July 1, 2019

The Honorable David Ross
Assistant Administrator for Water
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

RE: Docket No. EPA-HQ-OW-2019-0174

Dear Assistant Administrator Ross,

The WateReuse Association, Association of Metropolitan Water Agencies, American Water Works Association, National Association of Clean Water Agencies, Water Environment Federation, and Water Research Foundation appreciate the opportunity to comment on the development of a national Water Reuse Action Plan. We are pleased to jointly submit the following comments, which emerged from an extensive process of collecting, discussing, and compiling feedback from experts around the country.

When the U.S. Environmental Protection Agency (EPA) announced the development of a national Water Reuse Action Plan (WRAP), our organizations, recognizing the importance of water reuse as part of the concept of integrated water resource management, organized a broad-based effort to inform the WRAP development; the results of which are incorporated into this document. As a result, this document reflects a broad range of perspectives and viewpoints from the water sector.

A facilitated expert process compiled and prioritized input from a diverse group of technical experts from the sector, including water utilities, utility associations, local, state and federal agencies, academia, engineering firms, private sector technology developers, and trade associations. The process also incorporated stakeholders from important groups outside the water sector, such as agriculture, oil and gas producers, and environmental advocates.

In April and May of 2019, we convened two workshops, which brought together more than 100 participants from around the country. Prior to, during, and following these meetings, workgroups defined challenges and developed proposed actions for each water reuse application, drawing from the conversations at the workshops. In parallel, the national water associations solicited input from experts within their membership. The criteria below were used to evaluate whether specific actions should be recommended. The recommended actions herein:

- Fill a critical need
- Have a high potential for success and lasting impact
- Are nationally relevant
- Leverage available knowledge and experience

The key ideas and suggested actions resulting from this effort are synthesized in the attached recommendations document. Neither the sections nor the proposed actions within each section are organized according to priority.

We appreciate your leadership in focusing policy development on an important approach to water resources management.

Sincerely,

Pat Sinicropi
Executive Director
WateReuse Association

G. Tracy Mehan, III
Executive Director – Government Affairs
American Water Works Association

John Albert, MPA
Chief Research Officer
Water Research Foundation

Diane VanDe Hei
Chief Executive Officer
Association of Metropolitan Water Agencies

Tim Williams
Deputy Executive Director
Water Environment Federation

COMMENTS ON DEVELOPMENT OF A NATIONAL WRAP

Water reuse, or water recycling, has been practiced in the U.S. for more than 50 years. Communities across the country have incorporated water reuse into their water management strategies as a proven method for ensuring a safe, reliable, locally controlled water supply—essential for livable communities with healthy environments, robust economies, and a high quality of life. Additionally, many states have included water reuse as part of their statewide and regional comprehensive water plans.

Water reuse is employed across a variety of sectors for many applications. For example, municipalities are actively engaged in reusing water for irrigation. In 2011, EPA estimated that nearly half of all recycled effluent in the U.S. was used to irrigate farms (29 percent) and landscapes such as golf courses and parks (18 percent).[1] Reuse is also occurring in industrial sectors, both internal, onsite reuse for industrial processes and municipal delivery of reclaimed water to industry for uses such as industrial cooling at power plants.

Our recommendations focus on seven reuse applications where reuse is growing or growth is anticipated and action today would have lasting impact: water reuse for potable supply, reuse through on-site non-potable water systems, industrial applications of water reuse, agricultural applications of water reuse, reuse for environmental restoration, reuse of "produced water" from oil and gas production, and stormwater capture and reuse.

These recommendations are grounded in a set of seven guiding principles that cut across all of these water reuse applications. These principles are:

Integrated water resource management (IWRM). A fundamental principle for a sustainable and reliable water portfolio in the U.S. is an IWRM strategy, and making recycled water a key part of it at a community and watershed scale. Consequently, a national WRAP must similarly be based on the principle of IWRM. This approach can help communities develop tailored water supply portfolios that meet their unique needs and assure safe, sustainable, and resilient water supplies to support economic development and achieve environmental benefits.

Focus on sustainable solutions. Water reuse is just one source of water within the water supply portfolio for an individual company, individual community, watershed, or industrial sector. Sustainable solutions are those that are cost-effective within a triple-bottom line accounting framework. When making water supply decisions, by evaluating social and environmental considerations alongside financial ones, entities can weigh long-term benefits and move beyond decisions based solely on immediate cost-of-production. Similarly, the national WRAP should recognize and support local and state efforts that consider social, environmental, and financial benefits and are sustainable in the long run.

Partnerships to build on existing strengths. An effective WRAP should recognize water reuse as an element of an integrated water supply portfolio that builds on years of research and practical

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[1] Water Environment Federation. *Baseline Data to Establish the Current Amount of Resource Recovery from WRRFs*. September 2018.

experience across a number of different sectors. The national WRAP must also build on existing expertise. The most effective means of leveraging this knowledge is through collaborative partnerships. These could take the form of coordination within the water sector as well as collaboration between the water sector and non-governmental organizations, state and federal agencies, and the private sector. In drafting the WRAP, EPA should set the stage for effective collaboration with key partners.

Strong and sustained support for research. Advancing water reuse requires innovation within the water sector and other sectors that use water (e.g. oil and gas production, industrial reuse, etc.), along with broader cross-cutting research to address issues that cannot be adequately supported by a single research investment alone. An essential element of building consensus within the technical and policy communities will be an authoritative research portfolio focused on providing science-based data for decision-making. EPA's Office of Research and Development should coordinate with other state and federal agencies, the Water Research Foundation, and the university and private research community to develop a coordinated research agenda to efficiently meet identified needs. Such coordination could also establish a much-needed central clearinghouse of information to help inform reuse applications across all sectors.

Effective communications. Regardless of the progress in science and engineering for water reuse, public trust can be a challenge for accelerating the adoption of water recycling strategies. This is often compounded by a belief that there exist abundant, cheap, and natural supplies of water. Effective communications must be employed to advance the public's understanding of costs, benefits, and trade-offs in water resources management. Doing so will better position communities to extract benefits from water reuse projects.

Role of the federal family. Federal agencies can play a crucial role in accelerating the adoption of water reuse. For example, they can help communicate the importance and value of water reuse for the nation's water supply by developing and employing effective messaging for multiple audiences, including the general public. In addition, the federal family can "lead by example" by piloting reuse projects at federal facilities and by incorporating water reuse practices throughout the federal government where possible.

