

The Role of Aquifer Storage and Recovery in the National Water Reuse Action Plan

ASR-MAR Webinar: What's New with EPA?

February 9, 2021

National Water Reuse Action Plan

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



National Water Reuse Action Plan

- Developed with federal, state, tribal, local, and private sector partners
- Addresses challenges to advance water reuse
- Builds state and local capacity
- Encourages integrated solutions to water resources management
- Fosters collaboration



Release of the Water Reuse Action Plan
at EPA Headquarters in February 2020

National Water Reuse Action Plan

WRAP by the Numbers

11 Strategic Themes

41 Actions

30 Unique Action Leaders

90+ Action Partners

330 Implementation
Milestones

- Development and implementation that can adjust to changing policy and science landscape
- Continues to grow with new actions, leaders, and partners
- Anticipated impact
 - Help prepare for a safe and resilient water future
 - Promote environmental justice
 - Facilitate financial support related to reuse
 - Encourage collaboration across the water sector

Water Reuse Collaborative Action Implementation

The WRAP features 11 strategic themes

1. Integrated Watershed Action
2. Policy Coordination
3. Science and Specifications
4. Technology Development and Validation
5. Water Information Availability
6. Finance Support
7. Integrated Research
8. Outreach and Communications
9. Workforce Development
10. Metrics for Success
11. International Collaboration



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

WRAP Online Platform

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

National Water Reuse Action Plan: Online Platform

Instructions: Click on an action in the table to display detailed information.

Strategic Theme Area:

Show entries

Strategic Theme Area	
Integrated Watershed Action	Develop a Federal Policy State Consideration of Water Reuse
Integrated Watershed Action	Prepare Case Studies of Successful Integrated Water Resources Management
Integrated Action	Incorporate Water Reuse and Planning Efforts at the Local Level
Integrated Watershed Action	Leverage EPA's Water Partners Program to Support Water Reuse at the Watershed Scale
Policy Coordination	Complete Existing State Policies
Policy Coordination	Enhance State Collaboration on Water Reuse
Policy Coordination	Complete the EPA Study of Oil and Gas Production and Water Management
Policy Coordination	Enhance Wastewater Source Control Programs to Support Water Reuse
Policy Coordination	Compile and Develop Potential Water Reuse Opportunities
Policy Coordination	Develop Informational Materials to Facilitate Water Reuse

Showing 1 to 10 of 58 entries

Enhance State Collaboration on Water Reuse

Enhance State Collaboration on Water Reuse (Action 2.2.2)

Action Attributes | **Action Team** | **Implementation Milestones** | **Outputs and References**

Action Attributes

State: Developed

Action Leaders and Key Contact:
U.S. Environmental Protection Agency (EPA)
Jeff Lape
jlape.jef@epa.gov

Association of Clean Water Administrators (ACWA)
Jake Adler
jadler@acwa-us.org

Association of State Drinking Water Administrators (ASDWA)
Wendy Wilkes
wwilkes@asdwa.org

Description: Provide forums and opportunities for states to discuss water reuse.

Background: Some states, particularly in arid and semi-arid areas, have well-established water reuse programs and opportunities to learn from each other; (2) identify common needs to advance water reuse.

The Annual WaterReuse Pacific Northwest Conference, organized by the Pacific Northwest Water Reuse Association (PNWRWA), provides a useful model and a coordinated state-focused forum to encourage states to come together in September 2019. ACWA and ASDWA co-organized and facilitated the representatives from 18 state water programs participated in this event engagement of additional state associations to engage in future state water reuse.

Opportunities:

- Increase state collaboration on water reuse across the spectrum of water reuse.
- Share experiences across state organizations.
- Enable water reuse discussions and networking opportunities.

Enhance State Collaboration on Water Reuse

Enhance State Collaboration on Water Reuse (Action 2.2.2)

Implementation Milestones

Expand all

1. Convene the 1st state summit on water reuse at the 34th Annual WaterReuse Symposium in San Diego, CA.
Lead(s): ACWA (Jake Adler, jadler@acwa-us.org), ASDWA (Wendy Wilkes, wwilkes@asdwa.org)
Partners: EPA, WaterReuse
Target Completion Date: September 2019
Actual Completion Date: September 2019
Milestone Complete: Yes
Status/Updates: Completed (29 representatives from 16 states attended)
2. Secure meeting facilitation and notetaking support for the 2nd state summit on water reuse.
3. Conduct water reuse-focused discussions at a session at the ASDWA Member Meeting.
4. Conduct water reuse-focused discussions at a session at the ACWA Midyear Meeting.
5. Initiate planning for next annual state summit on water reuse.
6. Compile a list of state water reuse contacts and roles and post in an accessible location online.
7. Convene the 2nd state summit on water reuse at the 35th WaterReuse Symposium in Denver, CO.
8. Prepare state summit on water reuse meeting summary for state representatives.
9. Additional milestones to be determined.

