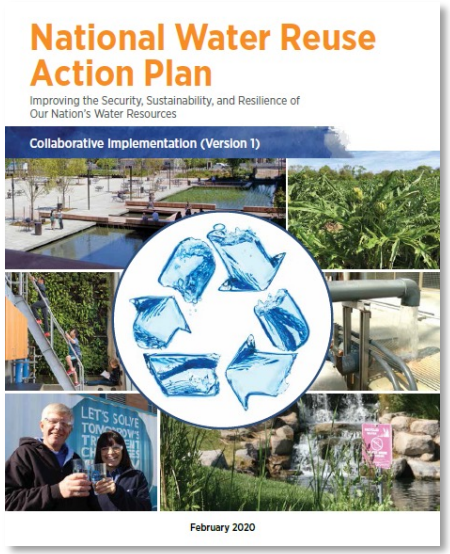
National water Reuse Action Plan And REUSExplorer

Sharon Nappier
National Program Leader for Water Reuse
U.S. Environmental Protection Agency

SESSION OVERVIEW



- WRAP Overview
  - Recent outputs
- REUSExplorer tool
  - User-centered demo
- Looking Forward

MOTIVATIONS FOR COMMUNITIES TO PURSUE REUSE

- Create a new and more climate-resilient source of water to supplement existing supplies
- Substitute non-potable water for applications that do not require drinking-quality water
- Improve ambient water quality
- Protect aquatic ecosystems through targeted restoration and reduced withdrawals/diversions
- Address groundwater overdrafts and related impacts (i.e., land subsidence and saltwater intrusion)
- Lower energy costs for treatment and transportation of water
- Provide an alternative approach to managing stormwater runoff

CASE STUDY: LOUDOUN WATER

- Supplies up to 2 MGD of non-potable water for cooling data centers
- Reduces nutrient discharges to the Chesapeake Bay

EXAMPLE CHALLENGES AND BARRIERS

- Public health protection from known and unknown constituents
- Unclear, inconsistent, or conflicting state regulations governing various reuse applications
- Consumer concerns about contamination and safety
- Cost of infrastructure upgrades, including system assessment, installation, and operation
- Technology needs for validating technology performance/real-time monitoring
- Unintended downstream impacts from reduced flows

THE VISION – CREATING TOOLS TO ENABLE REUSE

The WRAP collaborative was developed to build technical, financial, and institutional capacity for communities of all sizes to pursue water reuse practices.

"Water is the medium by which many communities experience climate stress, and reuse can help make our systems more resilient to its impacts."

- *Benita Best-Wong*
EPA's Deputy Assistant Administrator for Water

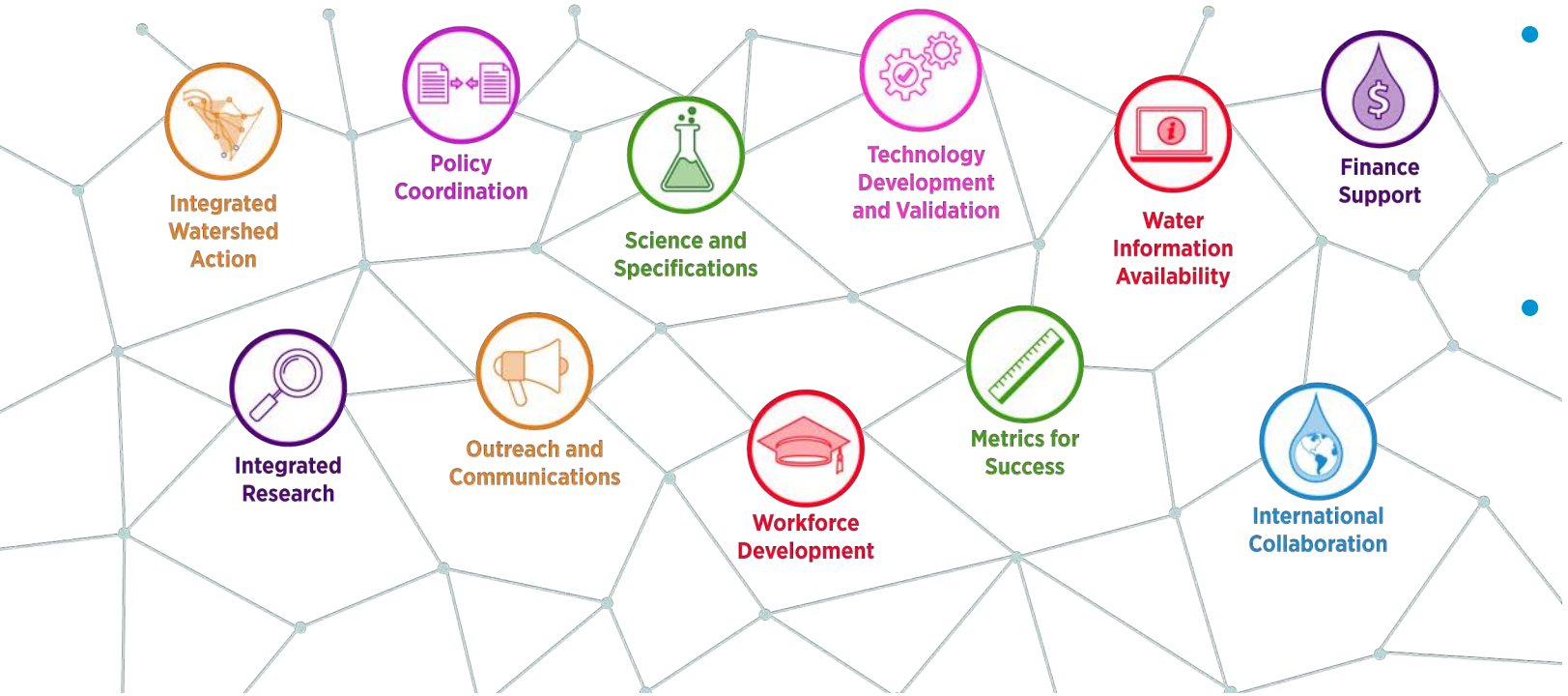
City of Los Angeles, Sanitation & Environment operates the Donald C. Tillman Water Reclamation Plant, which provides recycled water to customers in the San Fernando Valley and irrigates its onsite Japanese Garden

NATIONAL WATER REUSE ACTION PLAN

- Developed with federal, state, tribal, local, and water sector partners
- EPA facilitates implementation
- Builds state and local capacity
- Encourages integrated solutions to water resources management
- Fosters collaboration

CREATING TOOLS TO ENABLE REUSE

WRAP ACTIONS



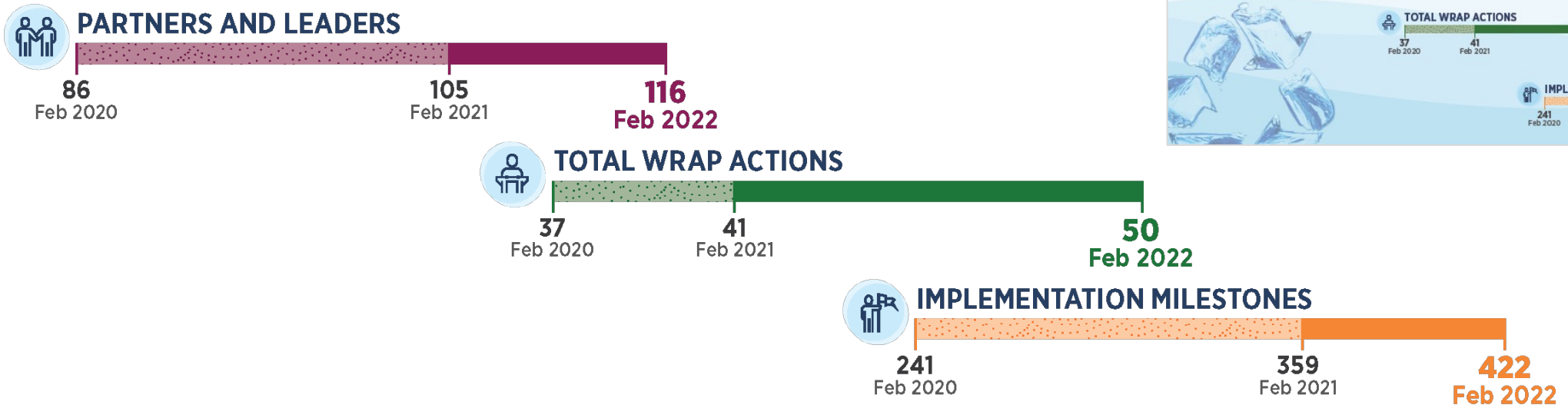
- The WRAP is a dynamic, iterative effort
- Serves to make water reuse more accessible and straightforward to implement

NATIONAL WATER REUSE ACTION PLAN

Examples of Reuse Sources and Uses

SNAPSHOT OF THE WRAP

- Celebrated 2nd anniversary in February
- Currently 116 partner organizations, a 35% increase since launch
- 9 actions completed to date (e.g., funding eligibility, tribal outreach / training, raising global awareness)



NATIONAL WATER REUSE ACTION PLAN

Update on Collaborative Progress—Year 2

March 2022

The **National Water Reuse Action Plan (WRAP)** helps drive progress on reuse by leveraging the expertise of scientists, policymakers, and local experts across the country to **create a more resilient water future** for communities of all sizes. Now two years into WRAP implementation, there are **116 dedicated partner organizations** contributing at various scales. Since February 2020, WRAP collaborators have been working through coordinated actions to address barriers to reuse, including issues related to funding, technology, policy, and organizational capacity. Currently, there are **50 WRAP actions**, with **13 added** since January 2021 on topics such as monitoring practices, plumbing codes and standards, and communication tools. Teams have **finished 267 implementation milestones overall** and **completed 5 total actions to date**, which included deliverables related to funding eligibility, tribal outreach and training, and raising global awareness for reuse. Through the Bipartisan Infrastructure Law, enacted November 2021, lawmakers called for continued WRAP implementation and the creation of a federal reuse interagency working group **"to advance water reuse across the U.S."** (Sec. 50218).