Clear and supportive policies based on sound science. Policies grounded in science, particularly at the state and municipal levels, can facilitate the adoption of successful water reuse across all use applications. Effectively constructed federal, state, and local policies can provide actors with confidence and certainty needed to innovate and advance water recycling. Education and communication across states, federal agencies, associations, and local communities will be key to ensuring that sound reuse policies are implemented. While this coordination can enhance the development of effective policies, it is also crucial that regulatory entities such as EPA remain independent to ensure that public trust in the water supply is maintained.

Using these principles as our foundation, we recommend the following actions be included in the national WRAP. For each proposed action, we describe the challenge that the action is intended to address, and where possible, we suggest potential lead actors to help advance each action.

Suggested Actions to Advance Water Reuse

A. Potable Water Reuse

In 2017, recycled water supplied at least 430 million gallons per day of the U.S.' potable water supply.[2] Advancements in treatment technologies and state and local policy have facilitated the expansion of current and anticipated levels of potable water reuse. However, the policy development process can differ substantially across communities and advancements in research are continually needed to improve practice, lower costs, and better understand potential health risks. The following recommendations identify specific actions that are best undertaken at a national scale to support utilization of recycled water for drinking purposes.

Challenge 1: A more thorough consideration of the life cycle of chemicals introduced through commerce is needed.

Action 1: Federal regulatory agencies should take steps to more fully consider the entire life cycle of chemicals introduced through commerce prior to those chemicals being approved for production or import.

A key aspect of reuse is the treatment processes to remove recalcitrant contaminants that are potentially toxic at low concentrations. Some of these compounds can also impair water treatment processes, especially those processes that are biological in nature. In order to address this challenge, federal agencies should:

1. Engage the chemical industry and the water sector to facilitate identification and focus attention on problematic chemicals, based on sound science; and
2. Support development of a sound, multiple-barrier risk management strategy including enhanced Clean Water Act (CWA) pre-treatment programs.

A life-cycle analysis of a new chemical intended for commerce would potentially reduce the need for advanced water treatment processes to remove such chemicals, and help assuage public concerns over the potential presence of chemicals that pose health risks in recycled water.

There are several steps that EPA can take to advance this action, including:

- Convening a federal working group on source control strategies to protect water sources (including treated wastewater) for reuse. The working group should consider the Toxic Substances Control Act (TSCA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), pretreatment programs under the CWA as well as other authorities (e.g., Food and Drug Administration (FDA)). This working group should build on existing research as well as best practices currently being implemented on a state and local level. The core members of the work group should include EPA, FDA, U.S. Department of

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[2] EPA, *Water Reuse Guidelines, Potable Reuse Compendium*. 2017

Agriculture (USDA), U.S. Geological Service (USGS), U.S. Army Corps of Engineers (USACE), the Centers for Disease Control and Prevention (CDC), and the White House Council on Environmental Quality (CEQ).

- A technical working group to support the work of the federal members, should also be convened to facilitate action. This would be composed of stakeholder organizations with relevant expertise (e.g., water sector associations, pollution prevention experts, the private sector, states, etc.).
- Adapting TSCA new chemical reviews (15 USC 2604) and review of existing chemicals (15 USC 2605) to place controls on chemicals in commerce to reduce the potential for toxic substances to enter wastewaters, and by extension, source waters.
- Utilizing the FIFRA to reduce introduction of toxic substances into wastewaters, and by extension, source waters.

Undertaking these actions now is timely, as EPA is currently revising TSCA work flows in response to the Frank R. Lautenberg Chemical Safety for the 21st Century Act. EPA should identify and engage stakeholders in the relevant practitioner communities (e.g., water treatment, pretreatment program implementation, chemical manufacturing, etc.) to take advantage of this opportunity.

Challenge 2: Current research to fully support IWRM is siloed and disconnected.

Action 2: Develop a robust and targeted national research strategy to inform development of potable reuse across the U.S.

EPA's draft *Safe and Sustainable Water Resources National Research Program Strategic Research Action Plan, 2019 – 2022* includes research relevant to potable reuse. There is an opportunity to capitalize on this effort to (1) address specific research needs for potable reuse; (2) integrate work funded through other organizations (e.g., U.S. Department of Energy (DOE), the Water Research Foundation, Bureau of Reclamation (USBR), CDC, National Science Foundation (NSF), state-level initiatives, academia, etc.); and (3) ensure that research coordination leverages existing expertise to best advantage.

Research planning should be an ongoing and iterative process, where planning is informed by successful execution and emerging information. Research is essential to inform risk assessments (including sound health risk characterizations) and guide processes to set chemical and pathogen treatment performance objectives to protect public health. Research must be coupled with effectively communicating research results, as the results of this research should inform science-based policy development .

Near-term steps that EPA can take to advance this action include:

- Engage federal partners (e.g., NSF, USBR, USDA, DOE), states pursuing research, and relevant research organizations like the Water Research Foundation to coordinate and leverage ongoing research efforts relevant to potable reuse. Such coordination could, for example, inform which constituents are the highest priority for developing improved monitoring tools, treatment efficacy studies, or additional health effects characterization.

- When appropriate, use new information on health effects to inform risk assessment methodologies and best practices for chemicals and pathogens.
- Summarize research results and communicate actionable information to decision-makers, project developers, and regulators at the local, state, and federal level (e.g., utility managers, local governing boards, state regulators, etc.).
- Integrate potable reuse information needs into related research agendas to support the practice of IWRM and broader visionary efforts (e.g. smart cities).

Effectively organizing a potable reuse research strategy through an inclusive process that engages a cross-section of subject matter experts and potential funders will take time. More immediate opportunities include engaging with DOE's forthcoming Energy-Water Desalination Hub, other Water Security Grand Challenge priority issues, and USBR's WaterSMART Title XVI - Water Reclamation and Reuse Title XVI Research Studies. Similarly, a coordinated effort to better summarize and communicate the findings of completed research in a form that is helpful to local government and state decision-makers could be initiated quickly. While the current EPA Water Reuse Guidelines are helpful, to be more valuable for decision-makers this information needs to be further refined and updated based on more recent research and experiences.

Challenge 3: Information sharing between EPA, state governments, associations, and other relevant stakeholders could be improved upon.

Action 3: Establish partnerships between state and federal regulatory agencies to foster a dialogue on potable reuse policy and funding.

Implementing potable reuse involves state policy discussions over a wide range of topics including pre-treatment authorities, wastewater treatment, discharges to surface waters and minimum flow requirements, groundwater replenishment, underground injection, drinking water treatment, water withdrawal permits, water rights, environmental consequence evaluation (e.g., state equivalents to the National Environmental Policy Act), and other state-specific statutes. The interconnected network of state laws, regulations, policies, and practices must be evaluated on a state-by-state basis because each state's policy context is unique.