Use the arrows to navigate between actions.

← Previous Action | Next Action →

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

Get Involved!

- **Propose or provide input on a new proposed action**
 - Share your idea with EPA's Water Reuse Team
 - Quarterly action onboarding
- **Support an existing action**
 - Reach out to action leader(s) about possible roles
- **Stay in the loop**
 - Follow action implementation progress in the WRAP Online Platform:
<https://www.epa.gov/waterreuse/national-water-reuse-action-plan-online-platform>
 - Email waterreuse@epa.gov to join our listserv for periodic updates



2.7.4

Increase Understanding of Current Aquifer Storage and Recovery Practices

● Background

- Aquifer recharge is a growing practice to address water scarcity concerns, but there are apparent differences in how it is described, implemented, and managed

● Opportunities

- Promote understanding and consideration of ASR practices and system designs that are appropriate for specific community goals
- Identify and address challenges to EAR/ASR implementation
- Clarify and understand the relevant terms and practices

Action leaders

- GWPC
- EPA

Partners

- USDA
- National Ground Water Association (NGWA)

2.7.4

EPA Products on Aquifer Storage and Recovery

State of Practice for Water Reuse in ASR and EAR

- Drivers
- Summary of current practice
- Case studies
- Implementation challenges
- Will largely exclude discussion of UIC and stormwater

EAR of Stormwater in the United States

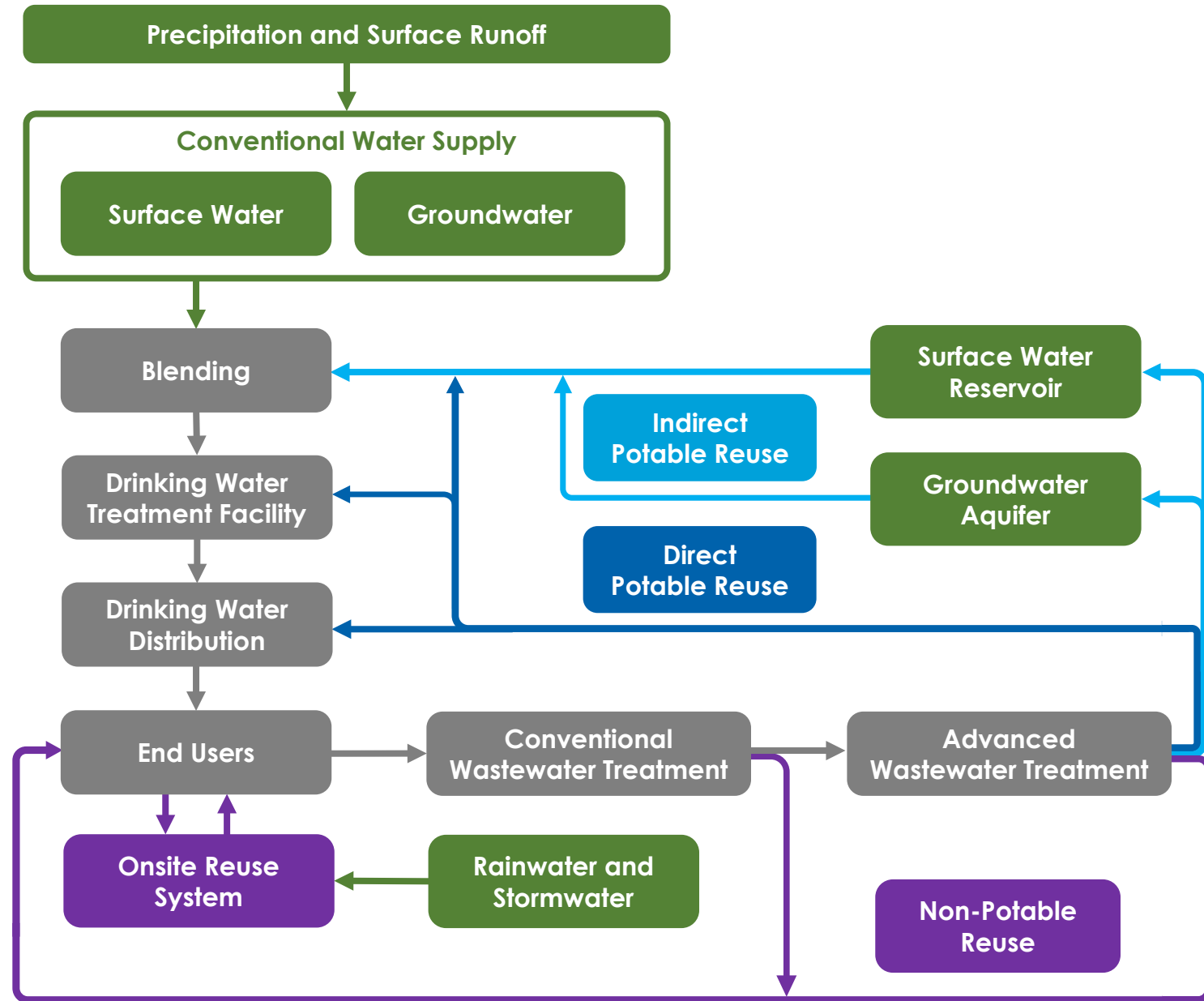
- Literature review
- System performance
- Water quality challenges
- Site selection and best practices
- Excludes regulatory discussion