WRAP YEAR 2 HIGHLIGHTS

At this stage, WRAP collaborators have delivered many critical outputs that lay the groundwork for more substantial impacts in the coming years. The following is a snapshot of some key activities and accomplishments over the past year.

Incorporating Water Reuse into Programs and Policies

- **Expert convening and report on stormwater capture and use**. Investigates opportunities, challenges, and next steps to expand the implementation of stormwater harvesting across the country (Action 3.3, led by EPA, NMSA, WateReuse, WEF, ReNUWIt, and the Johnson Foundation).
- **Integrating Water Reuse into the Clean Water State Revolving Fund document**. Describes the eligibility of water reuse in the CWSRF and highlights successful policies and practices that state CWSRF programs implement to support reuse (Action 6.2A, led by EPA).
- **$2.4 million in Conservation Innovation Grants**. Awarded across three proposals in this new priority area, reflecting USDA's broader strategy for water reuse on agricultural land (Action 5.1, led by USDA).
- **Collaboration on NPDES permitting processes**. Enhanced understanding of how permitting can support new water management technologies and strategies, including through development of a training webinar (collaboration between three WRAP action teams: Action 2.6, Action 2.16, and Action 3.3).
- **Compendium of Urban Waters and National Estuary Program water reuse activities**. Highlights the intersection of reuse with these key community-focused programs (Action 1.4, led by EPA).

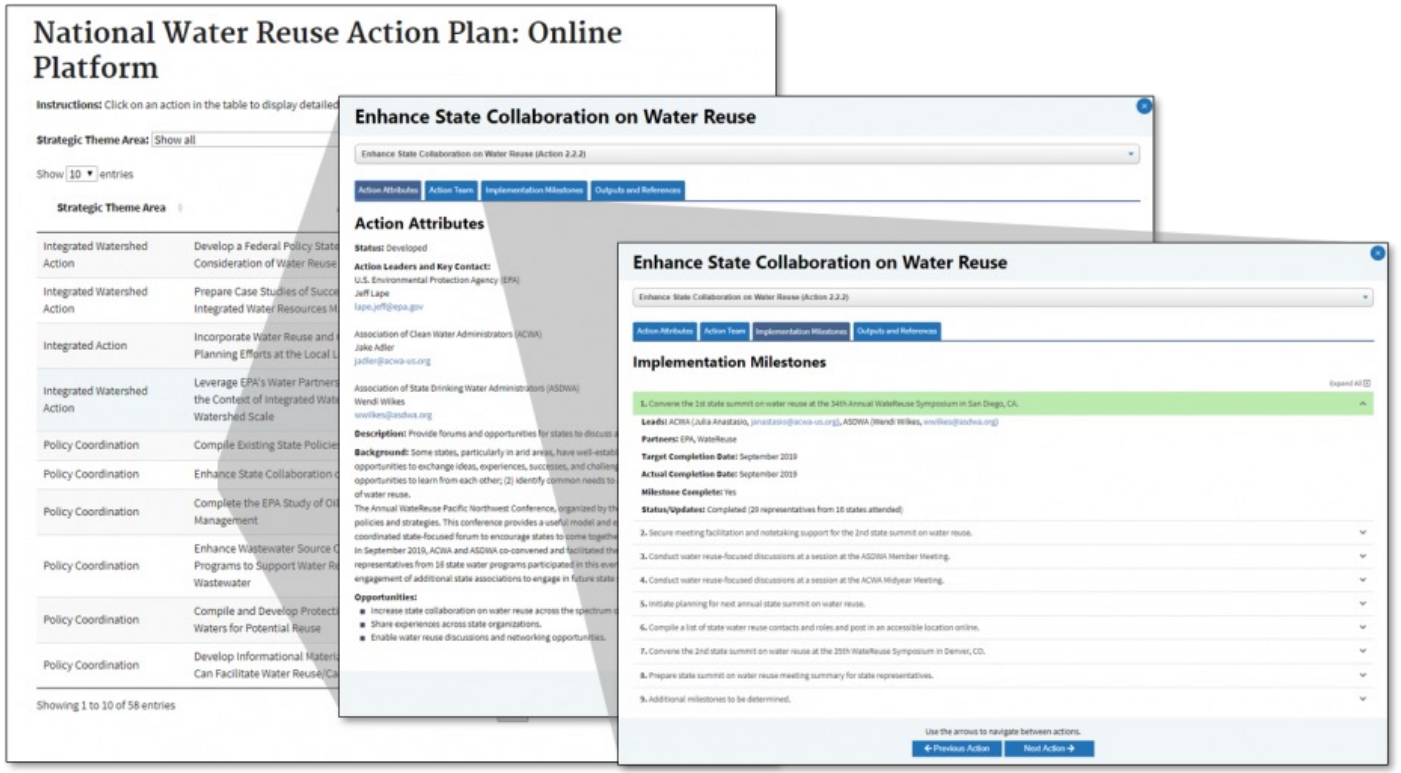
In February 2022, EPA staff and Assistant Administrator for Water Radhika Fox toured the Scottsdale Water Campus in Arizona. The campus has over two decades of experience in indirect potable reuse, recycling 1.7 billion gallons of treated wastewater annually through aquifer recharge. Photo credit: EPA

$1.4 billion invested in **7 reuse infrastructure projects** in 2021 through EPA's WIFIA loan program.

This figure illustrates the growth of WRAP collaborators, actions, and milestones each year since the start of WRAP implementation, with the latest cumulative tallies on the right.

ONLINE PLATFORM

- Repository for all active actions
- Provides background and opportunities to be gained
- Identifies leaders and partners
- Captures milestones and progress
- Helps form the pipeline of new actions and collaboration



https://www.epa.gov/waterreuse/national-water-reuse-action-plan-online-platform

WRAP COLLABORATIVE

- Incorporating water reuse into programs and policies
- Supporting technical and scientific advancements
- Building awareness and sharing knowledge

"A priority for [BIL] funding is pursuing a climate resilient water future, and water reuse is central to this strategy. Investing in water reuse protects the health of our communities and our environment while creating good paying jobs."

Radhika Fox
EPA Assistant Administrator for Water

Bipartisan Infrastructure Law: Section 50218

- IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the **Administrator shall establish a Water Reuse Interagency Working Group.**

- PURPOSE.—The purpose of the Working Group is to develop and coordinate actions, tools, and resources to advance water reuse across the United States, including through the **implementation of the February 2020 National Water Reuse Action Plan**, which creates opportunities for water reuse in the mission areas of each of the Federal agencies included in the Working Group under subsection C.

- SUNSET.—
  - IN GENERAL.—Subject to paragraph (2), the Working Group shall terminate on the date that is **6 years** after the date of enactment of this Act.
  - EXTENSION.—The Administrator may extend the date of termination of the Working Group under paragraph (1).

LAUNCHED MAY 2022

Water Reuse Interagency Working Group

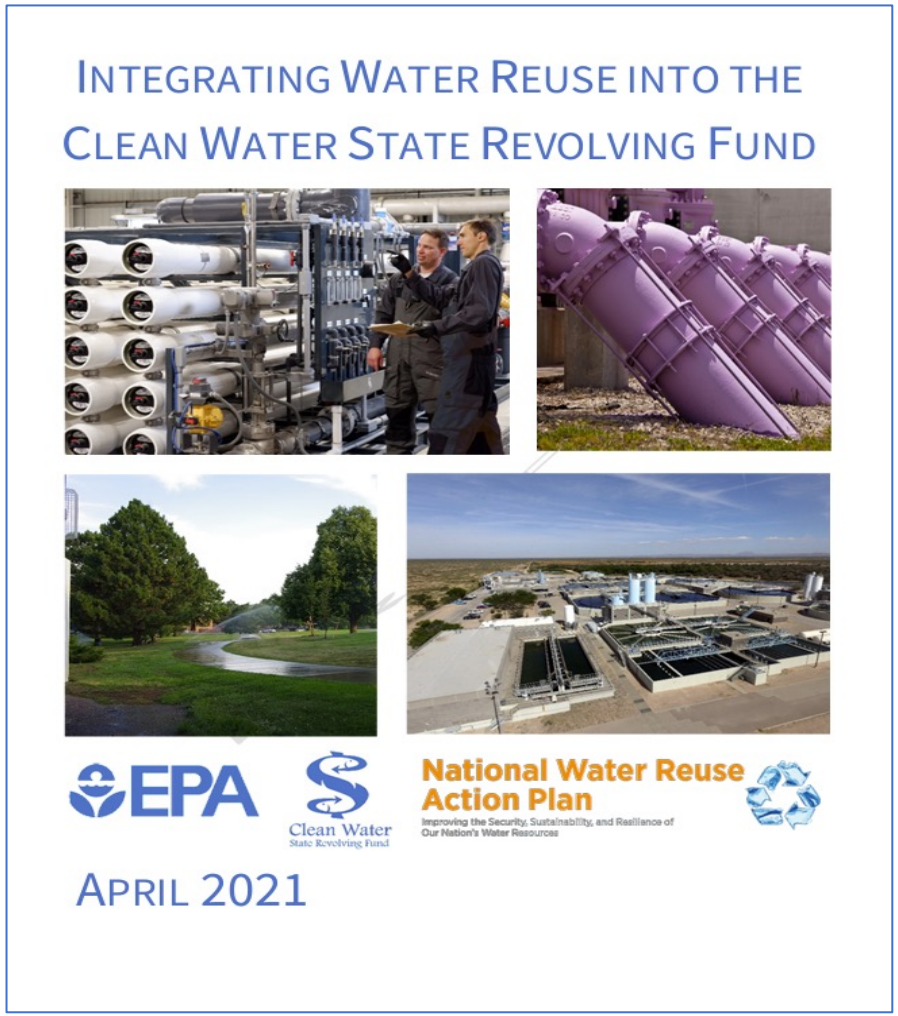
The Water Reuse Interagency Working Group, established May 2022 under the Bipartisan Infrastructure Law (Sec. 50218), develops and coordinates actions, tools, and resources to advance water reuse across the United States. The Working Group is also charged with continued leadership of the National Water Reuse Action Plan (WRAP): a collaboration, begun in 2020, in which federal, state, tribal, local, and water sector partners work together to build communities' capacity to pursue water reuse practices.