There is an opportunity for state policy makers to leverage the experience of states that have already taken steps to create policy frameworks for potable reuse. As illustrated by EPA's Water Reuse Guidelines and summaries available through the WateReuse Association, a number of states are already actively setting regulatory requirements and guidelines for potable reuse. Consequently, potable reuse is advancing by building upon existing state leadership and state-EPA relationships within the framework of cooperative federalism.

Steps that states and EPA can take in collaboration with the water sector to advance this action include:

- Support an ongoing dialogue with state agency partners to identify state needs for federal leadership through a partnership between EPA and state water programs;
- Facilitate information sharing between the water sector and state and federal regulatory communities; and

- Support the development of tools, resources, and decision frameworks to support state potable water reuse policy development and implementation.

The first step in advancing helpful resources in a timely manner is organizing the available information and building a forum for dialogue. The Association of State Drinking Water Administrators is currently engaging its members, EPA, and the Association of Clean Water Administrators to establish such a dialogue. This forum could serve as a central point of information exchange where research findings and other information from the sector could be shared with the interested stakeholders.

Challenge 4: There is limited messaging from the federal government about how potable reuse can appropriately be part of an integrated water supply portfolio.

Action 4: Increase public awareness of potable reuse through federal leadership.

Concurrently with the actions listed above, the federal government can raise awareness of the viability of potable reuse as part of an IWRM portfolio. Statements by EPA, DOE, USBR, USDA, Department of Defense (DOD), and other authoritative federal voices should be aligned to help provide continuity in messaging from the federal government. While there are many federal agencies to engage in this effort, it is especially important for EPA, CDC, FDA and USDA to coordinate and align messaging on potable reuse.

Steps that federal agencies can take to advance this action include:

- Make clear that potable reuse can be a viable element of an IWRM supply portfolio that is supported by the federal government;
- Work with federal, state and local partners to demonstrate and bring to full implementation water reuse projects at federal facilities or lands (e.g. DOD facilities) to demonstrate federal commitment by leading by example;
- Provide resources to communities and states to inform and support effective public education and communication on potable reuse; and
- Support development of case studies, including from the private sector, to describe the potential benefits and costs of implementing potable reuse from a triple bottom line perspective.

EPA could begin this action immediately by incorporating statements from its *Potable Reuse Compendium* into existing and new communications tools such as factsheets, short videos, and other materials, to demonstrate how potable reuse can be an essential part of IWRM. Similarly, EPA and other federal agencies can highlight the current practice of potable reuse in municipal facilities and federal reuse projects, particularly from USBR projects and federal facilities that are supplied by recycled water. More specifically, by using available agency materials together with those developed by the water sector, a focused collaboration by CDC and EPA could address both (1) proactive communication on potable reuse, and (2) community-level responses if there is a failure in a water reuse system.

B. Onsite Non-Potable Water Systems

Onsite non-potable water systems (ONWS) can collect and treat blackwater, graywater, stormwater, and rainwater for reuse in buildings, campuses, and districts for non-potable needs. The use of ONWS originally began as a response to drought-driven conservation needs, as these systems can decrease potable water consumption up to 70%. However, integrating ONWS with centralized infrastructure is becoming increasingly prevalent as an element of community IWRM. As with other forms of reuse, a community-specific evaluation of ONWS implementation is needed and should occur in the context of state law. Such an evaluation should include an assessment of potential impacts on other community infrastructure, including centralized treatment infrastructure.

The recommendations offered below are designed to facilitate the adoption of ONWS as part of communities' IWRM portfolios.

Challenge 1: There are a limited number of off-the-shelf packaged treatment systems containing appropriate technologies to treat graywater, blackwater, rainwater, stormwater and nuisance groundwater designed to meet risk-based water quality standards.

Actions can be taken to establish ONWS as "just another appliance" for new buildings and districts to drive greater adoption of ONWS in growing communities. Such systems would (1) assure a reliable level of treatment; (2) ensure reliable performance with continuous remote monitoring; and (3) simplify integration into building design.

Standard specifications for effectiveness, cost, ease of use, and small footprint design are needed to drive private sector innovation, sufficient market development, adoption at scale, and third-party verification of technology performance.

Action 1: DOE and EPA should issue a "call to action" for technology providers to develop "plug & play systems" that can easily be incorporated into building design. Emphasis should be placed on developing systems to address multiple source waters, end-uses, cost effectiveness, energy efficiency, easy operability, and small footprint. This "call to action" should include funding to encourage research and development with the private sector and a third-party verification process. Lead actors include DOE via its Water Security Grand Challenge Prize, along with EPA. The call to action should leverage current water sector programs that provide market exposure for new technologies and facilitate pilot and demonstration projects such as the Leaders Innovation Forum for Technology, among others.

Challenge 2: Lack of a national approach for risk-based water quality standards and inconsistent plumbing codes for ONWS has created uncertainty and barriers to wide-scale implementation of ONWS throughout the U.S.

Efforts to establish consistent risk-based water quality standards are already underway in several states, including California, Hawaii, Washington, Oregon, Colorado, Washington D.C., and Minnesota. Consistency among remaining states and concurrence by EPA would provide more certainty to technology developers, increase public confidence in ONWS approaches, and facilitate integration of ONWS.

<u>Action 2.1</u>: EPA, International Association of Plumbing and Mechanical Officials (IAPMO), International Code Council (ICC), WateReuse Association, and others with relevant expertise should offer assistance to states to develop risk-based water quality standards and best practices for ONWS. IAPMO and ICC prepare regular updates to the Uniform Plumbing Code and International Plumbing Code; inclusion of ONWS would facilitate state implementation.

<u>Action 2.2:</u> Develop federal procurement guidelines for General Services Administration (GSA) to install ONWS in federal facilities.

The federal government can lead by example by facilitating the adoption of ONWS at federal facilities. As with the broader adoption of ONWS, the guidelines should be set within the context of IWRM planning and should urge community-specific assessments of potential impacts on centralized water treatment systems.

<u>Challenge 3: No governmental or non-governmental entity is currently responsible for ongoing validation of ONWS treatment log-reduction models.</u>

The Risk Based Framework for the Development of Public Health Guidance for Decentralized Non-potable Water Systems report established log reduction targets for the removal of pathogens such as viruses, protozoa, and bacteria for a limited number of alternate water sources and end uses.[3] Additionally, data collection on pathogen concentrations in stormwater, graywater, blackwater and rainwater is occurring throughout the U.S. There is an opportunity to use these data to validate existing models to ensure accurate log reduction targets are established. Additionally, an opportunity exists to expand the risk-based framework to help define log reduction targets for new types of alternate water sources and end uses for onsite water reuse.