AR and ASR in the UIC Program

- Basics of AR & ASR via injection wells
- Protection of underground sources of drinking water
- Summary of state AR & ASR regulations
- National inventory of AR & ASR projects in UIC program
- General audience

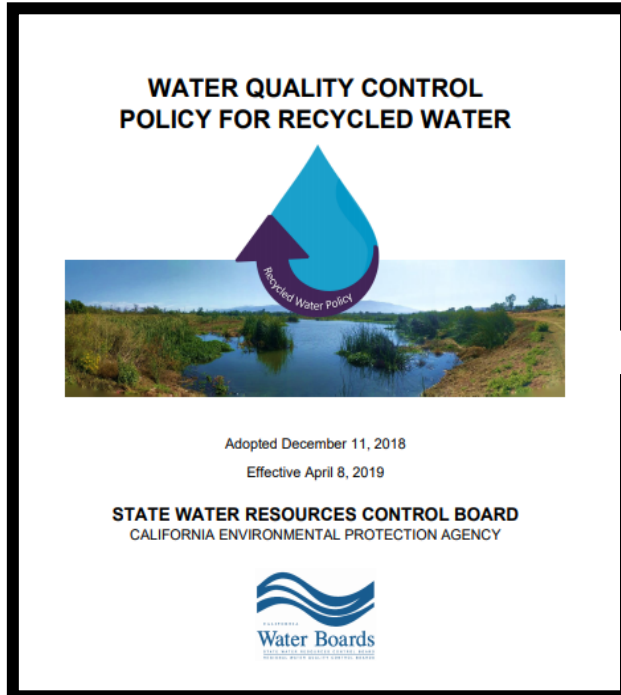
Water Reuse in the Urban Water Cycle

There are many ways to implement water reuse!



Drivers: Developing New Water Supplies

- Water reuse creates a drought resilient source of water that can be used for a variety of purposes
- Local source of water at a potentially lower cost and energy demand of other sources
- Availability of recycled water is less dependent on climatic conditions



3.1.1. Increase the use of recycled water from 714,000 acre-feet per year (afy) in 2015 to 1.5 million afy by 2020 and to 2.5 million afy by 2030.

Source: https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/

Drivers: Protection of Groundwater Supplies

- Groundwater injection of purified water can create a saltwater intrusion barrier
- Mitigate land subsidence to prevent aquifer compaction and preserve capacity

Can often be accomplished in tandem with groundwater augmentation as part of an indirect potable reuse project.