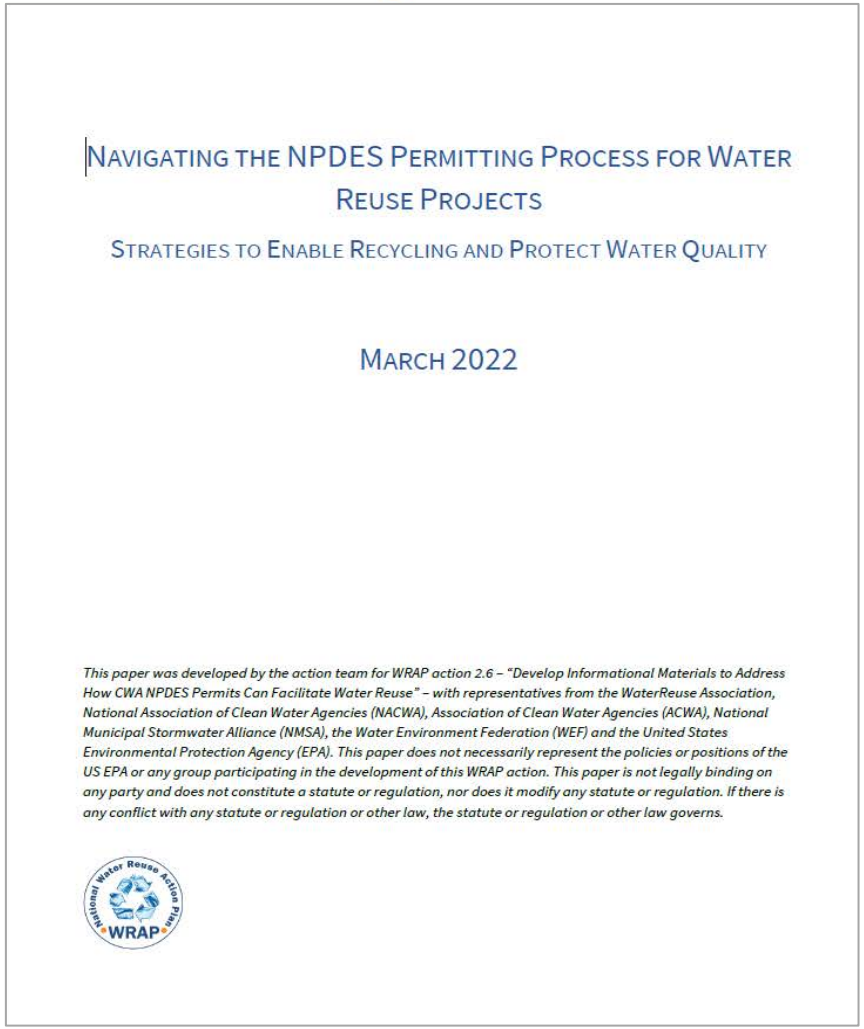
The Working Group builds on the WRAP's initial success and momentum, continuing to drive technical, financial, and institutional progress on water reuse by leveraging the knowledge of scientists, policymakers, and local experts to create a more resilient water future for communities of all sizes. The Working Group will remain active until at least 2028 and can be extended at the discretion of the Chair.

https://www.epa.gov/waterreuse/water-reuse-interagency-working-group

ACCOMPLISHMENTS

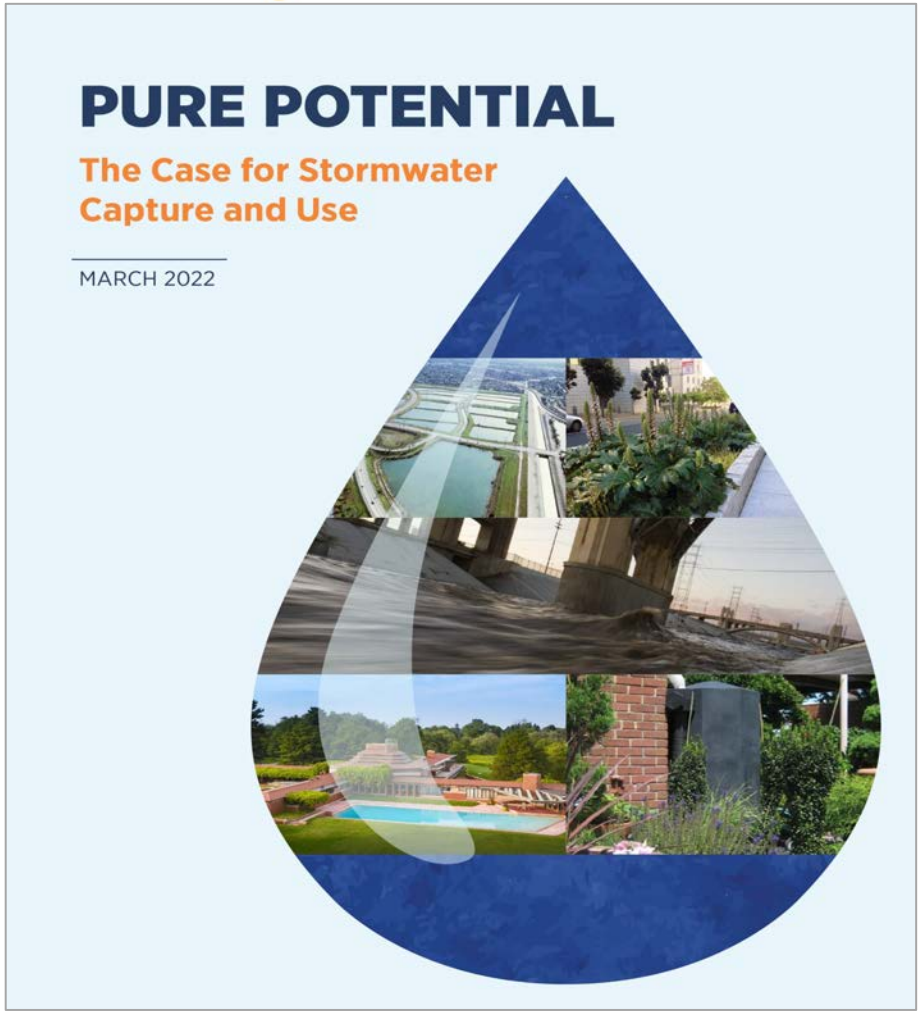
INCORPORATING WATER REUSE INTO PROGRAMS AND POLICIES





ACCOMPLISHMENTS

INCORPORATING WATER REUSE INTO PROGRAMS AND POLICIES



ACCOMPLISHMENTS

SUPPORTING TECHNICAL AND SCIENTIFIC ADVANCEMENT AND UNDERSTANDING

Infrastructure Funding

- WIFIA: **$1.4 billion** invested in reuse infrastructure

Research Funding

- STAR grant awards: **$6.2 million** for reuse research on viral pathogens and surrogate approaches

- SBIR Program awards: **$1.1 million** to develop water reuse treatment and monitoring technologies

ACCOMPLISHMENTS
BUILDING AWARENESS AND SHARING KNOWLEDGE

ACCOMPLISHMENTS
BUILDING AWARENESS AND SHARING KNOWLEDGE

Water Reuse Information Library

This interactive information library is designed to help water reuse practitioners access relevant and important resources, including reports and publications, fact sheets, webinar recordings, and webpages. It provides a link and detailed information about each resource, such as its description, contributors, and use application. The library primarily features outputs from National Water Reuse Action Plan (WRAP) actions, but also includes some resources not necessarily directly associated with WRAP activities. The number of entries will grow over time as more WRAP actions are completed, additional resources are identified, and water reuse collaborations expand. Based on user feedback, the navigation functions and other aspects of this library may evolve. Feel free to share feedback by emailing waterreuse@epa.gov.

