPENDIX C

Errata to the September 2019 Draft Action Plan

The draft Action Plan was released on September 10, 2019. Every effort was made to communicate accurate information in the draft; however, some corrections have since been identified. The corrections and factual clarifications below are organized by page number in the draft Action Plan.

Page Number	Correction
i	Caption for the last photograph should read: *The Prairie Waters system in Aurora, Colorado, supplements surface water supplies by capturing wastewater return flows in the South Platte River, which are pre-treated using riverbank filtration and aquifer recharge and recovery. The water is then treated at a 50 MGD purification facility for potable use.* (Source: Greg Baker, City of Aurora)
15	Caption for the photograph should read: *The Pomona Water Reclamation Plant in California recycles approximately 6 MGD of water for groundwater recharge, landscape irrigation, dust control, and industrial use.* (Source: Sharon Green, Sanitation Districts of Los Angeles County)
16	Caption in the footer should read: *Microsoft is teaming with the City of Quincy (WA) to build additional industrial water treatment facilities to provide reuse water for cooling at data centers and possible injection into the local aquifer.* (Source: Washington Department of Ecology, EPA-HQ-OW-2019-0174-0156)
17	Information in Inset 13 for California's Recycled Water Policy should be updated to reflect its 2018 updates. The policy establishes three goals, including increasing the use of recycled water from 714,000 acre-feet per year (afy) in 2015 to 1.5 million afy by 2020 and to 2.5 million afy by 2030. (Source: Jake Adler, Association of Clean Water Administrators)
23	The link to California's "12/10/10 Rule" in Inset 21 should be updated to www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/lawbook/RWregulations_20181001.pdf. (Source: Jake Adler, Association of Clean Water Administrators)
28	Inset 23 should read: Data to Confirm Customer-Tailored Water Quality from West Basin Water District. The West Basin Municipal Water District's Edward C. Little (ECL) Water Recycling Facility in El Segundo, California, was built in 1995 and is the only water recycling facility in the world that produces five different types of customer-specific recycled waters tailored for irrigation, commercial and industrial applications, and potable groundwater augmentation. The ECL facility, which recently celebrated 200 billion gallons of recycled water produced, treats approximately 40,000 acre-feet of water annually and conducts more than 2,000 tests per month using near-real-time monitoring to deliver accurate data. West Basin's water recycling efforts are the cornerstone of its "Water for Tomorrow" program. (Source: Matthew Veeh, West Basin Municipal Water District)

Page Number	Correction
28	Caption in the footer should read: *The West Basin Municipal Water District (CA) supplies recycled water, which is treated using reverse osmosis, for low- and high-pressure boiler feed water for three major refineries. (Source: Matthew Veeh, West Basin Municipal Water District)*
29	Caption in the footer should read: *The Long Island Nitrogen Action Plan, Water Reuse Initiative (NY) created an interactive permitting roadmap displaying reuse opportunities for golf courses.* (Source: New England Interstate Water Pollution Control Commission, EPA-HQ-OW-2019-0174-0074)
38	Caption in the footer should read: *The Ephrata WRF (WA) treats municipal wastewater to produce water for groundwater recharge, onsite irrigation, holding in a seasonal fish pond, and equipment cleaning.* (Source: Washington Department of Ecology, EPA-HQ-OW-2019-0174-0156)
43	Reference number 31 has been published. It should read: Sherman, L; Cantor, A; Milman, A; Kiparsky, M. (2020). Examining the complex relationship between innovation and regulation through a survey of wastewater utility managers. Journal of Environmental Management 260: 110025. https://www.sciencedirect.com/science/article/pii/S0301479719317438
Appendix B	The second bullet in the Science and Research section of the EPA profile (page 2) should indicate that the May 2019 version of the *Study of Oil and Gas Extraction Wastewater Management* was a draft report. (Source: American Petroleum Institute, American Exploration & Production Council, Domestic Energy Producers Alliance, and Independent Petroleum Association of America, EPA-HQ-OW-2019-0174-0112)