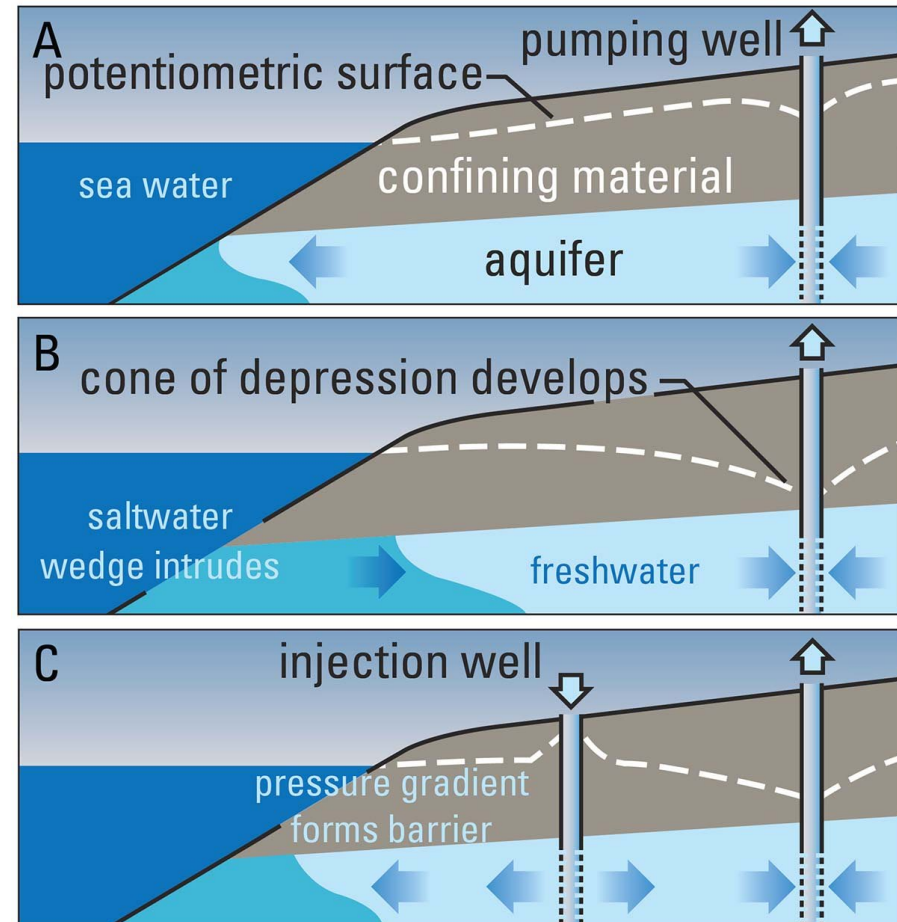
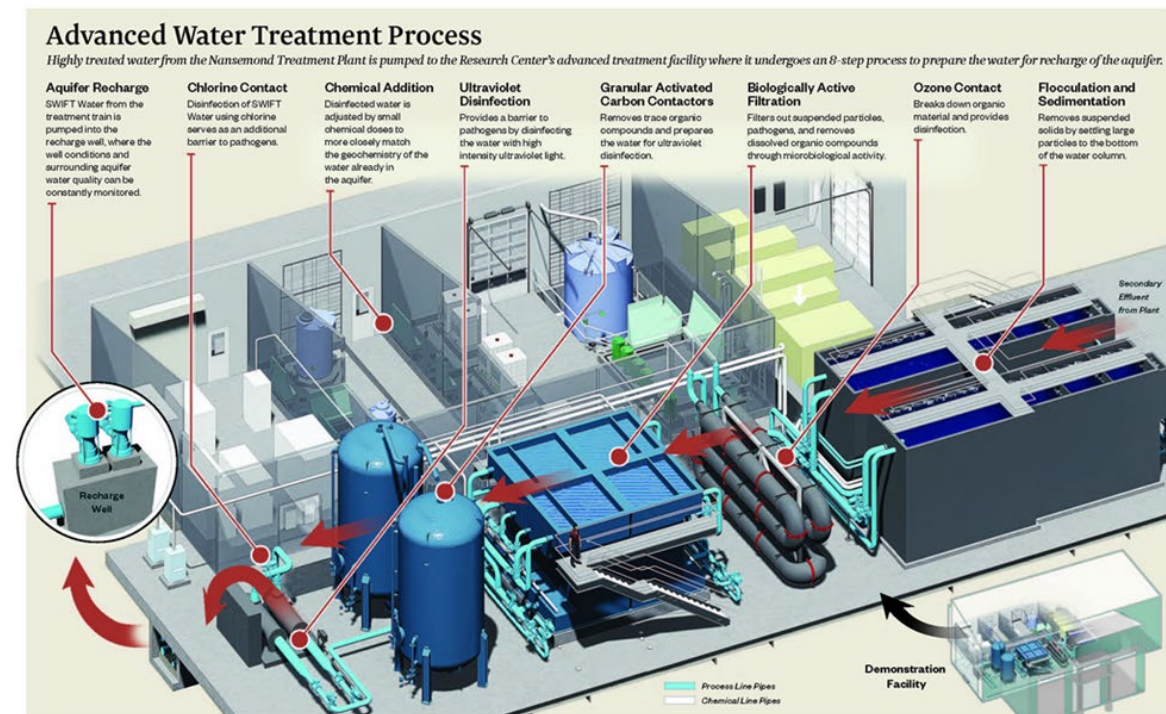