Water Reuse Related Links

- Water Reuse Home
- National Water Reuse Action Plan
- WRAP Action Activities and Highlights

Instructions: Click on a resource in the table to display detailed information about each.

Search: factsheet

Rightmost Column : Format

Show 25 entries

Name	Description	Focus Area	Water Reuse Applications	Format
CWSRF Support for Reuse	The Clean Water State Revolving Fund (CWSRF) program collected information on financial assistance provided to communities throughout the United States	Finance Support	Various	Factshe

STRATEGIC THEME IN FOCUS: 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.

–National Groundwater Association

The need for a tool like the ***REUSExplorer***

- Chemical and pathogen concerns vary by **source of water** and **reuse application**
- The level of water treatment should be tailored to meet the intended use (fit-for-purpose)
- Capacity to develop treatment specifications differs by state

WRAP Action 3.1
COMPILE FIT-FOR-PURPOSE SPECIFICATIONS

REUSExplorer is available at epa.gov/reusexplorer

- **There are no federal level water reuse regulations**. The states have primacy to develop their own water reuse regulations to supplement the Clean Water Act and Safe Drinking Water Act
- Action 3.1 assembles existing fit-for-purpose specifications for water reuse and information based on their underlying scientific and technical basis
- Creates a foundation for other tools that may be developed for states, territories, and tribes as they consider permitting or legislating various reuse applications.
- Plan to expand to select international regulations in the future

Action leader
- EPA

Action Partners
- Association of Clean Water Administrators (ACWA)
- Association of Metropolitan Water Agencies (AMWA)
- Association of State Drinking Water Administrators (ASDWA)
- Association of State and Territorial Health Officials (ASTHO)
- Colorado Department of Public Health and Environment (CDPHE)
- Water Research Foundation (WRF)
- WateReuse Association (WateReuse)
- World Bank

COMMON VOCABULARY TO DESCRIBE WATER SOURCES AND END-USES ACROSS ALL STATES

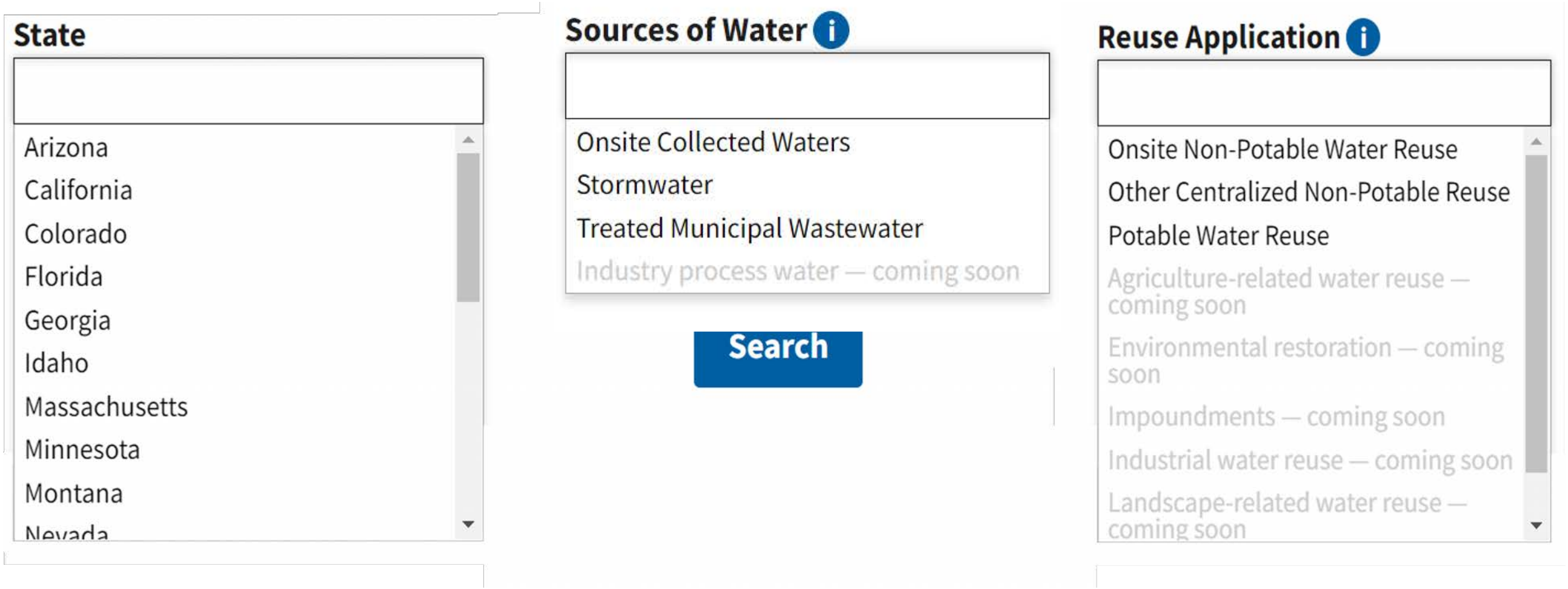
A ***source of water*** for reuse purposes is any alternative water source that can help offset the demand for traditional freshwater supplies.

Source of water
Treated municipal wastewater
Onsite collected waters
Industry process water
Stormwater

A ***reuse application*** or ***end-use*** is the recycling of an alternative source of water that is adequately treated for its intended use.

End-Use or Reuse Application
Potable
Onsite non-potable
Other centralized non-potable
Agricultural-related
Landscape-related
Livestock watering
Environmental restoration
Impoundments
Industrial

REUSExplorer : Multi-Search Capabilities



State

Optional Selection

Sources of Water

Optional Selection

Reuse Application

Optional Selection

Sources of Water

A source of water for reuse purposes is any alternative water source that can help offset the demand for traditional freshwater supplies.

Treated municipal wastewater

Treated wastewater effluent discharged from a centralized wastewater treatment plant of any size. Other terms referring to this source of water include domestic wastewater, treated wastewater effluent, reclaimed water, and treated sewage.

Onsite collected waters

Water sources generated within or surrounding a building, residence, or district. Other terms referring to this source of water include onsite collected stormwater or rainwater, greywater, blackwater, air conditioning condensate, and foundation water.

Industry process water

Water produced during industrial and manufacturing processes. Other terms referring to this source of water include air handling condensate, boiler, cooling or wash water, and water generated during oil and natural gas extraction.

State

Optional Selection

Sources of Water

Optional Selection

Reuse Application

Optional Selection

Reuse Applications

A reuse application is the recycling of an alternative source of water that is adequately treated for its intended use.

Potable water reuse

The use of highly treated recycled water for drinking water purposes. This reuse application includes both indirect potable reuse through introduction of recycled water into an environmental buffer such as a surface reservoir or groundwater aquifer, and direct potable reuse through introduction of recycled water into a drinking water system.

Onsite non-potable water reuse

The use of treated onsite collected waters for non-potable purposes at the single-building or district scale. This reuse application excludes the use of recycled water from a centralized treatment and distribution system for landscape irrigation or commercial uses.

Agriculture-related water reuse

The use of recycled water for production of both crops for human consumption and non-food crops of commercial value. This reuse application excludes livestock watering, onsite non-potable reuse, and landscape irrigation.

Landscape-related water reuse

The use of recycled water for the irrigation of parks, golf courses, road medians, and other landscapes. This reuse application excludes all agriculture-related water reuse, and onsite non-potable reuse.

