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

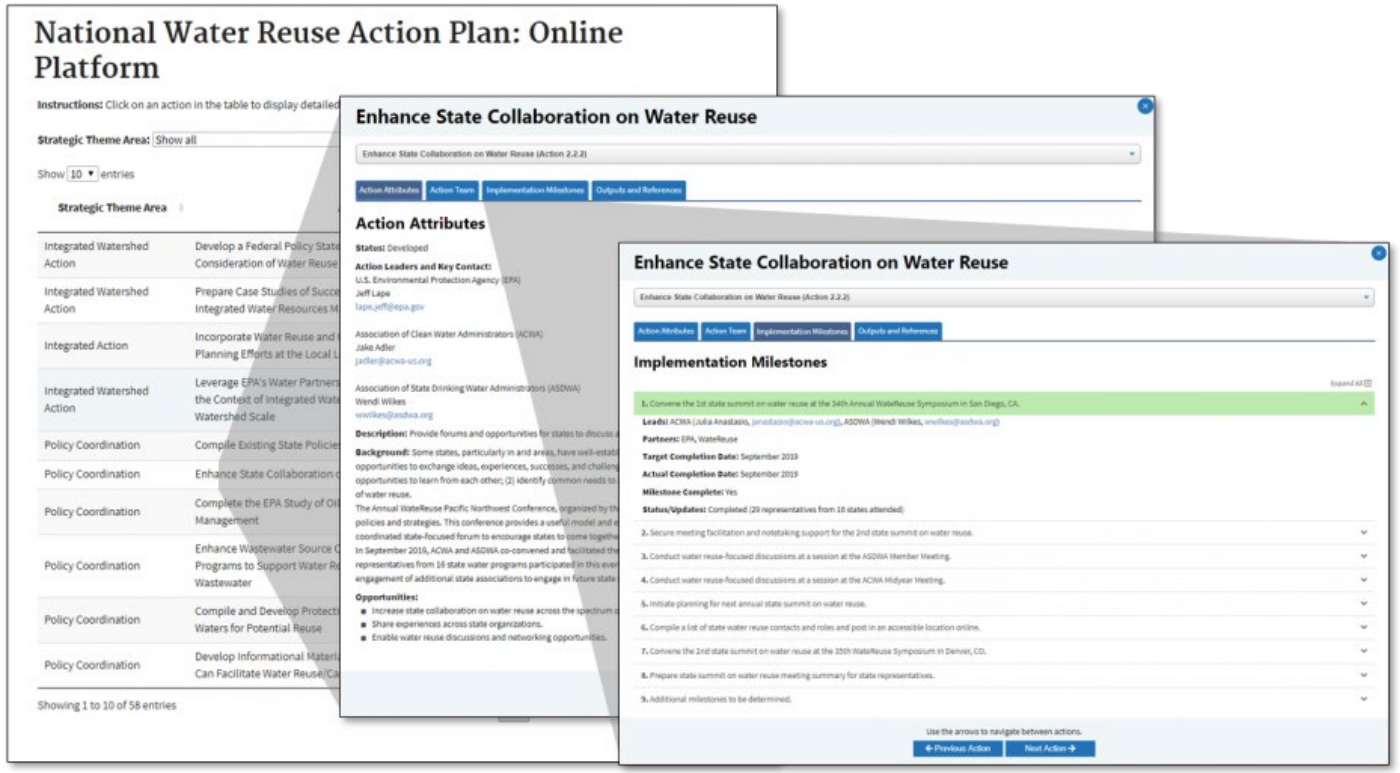
The WRAP features 11 strategic themes

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



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

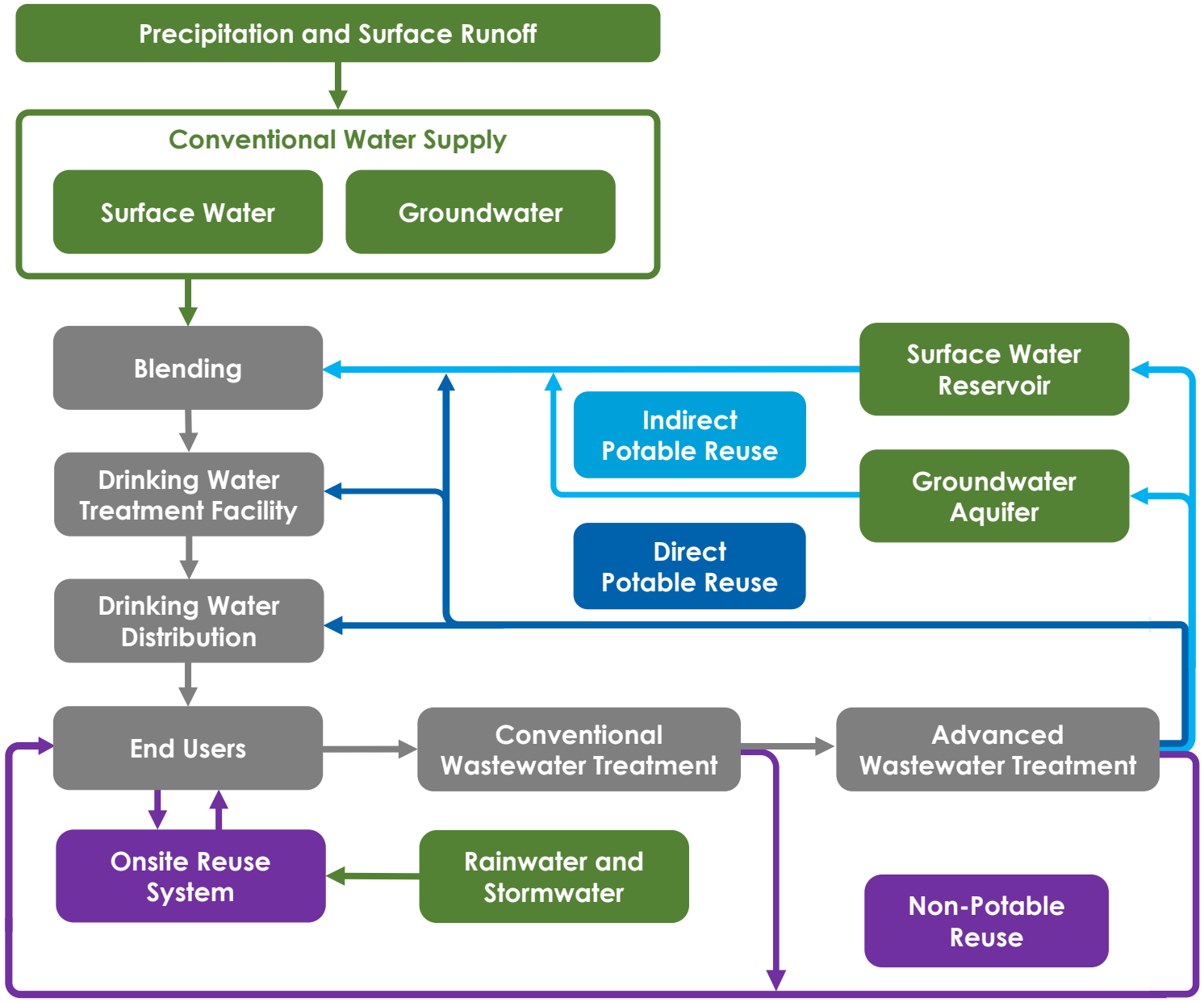
- Literature review
- System performance
- Water quality challenges
- Site selection and best practices
- Excludes regulatory discussion