Image source: <https://ca.water.usgs.gov/sustainable-groundwater-management/seawater-intrusion-california.html>

Drivers: Management of Discharges

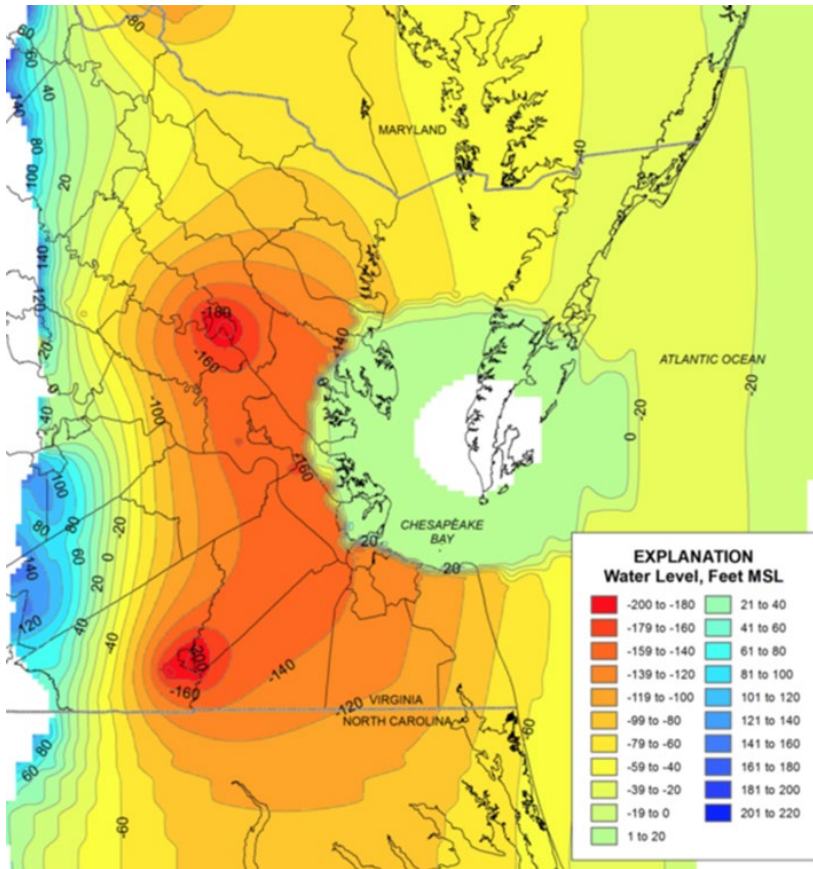
- Recycling municipal wastewater and stormwater can prevent discharges into sensitive ecosystems
- Important in regions under pressure to reduce nutrient loadings such as Florida or the Chesapeake Bay

The Hampton Roads Sanitation District's Sustainable Water Initiative for Tomorrow (SWIFT) project will decrease nutrient discharges into the Chesapeake Bay