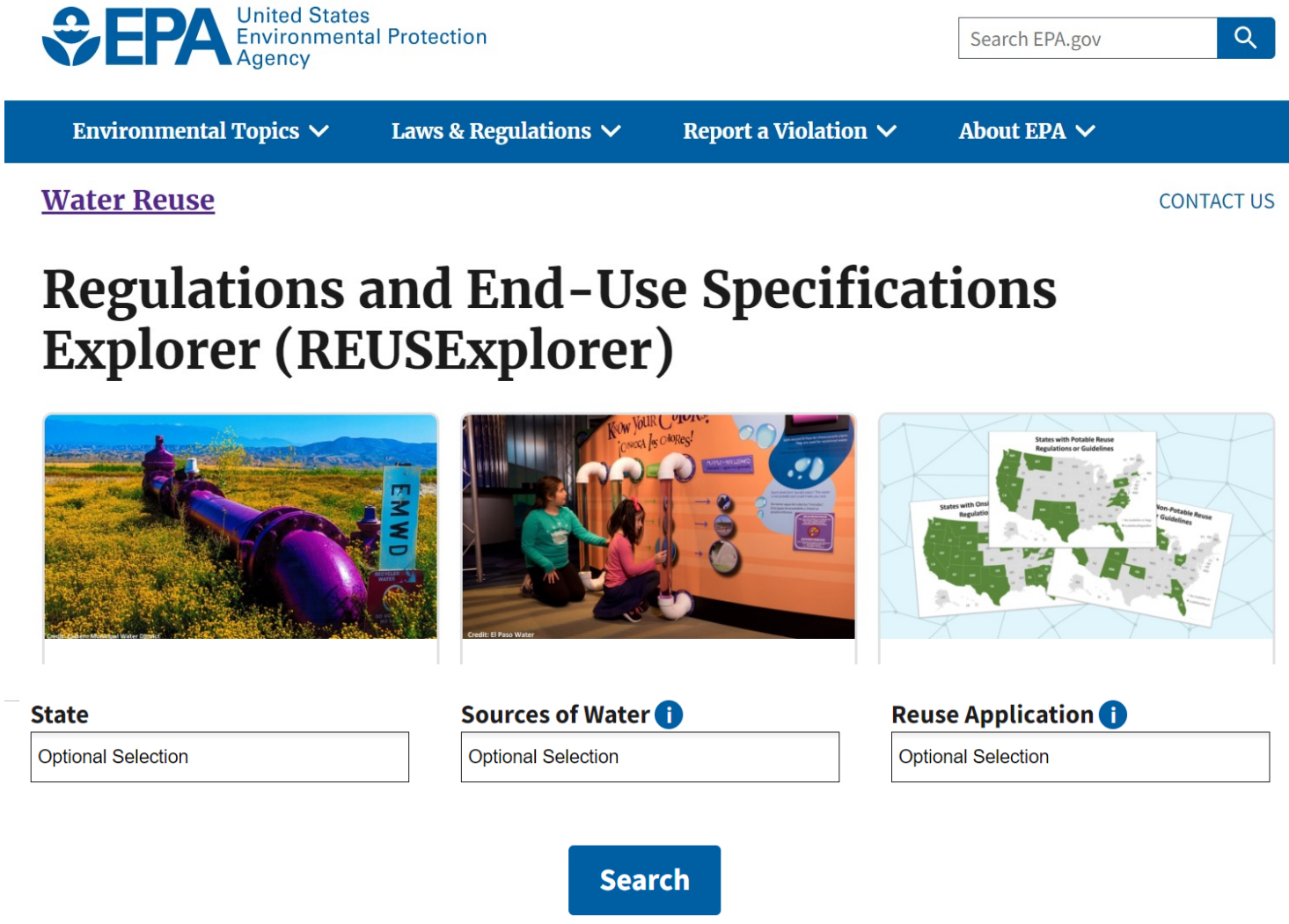
Other centralized non-potable reuse

The use of recycled water for non-potable applications other than landscape and agriculture where the source of water does not originate at the location of reuse. Examples of this reuse application include dust control, soil compaction, fire protection, commercial laundries, vehicle washing, street cleaning, and snowmaking.

Livestock watering

DEMO: STATE OR LOCAL REGULATORS AND PERMIT WRITERS

- Example need for state/ local govt: *Developing new regulations or writing permits for potable reuse*
- Search other states regs for similar end uses
  - Example: potable reuse
- Technical basis



State

Optional Selection

Sources of Water

Optional Selection

Reuse Application

Potable Water Reuse ×

Search

State	Sources of Water	Reuse Application	Summary Document
California	Treated Municipal Wastewater	Potable Water Reuse	See Results
Florida	Treated Municipal Wastewater	Potable Water Reuse	See Results
Massachusetts	Treated Municipal Wastewater	Potable Water Reuse	See Results
Montana	Treated Municipal Wastewater	Potable Water Reuse	See Results
Nevada	Treated Municipal Wastewater	Potable Water Reuse	See Results
New Mexico	Treated Municipal Wastewater	Potable Water Reuse	See Results
North Carolina	Treated Municipal Wastewater	Potable Water Reuse	See Results

State

Optional Selection

Sources of Water

Optional Selection

Reuse Application

Potable Water Reuse ×

Search

State	Sources of Water	Reuse Application	Summary Document
California	Treated Municipal Wastewater	Potable Water Reuse	See Results
Florida	Treated Municipal Wastewater	Potable Water Reuse	See Results
Massachusetts	Treated Municipal Wastewater	Potable Water Reuse	See Results
Montana	Treated Municipal Wastewater	Potable Water Reuse	See Results
Nevada	Treated Municipal Wastewater	Potable Water Reuse	See Results
New Mexico	Treated Municipal Wastewater	Potable Water Reuse	See Results
North Carolina	Treated Municipal Wastewater	Potable Water Reuse	See Results

California (Treated Municipal Wastewater for Potable Water Reuse)

On this page:

REUSExplorer Links

- REUSExplorer home page
- News in reuse regulations
- Maps of states with water reuse regulations or guidelines

In California, potable water reuse applications include indirect potable reuse (groundwater replenishment and reservoir water augmentation). The source of water (treated municipal wastewater) is specified by the state as municipal wastewater. The write-up below uses state terms when discussing sources or uses of water that may differ from the Regulations and End-Use Specifications Explorer's (REUSExplorer's) terms.

Technical basis

Potable water in the United States must meet all applicable Safe Drinking Water Act (SDWA) requirements, including its implementing regulations (40 C.F.R. § 141) for chemical and microbial contaminants, and pollutant discharges from a point source for surface water augmentation require a federal National Pollutant Discharge Elimination Systems (NPDES) permit (40 C.F.R. § 122). Additionally, potable water must meet California's Safe Drinking Water Act regulations (SWRCB, 2021c). California indirect potable reuse regulations (IPR) require specific treatment requirements for certain pathogens and chemicals, and projects must be reviewed and permitted on a site-specific basis by the Regional Water Board (Cal. Code Regs. tit. 22; SWRCB, 2018). Under California's Water Quality Control Policy for Recycled Water (SWRCB, 2018), IPR via groundwater recharge requires a Waste Discharge Requirement permit.

Microbial (pathogen) log reduction values were derived assuming raw sewage maximum densities of 10^5 culturable enteric viruses/L, 10^5 *Giardia lamblia* cysts/L, and 10^4 *Cryptosporidium* oocysts/L, and a health-based target of less than 1 infection per 10,000 people per year. Risk-based calculations resulted in treatment requirements of a total of twelve-log enteric virus reduction, ten-log *Giardia lamblia* cyst reduction and ten-log *Cryptosporidium* oocyst reduction (i.e., 12/10/10 Rule). These reductions apply to potable reuse applications through groundwater injection and groundwater spreading. Reservoir water augmentation reuse applications must also meet specific dilution requirements, in addition to the groundwater injection reductions. Log reductions must be validated for each of the treatment processes used to meet the treatment requirements (Cal. Code Regs. tit. 22; CDPH, 2014).

For chemicals, California indirect potable reuse regulations include enhanced source control, treatment requirements and specific monitoring outcomes. Treatment must include reverse osmosis and advanced oxidation which is to provide a minimum of 0.5-log reduction of 1,4-dioxane (CDPH, 2014). Finished water must meet 0.5 mg/L total organic carbon (TOC) (CDPH, 2014) and monitoring requirements for constituents of emerging concern (CECs). Specific CECs that required to be monitored on a regular basis include health-based CECs that have been assigned Notification Levels (e.g., 1,4-dioxane, N-nitrosodimethylamine (NDMA), N-nitrosomorpholine (NMOR), perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA) and performance-based CECs (gemfibrozil, iohexol, sucralose, sulfamethoxazole) (SWRCB, 2018). Notification levels are health-based advisory levels established by the California's Office of Environmental Health Hazard Assessment (OEHHA) that the State Water Board adopts for chemicals in drinking water that lack maximum contaminant levels (MCLs). When chemicals are found at concentrations greater than their notification levels, certain requirements and recommendations apply (SWRCB, 2021b). Additional CEC monitoring required by the Recycled Water Policy is an

Types of planned potable reuse approved for use in California

Cal. Code Regs. tit. 22 defines the following approved potable uses:

- Indirect potable reuse (IPR)
  - Groundwater replenishment: the planned use of recycled municipal wastewater that is operated for the purpose of replenishing a groundwater basin designated as a source of municipal and domestic water supply.
    - Surface (spreading) application: the application of recharge water to a spreading area for infiltration resulting in the recharge of a groundwater basin or aquifer.
    - Subsurface application: the application of recharge water to a groundwater basin(s) by a means other than surface application.
  - Reservoir water augmentation: the planned use of recycled municipal wastewater into a surface water reservoir used as a source of domestic drinking water supply.

Additional context and definitions

Surface spreading for groundwater augmentation applications are regulated via California's Title 22 water reuse regulations (Cal. Code Regs. tit. 22). However, the treatment requirements differ for surface spreading applications compared to other indirect potable reuse applications. For surface spreading applications, tertiary treatment and disinfection (CT requirements of 450 mg/L*min) are required in addition to the soil aquifer treatment. Other indirect potable reuse applications, like groundwater injection and reservoir water augmentation, have advanced treatment requirements.