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

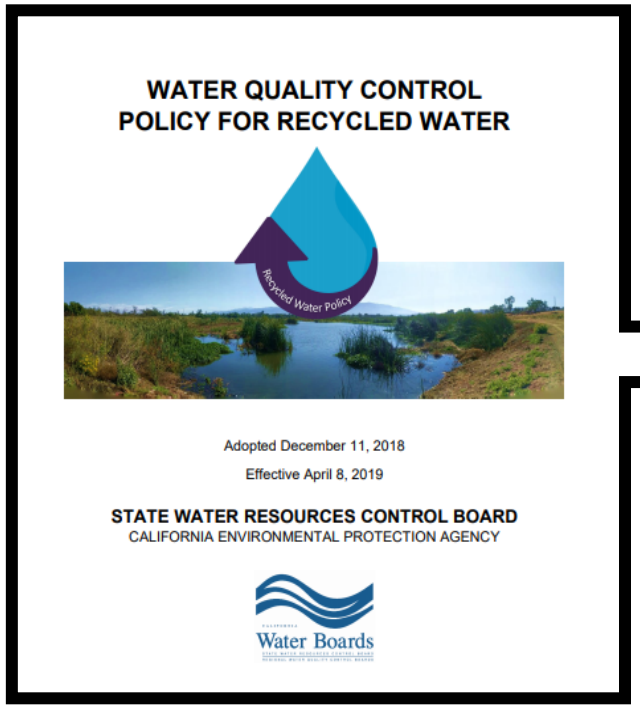
Water Reuse in the Urban Water Cycle

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



WATER QUALITY CONTROL
POLICY FOR RECYCLED WATER

Adopted December 11, 2018

Effective April 8, 2019

STATE WATER RESOURCES CONTROL BOARD
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

Water Boards

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.