<u>Action 3</u>: In the near term, EPA should seek to advance the following research in coordination with the Water Research Foundation, the broader research community, and the private sector:

- Validate existing Qualitative Microbial Risk Assessments (QMRAs) developed in the risk-based framework with additional rainwater, stormwater, blackwater and graywater pathogen concentration data;
- Expand the risk-based framework to create Log Reduction Targets (LRTs) for additional alternate water sources and end uses. Maintain and update an LRT matrix;
- Provide guidance on and recommend LRTs for ONWS to protect public health; and
- Develop predictive models for stormwater to develop more site-specific LRTs.

<u>Challenge 4: While ONWS can reduce a building's water footprint and ease the burden on stormwater and wastewater systems, reduced water consumption is raising concerns about revenue impacts and/or down stream flows in sewer systems for existing centralized treatment facilities.</u>

[3] Risk Based Framework for the Development of Public Health Guidance for Decentralized Non-potable Water Systems. Water Research Foundation. 2017, Available online: https://www.werf.org/a/ka/Search/ResearchProfile.aspx?ReportId=SIWM10C15.

ONWS offer many potential benefits to communities, including fostering community resilience, diversifying and stretching water supplies, managing stormwater, meeting policy and regulatory requirements, deferring capital costs for additional water and/or wastewater infrastructure, generating new revenue streams for utilities, creating opportunities for public-private partnerships, and generating environmental and community amenities.

However, it also poses potential challenges. Reduced water flows resulting from ONWS must be considered. Other potential impacts include: lower community water and wastewater system revenue, degraded drinking water quality, and impacts on function and longevity of wastewater facilities.

Action 4: Support development planning approaches and financial models to evaluate and implement integration of ONWS into communities where it is appropriate. Such approaches and models would provide a framework for efficient long-term capital investment decisions. Models and planning strategies should include:

- Evaluating the optimal scale for ONWS to produce measurable benefits for a community's centralized water infrastructure;
- Assessing the impacts of integration for financial sustainability, energy use, greenhouse gas emissions, water use, drinking water quality, wastewater characteristics, and other impacts on a community's centralized water systems and operations;
- Developing decision-support tools that can assist centralized systems with long-term planning analysis;
- Assessing financial impacts and how they might be managed over time; and
- Addressing volumetric analysis for CSO control and Long-Term Control Plans.

This action should involve Environmental Financing Centers, Water Finance Clearinghouse, infrastructure financers including bond issuers, other financial services firms, State Revolving Fund (SRF) programs, and water sector associations.

Challenge 5: Additional research is needed to develop an operator training program to support implementation of ONWS.

Implementing a risk-based water quality standard for ONWS requires enhanced operator capacity and new skills for utilities and public health agencies to evaluate treatment systems designs. Strong training programs for permit-writers, managers and operators of ONWS would build public confidence in system operations and ensure system capacity for proper functioning. The *Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-potable Water Systems* and the *National Blue Ribbon Commission's Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems* provide an initial starting point for developing a training program.

Action 5: Water sector associations, state and federal certification programs, universities, and vocational training schools should develop operator training and design and permitting training for ONWS. ONWS involve the use of multiple pathogen barriers with continuous online monitoring and verification of performance goals. Operators of these systems will need specific training to ensure both the proper functioning of treatment processes and the protection of public health from relevant pathogens. The training should include an overview of common treatment processes and examples of continuous monitoring methods to ensure water quality standards are met. The training materials that are developed should be applicable to any ONWS program.

Challenge 6: Operators need more information on how long treated non-potable water can be stored, taking the potential risk posed by microbial growth in the distribution system into account.

Opportunistic pathogens such as *Legionella* can be found in non-potable water distribution systems and storage facilities. Additional research is needed to inform operators on how long treated non-potable water can be stored and still be appropriate for particular applications (e.g., toilet flushing, irrigation, etc.). Existing research demonstrates that microbial regrowth in reuse water can be problematic if not managed appropriately.

Action 6: The research community in partnership with water associations should conduct research to assess what changes in water quality occur during storage of treated non-potable water, and what best management practices can be used to maintain microbial stability, with minimal reliance on maintaining a chlorine residual.

C. Industrial Water Reuse

Industrial water usage accounts for a significant portion of overall water usage in the U.S. This provides both an opportunity and challenge for water reuse. Water used in industrial applications is often provided by a municipal utility or withdrawn from a surface or groundwater source and directly used by the industrial user. Water scarcity, lack of reliability, and strict water quality requirements are drivers of water reuse for many industrial sectors.

Reuse in industrial sectors can be considered in a variety of ways:

- Use of recycled water supplied by a municipal utility, or other entity, to supplement or replace other industrial water supplies, such as potable water or raw surface/groundwater; and/or
- Reuse of water within the industrial facility itself, for example treating waste process water to enable its reuse within the facility.

The water used for industrial applications encompasses a broad range of processes, including boiler makeup water, sanitation, and cooling water. Due to the significant variability between industrial water applications, there is also significant variability in water quality and quantity requirements for any given sector and facility. This means that there is no "one size fits all" solution or set of actions that will apply universally to all industrial sectors. Flexible guidance with some level of segmentation of industrial applications may be mechanisms to more practically address the degree of variability that exists. Several of the most significant challenges associated with industrial water reuse include financial incentives, policy and regulatory uncertainty, and the need for increased knowledge-sharing to inform decision-making.

Challenge 1: Need for financial incentives

Where conventional water supply is relatively plentiful and inexpensive, it can be difficult for industrial users to make the business case for water reuse. Corporate social responsibility initiatives are often helpful in spurring the adoption of reuse, but there are also other financial incentives that could be effective in doing so.