Potable reuse specifications

Potable reuse specifications

Summary of California's Potable Reuse Specifications

Download Table (.xlsx)

Recycled Water Class/Category	Source Water Type	Water Quality Parameter*	Specification	Sampling/Monitoring Requirements (Frequency of monitoring; site/ location of sample; quantification methods)
		Viruses (enteric)	12-log enteric virus reduction	On-going monitoring
		Giardia lamblia	10-log *Giardia* cyst reduction	
		Cryptosporidium	10-log *Cryptosporidium* oocyst reduction	
			Minimum 2 months by added tracer	

Table continues on webpage

Potable reuse specifications

Summary of California's Potable Reuse Specifications

Download Table (.xlsx)

Recycled Water Class/Category	Source Water Type	Water Quality Parameter*
		Viruses (enteric)
		Giardia lamblia
		Cryptosporidium

Consistent specifications table for all states

Potable reuse specifications

Summary of Florida's Potable Reuse Specifications

Download Table (.xlsx)

Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling/Monitoring Requirements (Frequency of monitoring; site/ location of sample; quantification methods)
		Total organic carbon (TOC)	≤5 mg/L (maximum) ≤3 mg/L (monthly average)	Daily
		Total suspended solids (TSS)	≤5 mg/L (any one sample)	Measured prior to application of the disinfectant
		Total organic halogen (TOX)	≤0.3 mg/L (maximum) ≤0.2 mg/L (monthly average)	Daily

DEMO: INDUSTRY – ENGINEERS, CONSULTANTS, TECHNOLOGY COMPANIES

- National view and comparison
- Technology companies – search by source

- Example Needs:
  - *What is the technical basis for reuse of greywater in buildings in Colorado? How does that compare to other states?*
  - *What treatment levels should my company's innovative onsite system target for the national market?*

DEMO: INDUSTRY – ENGINEERS, CONSULTANTS, TECHNOLOGY COMPANIES

Colorado (Onsite Collected W Non-potable Water Reuse)

On this page:

In Colorado, onsite non-potable water r
of water (onsite collected waters) is spe
uses state terms when discussing source

Background on NSF/ANSI Standard 350

The National Sanitation Foundation/American National Standards Institute (NSF/ANSI) was originally adopted in 2011 and i
requirements for testing onsite residential and commercial water reuse treatment systems. NSF/ANSI 350 includes requirem
categories of facilities: residential (up to 1,500 gallons per day), and commercial (systems exceeding 1,500 gallons per day);

ly; and (4) laundry wa
nd toilet and urinal flu
for multi-family resid
es, and regulations, w
includes *E. coli* water
mum, and Class C inc
e sample maximum.

Technical basis

Colorado approves the onsite non-potable reuse of graywater for subsurface irrigation, and toilet and urinal flushing and domestic wastewater for industrial and commercial uses, landscape and agricultural irrigation, fire protection and toilet and urinal flushing (5 Code Colo. Regs. § 1002-86). All applicable provisions of the Clean Water Act (CWA) (33 U.S.C. §§ 1251 et seq.), including its implementing regulations, must be met in addition to any state water quality standards. Treated graywater is categorized into four classes that vary by design flow requirement and reuse application. There are no treatment requirements for graywater reused onsite for subsurface irrigation. Onsite non-potable water reuse systems treating graywater for urinal and toilet flushing must comply with NSF/ANSI Standard 350 (CDPHE WQCC, 2019) and use a treatment technology that will be "protective of public health" without the need for on-going water quality testing. The Water Quality Control Commission found that the NSF/ANSI standard meets an acceptable technology review protocol that would be certified by a third-party agency to simplify the technology review process for the local jurisdictions (see more information below).

or use in

the use of treated gra

Colorado also approves onsite non-potable reuse of reclaimed domestic wastewater (i.e., onsite treated blackwater) for industrial and commercial uses, landscape and agricultural irrigation, fire protection and toilet and urinal flushing (5 Code Colo. Regs. § 1002-84). The technical basis of pathogen removals is a health-based target of less than 1 infection per 10,000 people per year for Category 3 uses and 1 infection per 100 people per year for Category 2 and Category 1 uses. Category 1 and 2 health-based targets are less stringent than

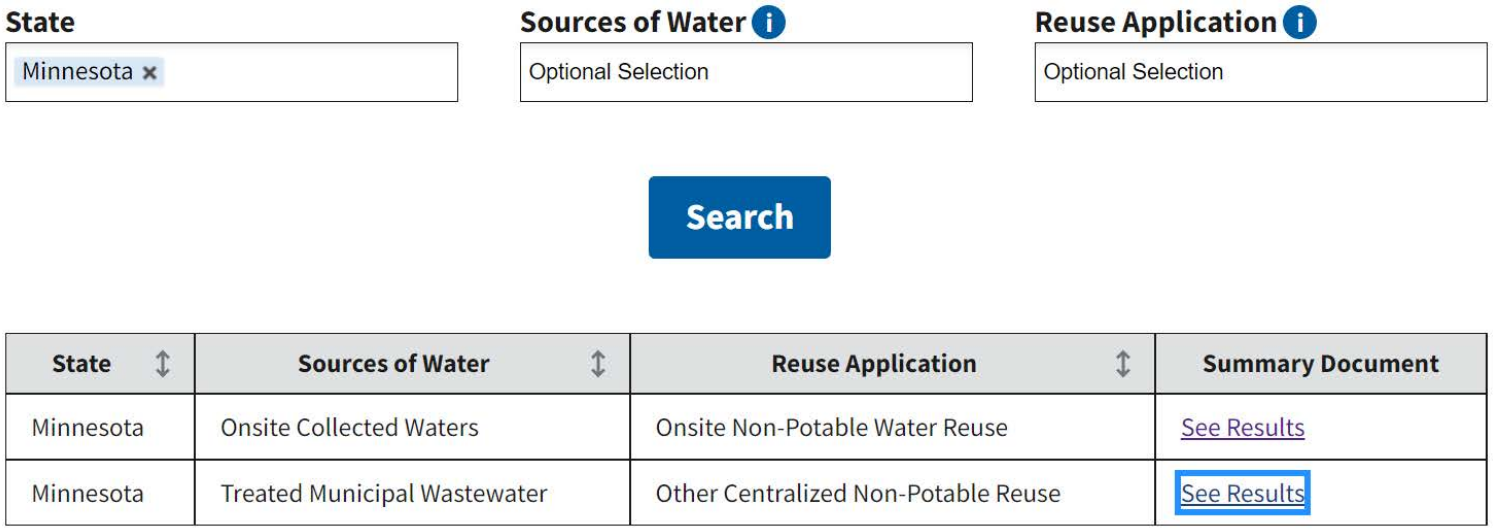
DEMO: RESEARCHERS

Example research question:

What is the minimum quality of water required for toilet flushing in Minnesota?

- Search by State
- See details by <u>both</u> Sources of Waters

- Downloadable specification tables



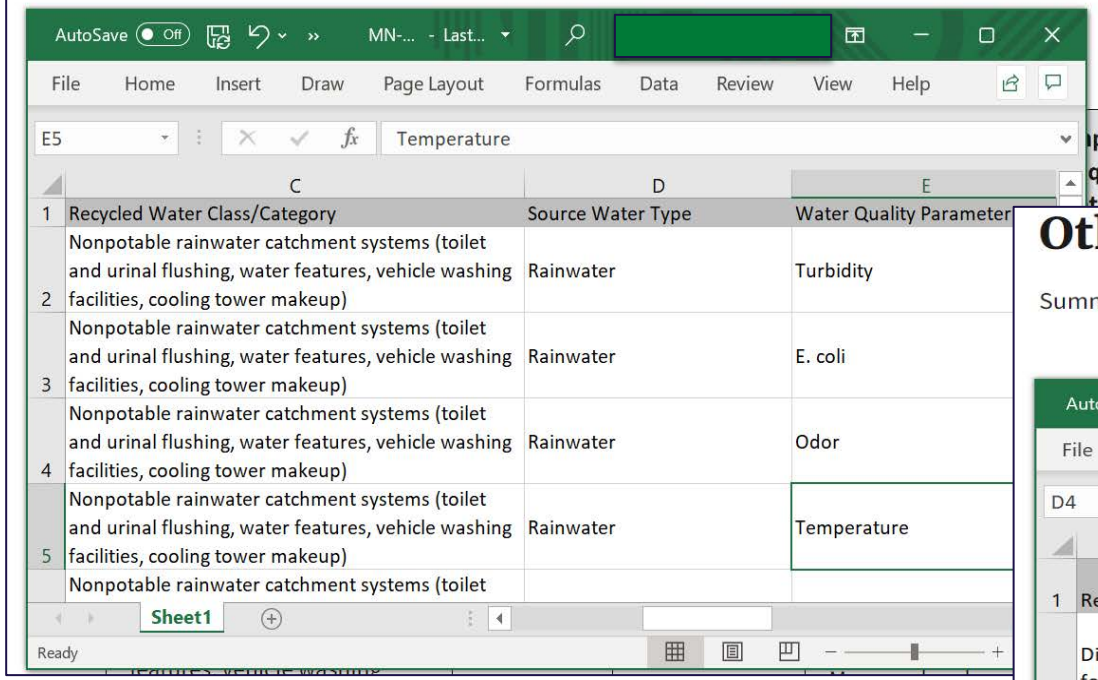
State	Sources of Water	Reuse Application	Summary Document
Minnesota	Onsite Collected Waters	Onsite Non-Potable Water Reuse	See Results
Minnesota	Treated Municipal Wastewater	Other Centralized Non-Potable Reuse	See Results

Downloadable Specifications Tables

Onsite non-potable reuse specifications

Summary of Minnesota's Non-potable Reuse Specifications

Download Table (.xlsx)