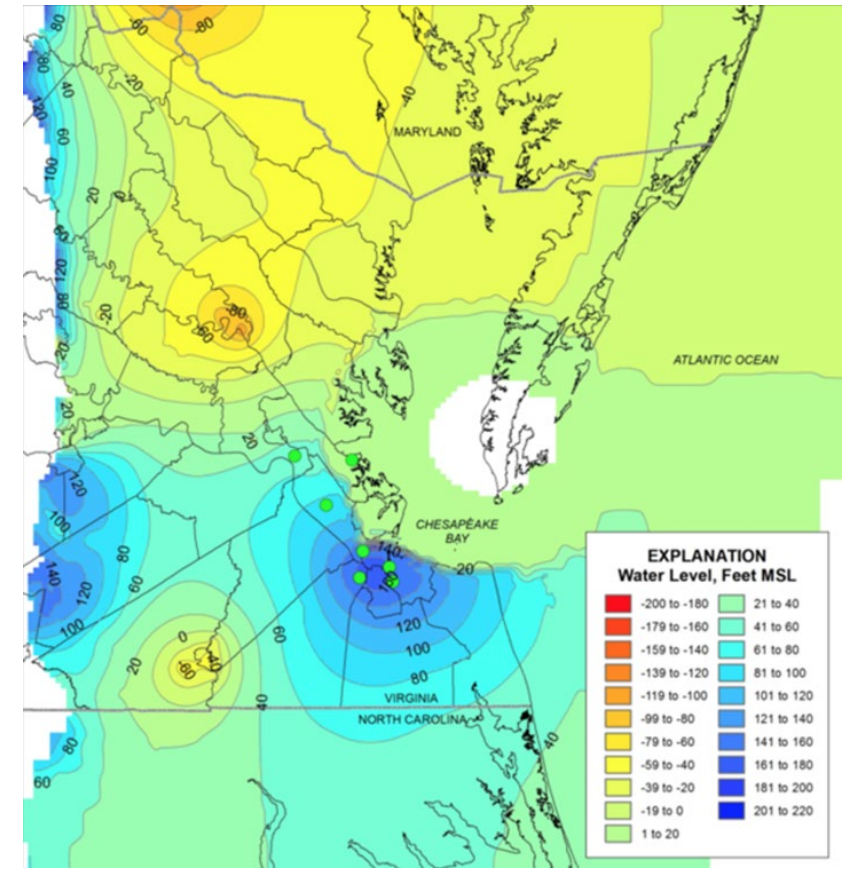
<https://www.hrsd.com/sites/default/files/assets/Swift%20Pictures/AdvancedWaterTreatmentProcessGraphic.jpg>

Enhancing Climate Resilience in Southern Virginia



Water level without SWIFT

Benefits of enhancing local water supplies, eliminating discharges, and reducing the rate of land subsidence to combat sea level rise.



Water level with SWIFT

Methods of Aquifer Recharge with Recycled Water

1. Injection

- Covered by the UIC program

2. Spreading Grounds

- Utilizes soil aquifer treatment for removal of chemicals and pathogens
- May require less engineered treatment
- Level of treatment largely based on the soil characteristics and travel time
- Can require large amounts of land for infiltration basins

Case Study: Montebello Forebay

First indirect potable reuse project in the United States

- Opened in 1962
- 44 MGD
- Utilizes soil aquifer treatment through spreading grounds following tertiary treatment



Available Sources of Water for Potential Reuse

1. Municipal Wastewater

- Wastewater from municipal sources that is collected and treated in a wastewater treatment facility

2. Industrial wastewater

- Water produced in various industrial processes. Can be separate from municipal wastewater or incorporated into municipal wastewater