Action 1: Develop financial incentives to encourage industry to consider water reuse. A range of options exist for providing financial incentives for industrial reuse, including the following:

- **Tax Credits** - Federal, state, and local governments could provide an investment tax credit for industries meeting certain, incremental water reuse targets. Targets could be based on baseline data collected for a specific sector. Long-term, this could be coupled with other sustainability elements, such as emissions. Best practices may be gleaned from other sectors (e.g. solar energy).
- **Utility Incentives** – Utilities can explore providing incentives to industries to use recycled water, especially where there are direct benefits for the utility in doing so. A metropolitan water utility in Colorado offers an illustrative example, focused on water conservation. During a period of drought, the water utility reimbursed its largest industrial water users for selected capital expenditures, contingent on the ability to meet a specific water savings target. Similarly, flexible reimbursement policies, lower availability charges, and competitive rates allowed one Virginia utility to enroll more than 30 data centers into its reclaimed water program. The collective demand from these industrial customers shaves 5% off of the utility's potable water peak demand, significantly lowers nutrient discharges to local waterways, and saves each data center approximately $2.5 million in life-cycle facility costs.
- **Private Foundation Funding** – Engage private foundations to prioritize industrial water reuse among their project funding portfolio. Water associations could engage with foundations by providing education to increase understanding of water reuse and its benefits. Industrial reuse can play a significant role in helping foundations advance broader watershed-based conservation goals.
- **Trading** – EPA can help create a market for water quality and quantity trading for industrial reuse, for both discharge and consumption, by developing appropriate context, stakeholders, and success factors, and providing case studies to illustrate success. Markets may be established across industries, watersheds, or organizations to allow for increased flexibility in reuse treatment at potential sites. Coordination with state Water Quality Standards programs will be important. EPA can facilitate discussions and assist in program development where watersheds cross state boundaries.

Challenge 2: Need for sector-specific knowledge sharing to inform decision-making

Sharing information in a sector-specific context can help build awareness of the benefits of reuse and encourage stakeholders not yet engaged in reuse to consider options for implementation.

Action 2: Establish industrial reuse benchmarks, fit-for-purpose information, and a data clearinghouse.

EPA, the water sector, and industry-specific associations should work towards developing baseline data, with a goal of establishing benchmarks for areas such as water efficiency and reuse. Due to the variability inherent in industrial water use applications and the variations in the source of the water to be reused, this recommendation to establish baselines and benchmarks is made with recognition that some degree of segmentation will be required, based on factors such as sector, geography, and local challenges.

Regarding fit-for-purpose considerations, industry-specific associations and the research community should compile a body of research that provides evidence-based information that enables industries to more accurately match water uses with the source and quality of water. This may involve setting a research agenda for industrial reuse, compiling current knowledge, and soliciting research projects.

These data and research results could be housed in a data warehouse/clearinghouse, which also includes case studies and a robust search function. One way to further this concept is to establish an interactive survey or tool that enables users to input site or industry-specific information, related to challenges, limitations, or opportunities, and receive feedback that provides a set of options for implementing reuse.

Challenge 3: Perceived lack of economic drivers for industrial reuse.

It can be challenging to encourage voluntary changes from industry. By leveraging corporate sustainability and its marketing/branding potential, water reuse can be accelerated in the industrial space.

Action 3.1: Create a federal-level recognition award program for exceptional water reuse projects in industry.

Competition exists within many industries, as companies seek to differentiate themselves and gain an advantage in the market. Increasingly, this may include incorporating a triple bottom line approach to operations, with consideration of sustainability – of which reuse is one component – in corporate decision-making. Accordingly, a recognition program for exceptional water reuse projects in a given industry or across several industries could help a company distinguish its brand and ultimately create a competitive advantage. Such recognition need not be financial in nature, provided that the recognition comes from a level that provides a high enough degree of prestige.

Action 3.2: Leverage the CEO Water Mandate[4] and/or other similar programs to encourage industries to take action.

Leveraging current water-related partnerships and/or recognition programs, such as the CEO Water Mandate or Alliance for Water Stewardship resources, relies on peer-to-peer engagement to elevate the performance of the sector. Leadership from the White House, DOE, EPA, industry associations, and water utilities can all play a role in promoting these programs.

[4] https://ceowatermandate.org/about/what-is-the-mandate/

D. Agriculture Water Reuse

According to the U.S. Department of Agriculture's (USDA) Economic Research Service, agriculture consumes roughly 80 percent of the water that is used in the United States.[5] The sector's impact on water, both in terms of ground and surface water withdrawals and in terms of drainage to water bodies, is immense. Therefore, increased use of recycled water by the agricultural sector could have a very significant impact on the water environment.

Water recycling relates to agriculture in at least two important ways. First, in areas where natural supplies are limited (e.g., groundwater supplies are limited, or could become limited), using recycled water for irrigation can help address water supply issues. In some states, recycled water is already being used to irrigate tens of thousands of acres of farmland. For example, 92 percent of the recycled water that Idaho produces is used to irrigate crops.

Second, agricultural capture and reuse of storm and drainage water can help reduce nutrient loading and downstream flooding. The extent to which farmers are capturing and reusing drainage and storm water across the U.S. is not clear. However, we do know that USDA has worked with some producers to implement relevant conservation practices. For example, in 2017 and 2018, USDA's Natural Resources Conservation Service (NRCS) entered into 449 contracts with farmers to support the implementation of tail water recovery systems, irrigation reservoirs and catchment systems, and constructed wetlands for biological treatment of water.

Challenge 1: Costs and benefits, including environmental benefits, of recycling drainage water and of using highly treated municipal effluent for irrigation are not adequately quantified and or understood by farmers.

As with all business owners, economics play a major role in farmers' decision making. This is true across a range of decisions, including what inputs to use (e.g. fertilizer). When considering whether, when, and how to recycle water or use recycled water, farmers will compare costs and benefits to business as usual, which in most cases involves sourcing irrigation water from the ground and letting untreated drainage water leave farm fields into drainage ditches. In order to facilitate a significant uptake of water recycling across farm country, research is needed to quantify the costs and benefits of water recycling in agriculture, and those costs and benefits will need to be communicated to farmers and other stakeholders.

Action 1.1: Create a national research plan for water reuse in agricultural production.

Where such information is not already known, EPA and USDA's research agencies should coordinate with The Water Research Foundation, the research community, farm groups, and industry to conduct research on the following topics:

- The costs and benefits of using recycled water for irrigation relative to groundwater withdrawal;

[5] USDA Economic Research Service. *Irrigation & Water Use.* Available online: https://www.ers.usda.gov/topics/farm-practices-management/irrigation-water-use/

- The nutrient benefits and energy savings/costs of reuse water (both municipally treated wastewater and recycled agricultural drainage water);
- The potential for and drivers of increased capture and reuse of agricultural drainage water in the landscape to reduce downstream nutrient loading; and
- The scale at which capture and reuse of agricultural drainage water would have a tangible impact on flood peak reduction and other downstream water quantity concerns.

Action 1.2: Facilitate information exchange to increase stakeholders' understanding of the costs and benefits of using recycled water.