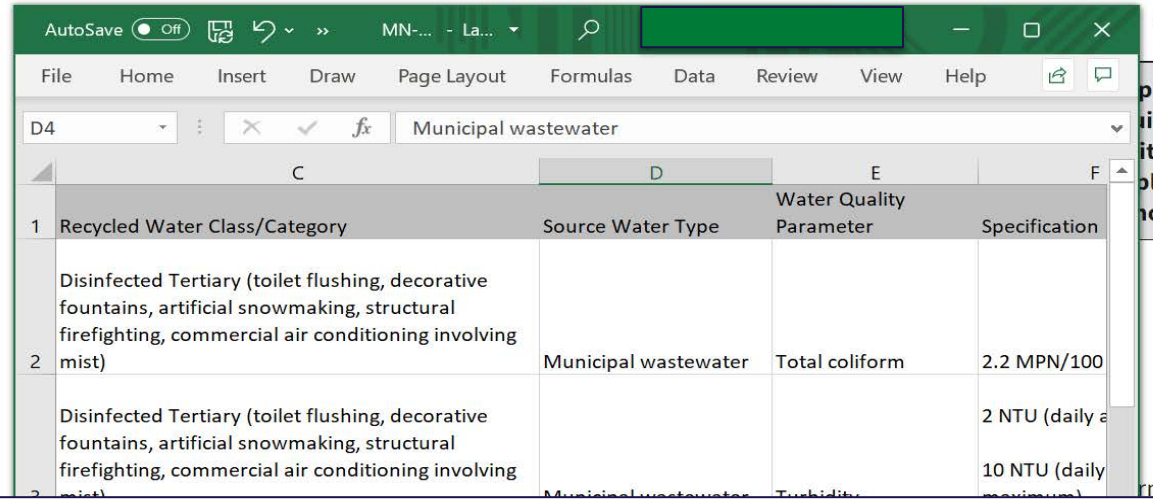
	C	D	E
1	Recycled Water Class/Category	Source Water Type	Water Quality Parameter
2	Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Turbidity
3	Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	E. coli
4	Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Odor
5	Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Temperature
	Nonpotable rainwater catchment systems (toilet		

...pling/Monitoring Requirements
...quency of monitoring; site/
...tion of sample; quantification

Other centralized non-potable reuse specifications

Summary of Minnesota's Other Centralized Non-potable Reuse Specifications

Download Table (.xlsx)



	C	D	E	F
1	Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification
2	Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving mist)	Municipal wastewater	Total coliform	2.2 MPN/100
	Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving			2 NTU (daily a 10 NTU (daily

...pling/Monitoring
...irements (Frequency of
...itoring; site/ location of
...ple; quantification
...nods)*

...rmined on a case-by-case

Minnesota Specifications Tables

Onsite non-potable reuse

C	D	E	F	G
Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling Monitoring Requirements
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Turbidity	<1 NTU	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	E. coli	2.2 MPN/100 mL	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Odor	Non-offensive	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Temperature	Measured and recorded only	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and				After initial installation and monthly thereafter. Exception: If the system

Other Centralized Non-potable Reuse

C	D	E	F	G
Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling Monitoring Requirements
Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving mist)	Municipal wastewater	Total coliform	2.2 MPN/100 mL	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22
Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving mist)	Municipal wastewater	Turbidity	2 NTU (daily average) 10 NTU (daily maximum)	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22
Disinfected Secondary-23 (nonstructural firefighting, commercial air conditioning that does not involve mist, soil compaction, dust control, mixing concrete, cleaning roads and sidewalks)	Municipal wastewater	Total coliform	23 MPN/100 mL	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22

Minnesota Specifications Tables

Onsite non-potable reuse

C	D	E	F	G
Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling Monitoring Requirements
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Turbidity	<1 NTU	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	E. coli	2.2 MPN/100 mL	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Odor	Non-offensive	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and urinal flushing, water features, vehicle washing facilities, cooling tower makeup)	Rainwater	Temperature	Measured and recorded only	After initial installation and monthly thereafter. Exception: If the system has continuous online electric monitoring, sampling is only required every 12 months thereafter.
Nonpotable rainwater catchment systems (toilet and				After initial installation and monthly thereafter. Exception: If the system

Other Centralized Non-potable Reuse

C	D	E	F	G
Recycled Water Class/Category	Source Water Type	Water Quality Parameter	Specification	Sampling Monitoring Requirements
Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving mist)	Municipal wastewater	Total coliform	2.2 MPN/100 mL	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22
Disinfected Tertiary (toilet flushing, decorative fountains, artificial snowmaking, structural firefighting, commercial air conditioning involving mist)	Municipal wastewater	Turbidity	2 NTU (daily average) 10 NTU (daily maximum)	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22
Disinfected Secondary-23 (nonstructural firefighting, commercial air conditioning that does not involve mist, soil compaction, dust control, mixing concrete, cleaning roads and sidewalks)	Municipal wastewater	Total coliform	23 MPN/100 mL	Determined on a case-by-case basis. In most cases, daily monitoring is required as detailed in Cal. Code Regs. tit. 22

REUSExplorer NEWS PAGE

United States Environmental Protection Agency

Search EPA.gov

Environmental Topics | Laws & Regulations | Report a Violation | About EPA

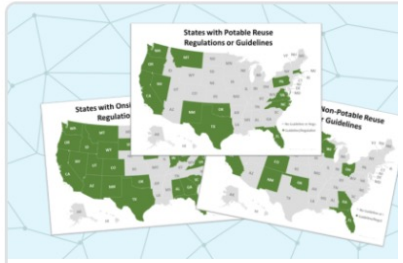
Water Reuse

CONTA

Regulations and End-Use Specifications Explorer (REUSExplorer)

News in Water Reuse

Recent and Upcoming



Distribution of Reuse

News in Water Reuse Regulations and Guidelines

Several states are actively working on their reuse regulations or guidelines. This page highlights some of these developments; however, it may not reflect all upcoming changes to state laws or policies.

Please contact waterreuse@epa.gov if the information on this page needs updating or if a state is updating or planning to update its laws and policies and we have not included that information on this page. Please include a link to the relevant state website with the updated information.

REUSExplorer Links

- REUSExplorer home page
- Maps of state regulations and guidelines

California

- The California State Water Resources Control Board's (SWRCB) Division of Drinking Water is in the process of developing uniform water recycling criteria for **direct potable reuse**. SWRCB is required to complete this process by December 31, 2023 and is currently administering an expert review panel to help guide this process. More information on draft criteria, public meetings, and meetings of the expert panel can be found here.
- SWRCB is in the process of developing risk-based water quality standards for the **onsite treatment and reuse** of non-potable water for non-potable end uses in multifamily residential, commercial, and mixed use buildings. SWRCB is required to adopt regulations by December 1, 2022 and the Department of Housing and Community Development is required to propose necessary building standards by December 1, 2023. More information can be found here.

Colorado

- The Colorado Department of Public Health & Environment (CDPHE) is developing a **direct**

REUSEXPLORER MAPS PAGE

United States Environmental Protection Agency

Search EPA.gov

Environmental Topics | Laws & Regulations | Report a Violation | About EPA

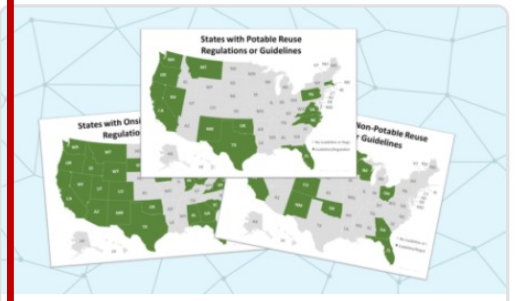
Water Reuse

CONTACT US

Regulations and End-Use Specifications Explorer (REUSExplorer)

News in Water Reuse

Recent and Upcoming



Distribution of Reuse

Title	Link
States with Potable Reuse Regulations or Guidelines	
States with Agriculture Reuse Regulations or Guidelines	
States with Onsite Non-Potable Reuse Regulations or Guidelines	

States with Potable Reuse Regulations or Guidelines

REUSExplorer: Snapshot of State Regulation Summaries by Application*

112 State summaries currently on *REUSExplorer*

161 Expected total by end of 2022

ONLINE NOW	13 Potable water reuse 12 Onsite non-potable water reuse 21 Other centralized non-potable reuse 28 Agricultural irrigation 32 Landscape irrigation 6 Livestock watering
COMING Dec 2022	8 Environmental restoration 15 Impoundments 19 Industrial (onsite, imported) 7 Rainwater (potable)

36 states have developed at least one reuse regulation

*Subject to change as new content is reviewed throughout 2022.