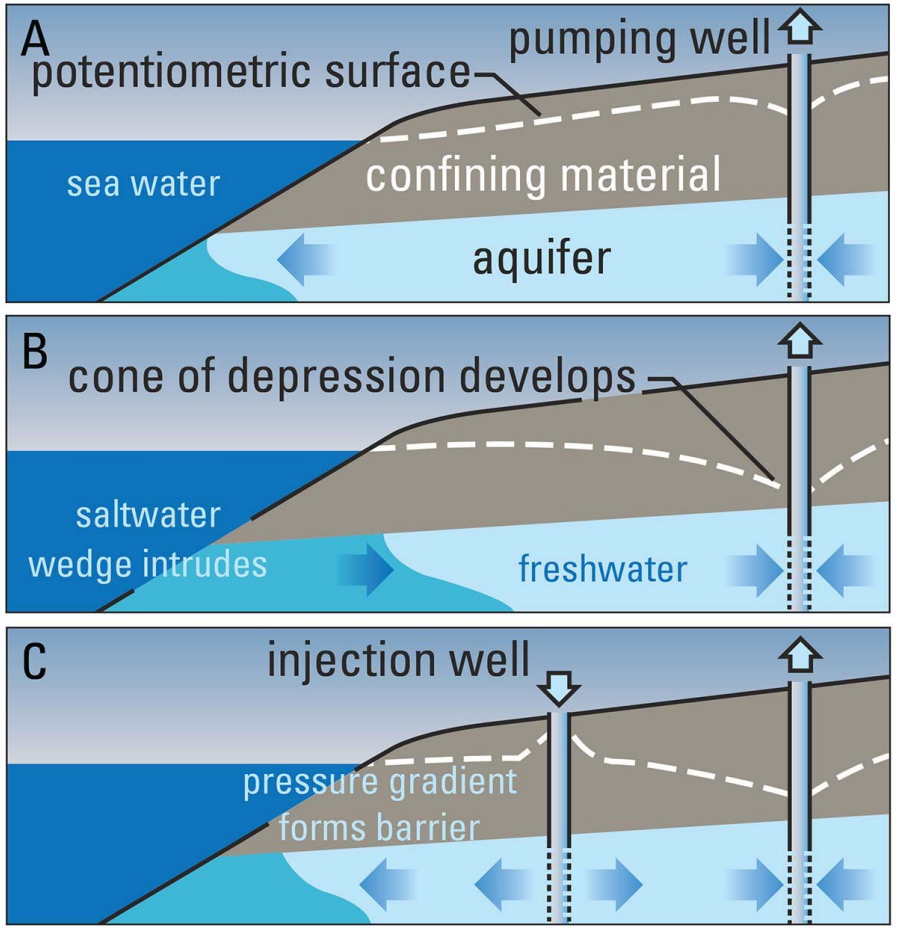
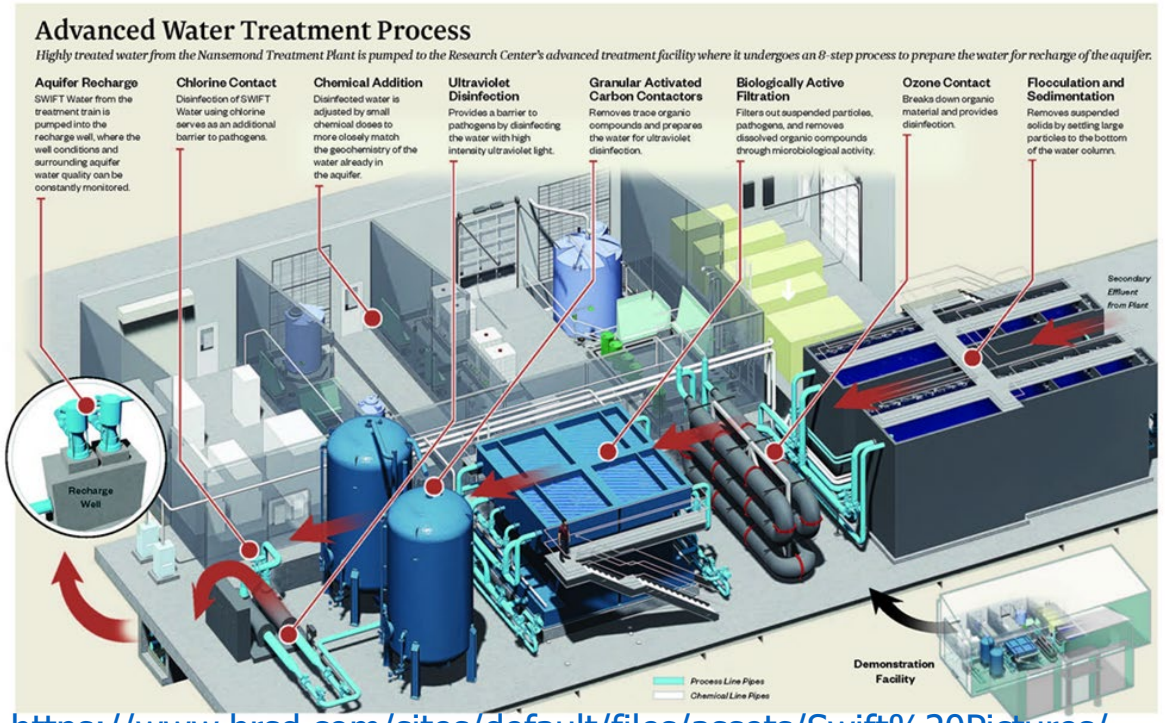