Water providers and researchers should communicate costs and benefits to farmers, agricultural organizations and advisers, agency staff, and conservation groups. Where research is being conducted in a university context, particularly at land grant universities, researchers can communicate results directly to USDA extension. Municipalities and industries that have an interest in working with farmers in their regions can reach out to farmer leaders and farm groups to share and discuss research results. Researchers at the national level can provide research results to national associations, including farm, water, and conservation associations.

Challenge 2: There are limited mechanisms to compensate farmers for the environmental benefits that they produce by recycling drainage water or using highly treated municipal effluent for irrigation.

The research outlined above in Action 1.1 can help elucidate the environmental benefits of water reuse in agriculture, which include groundwater savings, flood mitigation, and reductions in nutrient loading. The cost of water recycling for farmers, especially when technology is involved, can be significant. Moreover, the cost of municipally sourced recycled water may exceed the cost of withdrawing groundwater. Incentives could be put in place to help farmers transition to water recycling.

Action 2.1: Integrate water reuse into USDA conservation and farm support programs.

USDA's Natural Resources Conservation Service (NRCS) should review and assess its programs and standards to determine opportunities for better supporting water reuse, including both the use of highly treated municipal effluent for irrigation and the capture and reuse of drainage water.

NRCS provides federal cost-share assistance to farmers to install a range of conservation activities, and therefore is highly influential in practice selection. Opportunities for increasing water reuse may include additions or revisions to conservation practice standards, Conservation Stewardship Program enhancements, conservation activity plans, and scenarios in cost calculations. For example, NRCS could create a conservation activity to help farmers afford the cost of transitioning from groundwater to municipally treated recycled water for irrigation. Other examples include adding the reuse of drainage or runoff water to the Tailwater Recovery standard and adding scenarios with water reuse to payment schedules.

Action 2.2: Promote environmental service exchange partnerships.

USDA and EPA should encourage partnerships at the landscape, state, and local levels to facilitate "services exchanges" whereby entities can pay farmers to provide certain services. More specifically:

- EPA, USDA, the research community, and the private sector should research the viability of a mechanism by which downstream communities can pay farmers to store stormwater during rain events, reuse the water, and recycle nutrients for supplemental irrigation;
- EPA and USDA should enter into a partnership to facilitate water quantity trading in the same way that they have partnered on water quality trading.
- USDA should seek to partner with the ACE to facilitate the engagement of farmers in ACE flood prevention efforts;
- Municipal wastewater agencies that have already formed partnerships and in-lieu exchange programs with farmers should share their expertise and experience with other agencies; and
- On the water quality side, EPA should encourage entities developing water quality trading programs to include agricultural drainage water reuse as an approved offset.

The environmental benefits of water recycling are significant. Farmers who transition from groundwater and surface water withdrawal to highly treated municipal effluent for irrigation can conserve a valuable natural resource. Farmers who recycle agricultural drainage and stormwater can reduce nutrient loading and manage flooding. On both the quality and the quantity side, these benefits can be monetized and captured as a tool to advance more water recycling across the country.

Challenge 3: Lack of technological innovation to enable water recycling

As outlined above, farmers are in a unique position to capture, manage, and redirect stormwater for beneficial uses. While technology exists to manage stormwater in urban settings, additional innovation, testing, and demonstration is needed before similar technologies can be applied to agricultural landscapes.

Action 3: Develop a pilot project to demonstrate cost-effective management systems for monitoring, control, and automation of agricultural water reuse systems, including a decision support framework to help farmers integrate information.

New and emerging technologies allow us to more accurately forecast rainfall events and periods of drought. We have the ability to monitor and model reservoir, stream and soil moisture levels and quantify water volumes that are being reduced through various pathways to build better large-scale water balance models. Companies are also developing technology that simplifies the management of control systems through the use of swarm intelligence or other algorithms to open and close valves to manage water levels and flow rates on surface and subsurface storage structures like reservoirs, ditches and drainage systems. This stored water can be reused on the farm where the storage is located or pumped or delivered to another farm or field. The control of the system can be based on various inputs or triggers, but a cost-benefit pricing mechanism may prove to be the most efficient in a market-based approach.

Challenge 4: Increase consumer, farmer, and utility confidence in the safety of recycled water.

As mentioned above, using municipally treated wastewater effluent as an irrigation source is common is some states. For example, in California, 30 percent of recycled water is used for agricultural production.[6] Despite the safety of the practice, farmers may be reticent to use it to grow crops, and buyers may be reticent to source food that has been grown with it. This concern is often due to a lack of knowledge about the processes used to treat wastewater for reuse and the results of such treatment. More work can and should be done to form partnerships to educate the food supply chain about the relative risks and benefits of using recycled water for agricultural production.

Action 4: Water associations and utilities should form partnerships with producer associations, USDA extension programs, and others to conduct outreach to farmers and the food supply chain to discuss the benefits of and typical concerns related to using recycled water for irrigation, and to promote recycled water to achieve sustainability goals.

Beginning in 2022, federal food safety regulations will require irrigation water to meet certain risk-based safety standards. Even now, however, it is not uncommon for buyers to require farmers to undergo food safety audits. In other words, regardless of federal actions, the market drives food safety. Farmers will not use recycled water for irrigation if they are concerned that doing so will get them crosswise with federal, state-level, or market-based food safety requirements. Partnerships are necessary to communicate the relative risks of using recycled water.

Challenge 5: State-level policies and strategies can help advance on-farm water recycling.

States can influence water reuse through enabling policies and also through their support of conservation practices as part of various water quality initiatives. EPA, water associations, and state-level stakeholders all have a role to play in connecting the dots for states that have not yet integrated water recycling into their agricultural water management policies and strategies.

Action 5.1: Include agricultural water capture and reuse practices in state nutrient reduction strategies.

States and regions across the U.S. are developing nutrient reduction strategies to reach water quality goals, and some states have identified a list of practices that should be implemented to reduce nutrient losses to receiving waters. EPA can encourage the inclusion of practices that reuse water as part of these strategies to encourage states to include.

Action 5.2: Develop state policies to promote agricultural reuse.

EPA, water associations, and state regulator associations should collect and share examples of state-level enabling policy, including policies that have enabled use of recycled water for irrigation of food and non-food crops, as well as those that have enabled drainage authorities to operate their systems

[6] Water Research Foundation. Project Number: Reuse-15-08/4775. *Agricultural Use of Recycled Water: Impediments and Incentives.* 2019.

for multiple benefits (storage, water quality practices, downstream flood reduction) beyond just drainage.