KEY TAKEAWAYS FOR REUSEXPLORER AND MORE

epa.gov/reusexplorer

- Transformational tool for multiple stakeholders
  - State regulators and permit writers
  - Industry including engineers and technology companies
  - Researchers and policy makers
- Provides common vocabulary to describe sources of water and end-use applications
- Comparable set of specifications across all US states for future synthesis and research work
- Provides an avenue for state and federal collaboration on reuse – *please let us know if content on your state summary should be updated* **waterreuse@epa.gov**
- Content will continue to be added throughout 2022

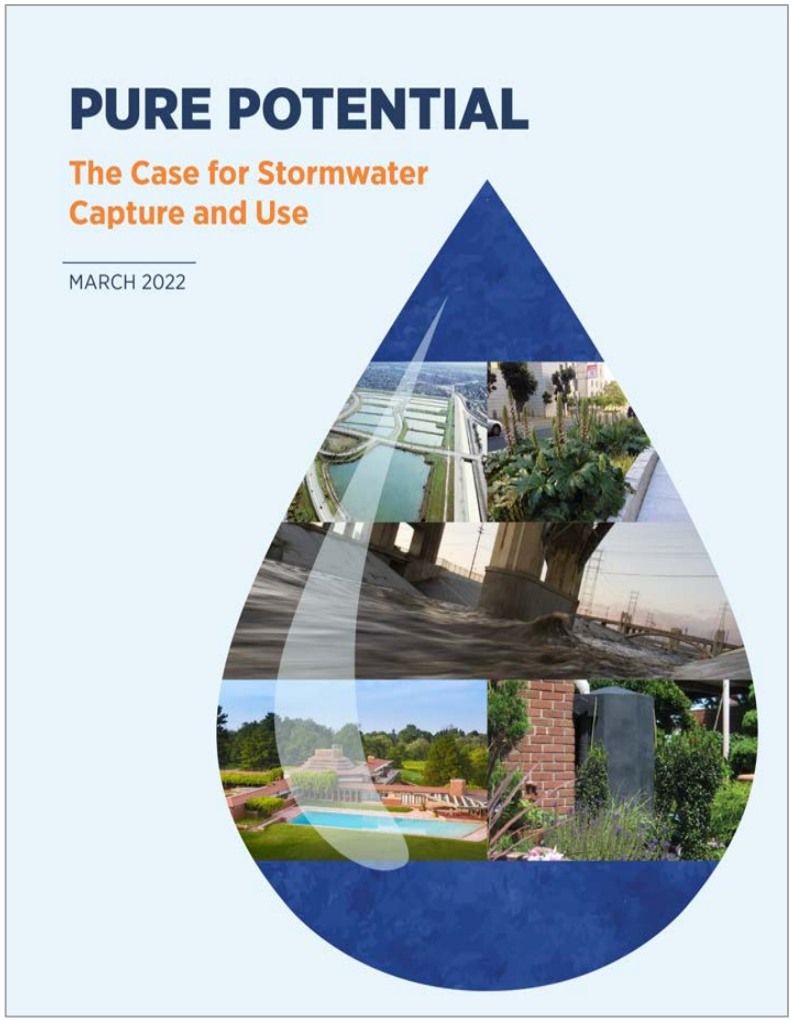
Acknowledgements

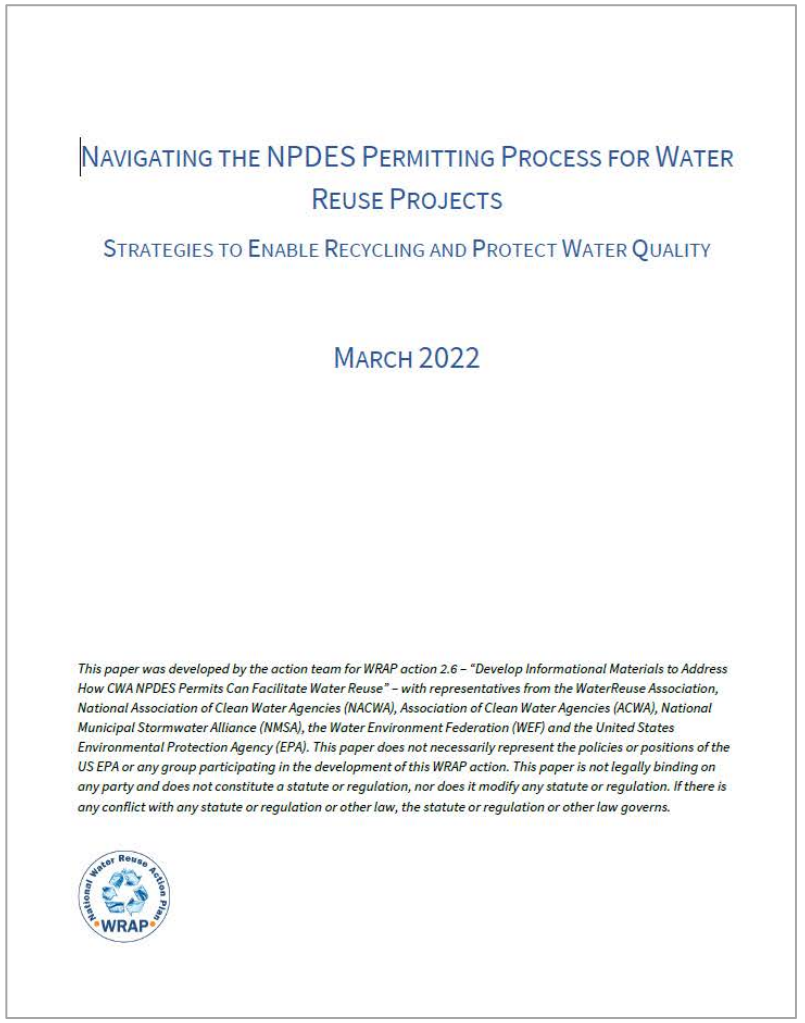
- EPA Water Reuse Team
  - Rabia Chaudhry, Ashley Harper, Angela Davis, Justin Mattingly
- ICF content team
  - Kate Helmick, Kaedra Jones, Jeff Soller, Sorina Eftim
- PG/ ERG web team
  - Sargon DeJesus, Amy King, Kihwa Kang, Andrew VanNess, Brad Cooper, Adriane Garnreiter
- All Action Partners in right panel
  - Especially Jake Adler, Wendi Wilkes, Alan Roberson, and all state reviewers
- User focus group participants
  - Tressa Nichols, Valerie Rourke, Anita Anderson, Brandi Honeycutt, Marlo Berg, Pinar Balci, Alex Spencer, Austa Parker, and others who provided feedback via email

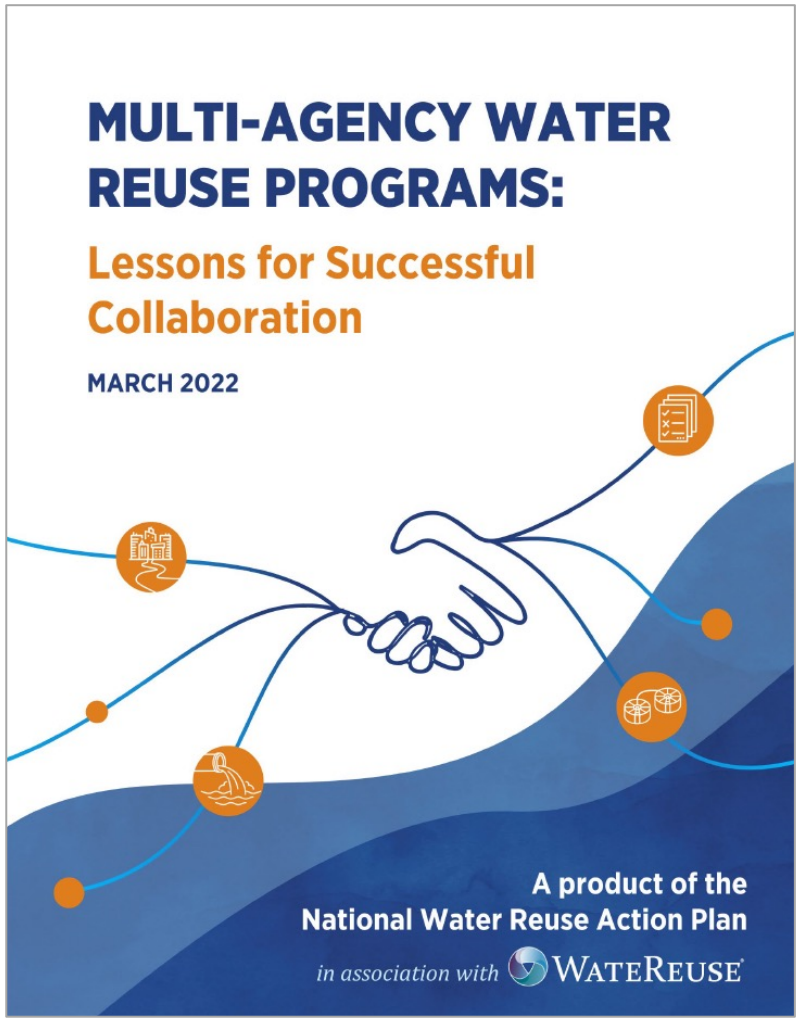
Action Partners

- Association of Clean Water Administrators (ACWA)
- Association of Metropolitan Water Agencies (AMWA)
- Association of State Drinking Water Administrators (ASDWA)
- Association of State and Territorial Health Officials (ASTHO)
- Colorado Department of Public Health and Environment (CDPHE)
- Water Research Foundation (WRF)
- WateReuse Association (WateReuse)

2022 - HOT OFF THE PRESS!







LOOKING AHEAD

- Capacity building
  - Federal: Interagency Workgroup
  - State: Summit 3 virtual sessions
  - Local: U.S.-Israel Delegation with utilities
- REUSExplorer – new content over 2022
  - NEW: Ag, Irrigation, Livestock Watering

Join FREE webinar on Eventbrite for a detailed demonstration of REUSExplorer

Sep 21, 2022 (Wed)
1 PM – 2 PM EDT

JOIN THE EFFORT!

- **Stay in the loop**. Join the WRAP listserv for periodic updates by emailing **waterreuse@epa.gov**.
- **Learn about and support active actions**. Find details and contact information for each action in the **Online Platform**.
- **Propose or lead a new action**. For information about how to propose or provide input on an action, visit our **website**.

THANK YOU!

Sharon Nappier,

EPA National Program Leader for Water Reuse, Office of Water

Nappier.Sharon@epa.gov

https://www.epa.gov/waterreuse/water-reuse-action-plan