3. Agricultural Return Flows

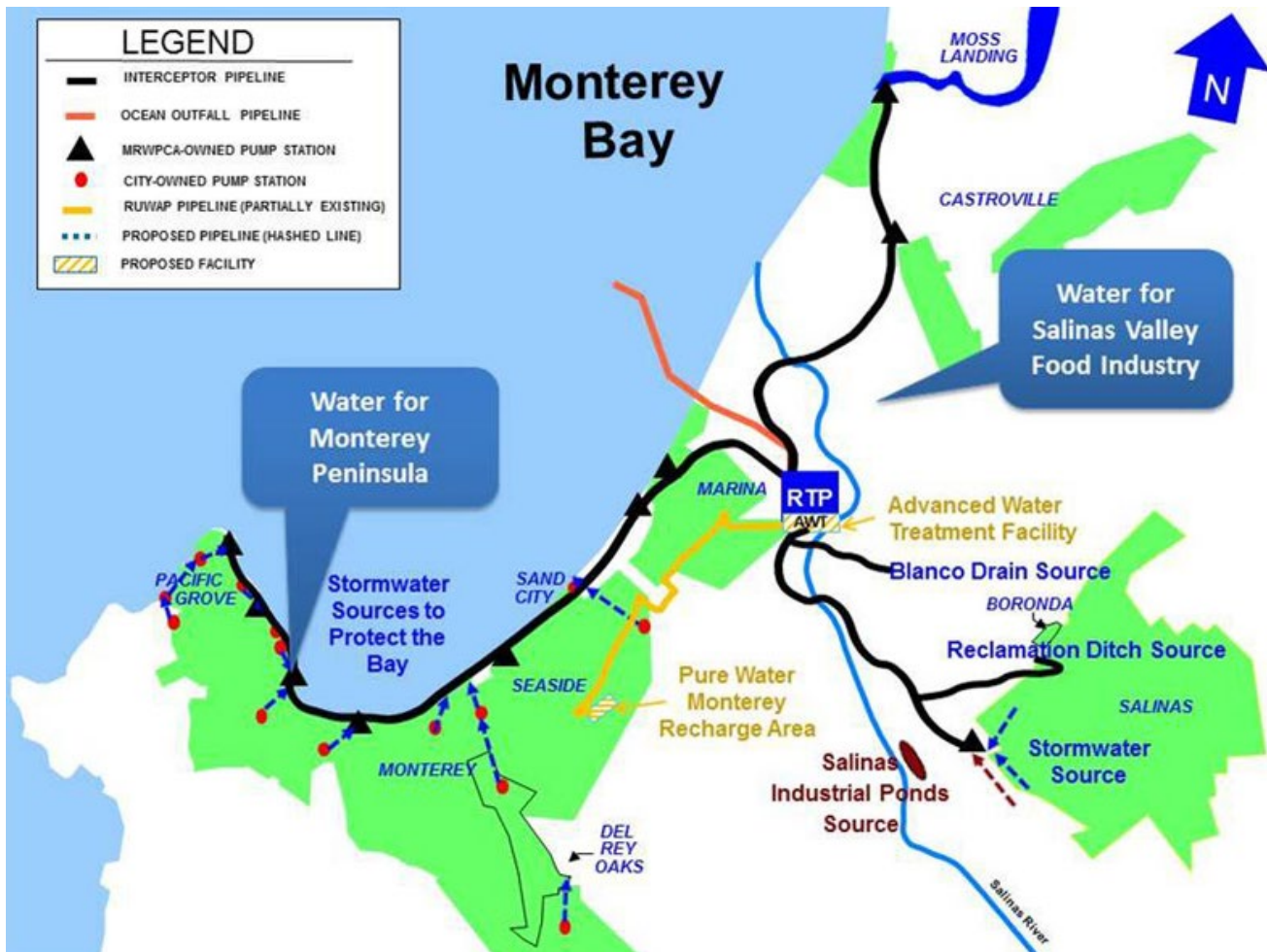
- Surface and subsurface runoff following the irrigation of agricultural land

4. Stormwater

- Rainwater or snowmelt that flows over land or impervious surfaces that is collected and, in some cases, treated before injection or infiltration (covered by ORD white paper)

ASR projects with recycled water can incorporate multiple sources of waters

Case Study: Monterey One Water



Utilizes multiple sources of water

- Municipal wastewater
- Agricultural return flows
- Urban stormwater
- Industrial process water

Treatment Requirements

Largely dependent on the source of water!

- Municipal wastewater has a different risk profile than stormwater or agricultural return flows
- Pathogens (acute risk)
 - For example, California requires a 12-log removal of virus, 10-log *Giardia*, and 10-log *Cryptosporidium* for indirect potable reuse via groundwater injection of advanced treated wastewater
- Chemicals (chronic risk)
 - Can include specific Maximum Contaminant Levels for individual chemicals or bulk parameters (e.g., TOC)

Cost Considerations

● Treatment

- Dependent on the source of water and the treatment requirements
- Treatment processes such as reverse osmosis may be required either due to regulation or to necessity (e.g., salt removal)

● Conveyance

- Both the conveyance of the water to a treatment facility as well as the conveyance of treated water to injection/infiltration sites



Feedback Welcomed!

Justin Mattingly

EPA Office of Water

Mattingly.Justin@epa.gov

<https://www.epa.gov/waterreuse>

waterreuse@epa.gov