Challenge 6: Salinity is a limiting variable to sustainable reuse

The increase of total dissolved solids and salt in recycled water can place significant limitations on the viability and sustainability of recycled water programs. Actions should be taken to advance salinity management on a nationwide scale.

Action 6: EPA should take the following actions to limit the amount of salt that enters the domestic wastewater supply:

- Provide the WaterSense label only to products that do not degrade water quality. Products that add salt to wastewater should not qualify;
- Discourage the use of cation exchange water softeners (self-regenerating water softeners), as the discharges from these devices degrade recycled water quality. Our understanding is that EPA has decided not to proceed with the development of a draft specification for water softeners as part of the WaterSense program at this time;
- Promote existing federal programs that reduce the salinity in source water (e.g. Colorado River Basin Salinity Control Forum), and to the extent that funding decisions can be made administratively, ensure adequate federal funding for these programs;
- Support states and municipalities that want to develop source control and pre-treatment programs to keep salts out of the wastewater stream.

While included here as a recommendation important to agricultural applications of reuse, the need for advancements in salinity management applies to multiple types of water reuse.

E. Environmental Restoration Water Reuse

Water reuse can provide a dependable supply of water to create, enhance, or restore ecological functions and sustain long-term environmental benefits. Innovative opportunities for environmental restoration using recycled water include wetland restoration, groundwater injection for saltwater intrusion barriers, riparian restoration, hydration of dewatered streams, treatment of impaired groundwater, and water exchanges that can preserve critical habitat for endangered species.

Despite the clear benefits of water reuse for environmental restoration, significant barriers limit the expansion of the practice. These barriers include a general lack of knowledge about the use of recycled water for environmental restoration projects, and confusion around which federal programs and policies are relevant to these activities. The actions outlined below aim to address these challenges.

Challenge 1: Entities planning environmental restoration projects are generally not aware how water reuse can advance their goals.

Across the country, entities such as highway administrations, property developers, environmental contractors, and local governments engage in a variety of environmental restoration efforts. Oftentimes, these entities are unaware that recycled water can be used to advance their goals. Moreover, water recycling for environmental applications requires consideration of a complex suite of benefits and risks and engagement of multiple partners. A robust information gathering and dissemination effort could help address these challenges.

<u>Action 1:</u> The water sector should collect, collate, and disseminate case studies demonstrating the successful use of recycled water for environmental restoration.

The water sector should develop a compendium to support reuse applications for environmental restoration. Ideally, the compendium would highlight case studies demonstrating the benefits of reuse applications for a range of water environments, such as flow augmentation of low flow streams, creation of saltwater barriers, and hydration of wetland systems. This should include a consideration of environmental economics.

A compendium could provide examples of lessons learned, regulatory strategies, communication approaches, and outcomes that can help project proponents overcome regulatory uncertainty and catalyze projects. Innovative and effective projects can be shared to increase awareness and foster growth. The water sector could partner with state agencies and their associations as well as with EPA and interested organizations to implement this item. Collaboration with EPA would ensure broad communication of information. The approach would build on progress by other champions, including state regulatory agencies and local governments.

<u>Challenge 2: Entities pursuing environmental restoration with recycled water may be stymied by a lack of clarity regarding (1) whether or not their projects are eligible for federal funding, and (2) how federal regulations may or may not apply to their projects.</u>

A lack of clarity around federal funding eligibility and regulatory applicability has limited viable restoration projects. Entities intersted in using recycled water for environmental restoration have been told that they do not qualify for EPA funding. Similarly, potential project leads have been told that existing regulations prohibit the use of recycled water for restoration.

<u>Action 2:</u> Issue informational guidelines to clarify (1) federal funding eligibility for environmental restoration projects using recycled water, and (2) what federal regulations would apply to various types of restoration projects that are using recycled water.

Because these types of projects relate to a variety of resource considerations (e.g. water quality, wetlands protection, fish and wildlife habitat, and irrigation delivery systems), inter-jurisdictional coordination can provide greater certainty, support more holistic planning, and better facilitate implementation of projects. Therefore, in developing these guidelines, EPA should seek to closely collaborate with NRCS, the U.S. Fish and Wildlife Service (FWS), USACE, other relevant federal partners, and the water sector.

F. Non-potable Reuse of Oil and Gas Water

Produced water from oil and fracking wells is a new source of potential water that can be treated and reused for beneficial non-potable water supply purposes, such as cooling industrial facilities. Given that produced water in its raw form contains chemical constituents that are of concern to public health and the environment, it is imperative that in developing standards for treating this water source, potential risks to environment and public health are fully assessed.

In order to facilitate the reuse of produced water for beneficial non-potable purposes, fit-for-purpose treatment technology and regulatory standards must be in place to ensure protection of public health and the environment. EPA and other regulatory agencies, including state agencies, can help facilitate the development of such standards where they do not exist.

Challenge 1: For some potential applications of produced water reuse, fit-for-purpose standards and criteria have not yet been developed to ensure that public health and the environment are protected.

Action 1.1: Develop standards to meet public health and environmental objectives.

Where there is an interest in and a potential market for recycling produced water for beneficial non-potable uses, relevant regulatory agencies should develop fit-for-purpose standards. When treated produced water is going to be discharged into surface waters, an evaluation of public health and environmental impacts should be done as part of the development of proposed Effluent Limitation Guidelines (ELGs). Standards must similarly be developed for non-potable reuse applications where ELGs do not apply.

As part of this undertaking, regulators should work with oil and gas producers and the scientific community to identify priority constituents, determine where meaningful detection levels can be achieved, and ensure that fit-for-purpose testing and treatment requirements are sufficiently protective. For some potential reuse applications of produced water, the water quality requirements are unknown. These areas will require foundational research before appropriate standards can be developed.

Action 1.2: Develop informational fit-for-purpose guidelines to help facilitate the beneficial and safe use of produced water.

EPA, USDA, and other federal agencies should partner with the water sector and oil and gas industry to assist sectors considering the reuse of produced water to develop informational guidelines that reflect key reuse considerations, including (1) treatment, (2) quantity and timeframe for water delivery, (3) appropriate hazard control points and monitoring checks, and (4) relevant constraints important to the finished product.

This information could be compiled in a compendium of practice guidelines that are in use in each state, including each state's regulatory framework for water quantity as well as quality, ground water standards, and other appropriate and useful information. A compendium of criteria should be readily accessible to potential users and interested stakeholders.

Challenge 2: There are technological gaps that limit the use of produced water in new sectors.

There are many technologies available to treat produced water. As with all applications of water reuse, treatment of produced water will need to be based on a characterization of the water and the specific fit-for-purpose needs of particular use applications. Effectively applying existing technology solutions and making further technological advancements will be important to producing cost-effective options for producing reuse-quality water. Technology needs are complicated by the high variability in the quantity and quality of produced water, as well as by the diverse needs of potential end users outside of the oil and gas sector.

Action 2: EPA, other federal agencies, the water sector associations, oil and gas producers, and the research community should partner to develop a research plan to address unresolved information gaps and technological needs related to reuse of produced water. Information gaps relevant to reuse of produced water include: (1) demonstrating treatment efficacy for technologies drawing on a robust produced water characterization, (2) strategies to overcome transportation challenges resulting from dispersed well sites as well as uncertainty in production levels, and (3) analytical methods and management strategies to address challenging constituents like naturally occurring radioactive materials (NORM) and technologically enhanced naturally occurring radioactive materials (TENORM) resulting from produced water treatment.

Challenge 3: Treatment of produced water is likely to produce high levels of solids, which will need to be managed.

Large quantities of salts would be produced from increased treatment of produced water for reuse. In order to recover and manage these resources, there needs to be an understanding of the market opportunities as well as any associated risks within receiving sectors.

Action 3.: EPA should support the development of methods to effectively manage residuals from treatment of produced water.

The oil and gas industry, the water sector, and the research community should work together with EPA, DOE, and other federal agencies to develop a plan for the management of residuals from the treatment of produced water. The plan should include an assessment of market opportunities, treatment options, disposal options for solids that are not marketable (or do not currently have a market), an assessment of the quality of residuals slated for reuse and their appropriateness and safety for that reuse. Alongside this effort, USGS should update its produced water database with more available information and expand the scope of constituents analyzed and reported on.

G. Stormwater Capture

While some states and localities have enacted policies to guide non-potable reuse of stormwater, those policies and regulations are fragmented from state-to-state and largely depend on water availability and permissible uses. The slow rate of adoption is occurring in spite of research demonstrating the potential benefits of greater stormwater harvesting.

According to the National Academy of Sciences (NAS), neighborhood- and regional-scale stormwater reuse projects can contribute significantly to urban water supplies.[7] NAS estimates, for example, that in Los Angeles, average stormwater runoff from medium-density residential developments, if captured and stored, would be roughly sufficient to meet indoor residential water needs in those areas (NAS, 2016).

In contrast to these urban stormwater capture efforts, USACE manages a different component of stormwater management—flood control and coastal storm surges. While water reuse and harvesting are not among its traditional missions, USACE carries out these types of activities under its broader Civil Works and Environmental Restoration missions.

There are new opportunities to facilitate stormwater harvesting through IWRM. Legislation enacted in the 115th Congress directed both USACE and EPA to pursue integrated planning and to coordinate with states and localities. Federal, state, and local government entities, water resource managers, the research community and other relevant actors can work together to facilitate the harvesting and beneficial reuse of stormwater in a manner that enhances the environment and protects public health.

Challenge 1: There is a lack of information regarding the constituent parts, fit-for-purpose treatment needs, and potential downstream impacts of stormwater harvesting and use.

Additional information is needed on the constituents of runoff and the potential impact of constituent occurrence on reuse treatment design, as well as the implications of stormwater recycling on achieving in-stream values. Communities may be unable to craft appropriate management plans for harvesting and reusing stormwater. Additional research is needed on the impacts of stormwater harvesting on downstream water quantity and in-stream flows. For both public health and environmental considerations, research is needed on a macro scale and a project-scale.

Action 1.1: Research and categorize the constituents of stormwater to better understand treatment needs for various use applications (e.g. irrigation, industrial uses, graywater applications, etc.).

The research community, in partnership with the water sector and EPA, should build on the NAS body of work, peer-reviewed literature, and the extensive knowledge already gained in states looking to better understand and implement water reuse through stormwater capture (e.g., Minnesota, California, Oklahoma, Florida, New York, Ohio and others). Specifically, research should focus on efforts to study the constituents of harvested rainwater as well as stored runoff. Better understanding the actual composition of the water will help guide more appropriate risk analyses that will drive responsible and effective policies. In addition, EPA and states can work to develop a compendium of case studies to inform future projects. These case studies should document barriers and benefits to using stormwater runoff for reuse, as well as evaluate how well the stormwater capture is integrated into long-term local water supply planning.

Action 1.2.: Research is needed on the potential impacts of stormwater harvesting on downstream water quantity and in-stream flows.

[7] National Academies of Sciences, Engineering, and Medicine (NAS). 2015. Using Graywater and Stormwater to Enhance Local Water Supplies: An Assessment of Risks, Costs, and Benefits. Washington, DC: The National Academies Press. https://doi.org/10.17226/21866

As states look towards stormwater capture as a source of water supplies, without proper guidelines and carefully constructed policies, there could be water quantity impacts downstream. This will be particularly relevant in areas where water rights dictate water use.

Challenge 2: Incorporate stormwater reuse in USACE planning and assessment projects where appropriate.

As mentioned in the introduction to this section, USACE has almost two centuries of guidance and laws governing their traditional mission areas but does not include water reuse and harvesting among those mission areas. With the implementation of America's Water Infrastructure Act of 2018 (AWIA), USACE's support for the practice is beginning to grow. The following recommendation is designed to help incorporate stormwater harvesting activities into the planning and assessment of Corps projects, where such activities are appropriate.

Action 2: Support water recycling as a key component of implementing SEC. 1164 of AWIA.

USACE's implementation guidance for Section 1164 of AWIA (dated April 18, 2019) supports the inclusion of recycling features in feasibility studies. This provides an opportunity to link elements such as water reuse to projects for flood damage reduction and aquatic ecosystem restoration. In implementing Section 1164 of AWIA, USACE should actively encourage district offices to support the integration of recycling features in feasibility studies, as detailed in its April 2019 implementation guidance. USACE should also raise awareness among non-federal sponsors of nature-based and green infrastructure alternatives for managing stormwater in feasibility studies.

Importantly, it is critical that USACE recognize state water allocation doctrines, as well as established water allocation agreements between USACE and other parties. Integration of stormwater reuse into USACE policy must guard against unintentionally endangering existing allocations of municipal water storage in USACE reservoirs.

Conclusion

We submit these recommendations to inform the development of a national Water Reuse Action Plan. We look forward to reviewing a draft of an Action Plan when it is available, and stand ready to partner with EPA and other stakeholders to advance water recycling as part of an integrated water management portfolio.