Image source: https://ca.water.usgs.gov/sustainable-groundwater-management/seawater-intrusion-california.html

Drivers: Management of Discharges

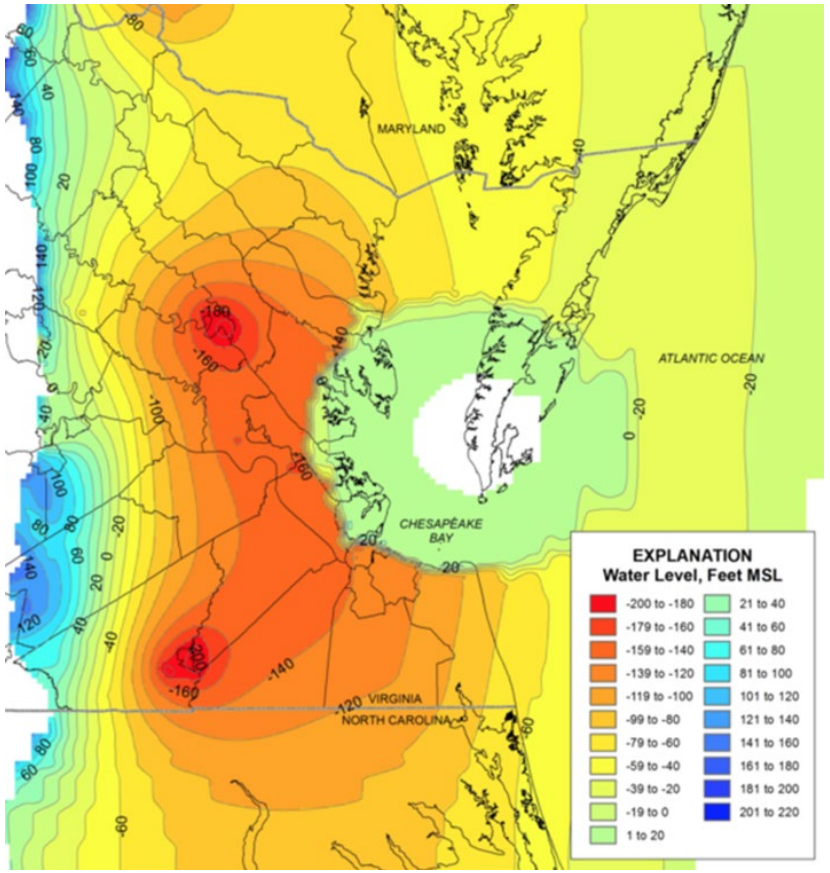
- Recycling municipal wastewater and stormwater can prevent discharges into sensitive ecosystems
- Important in regions under pressure to reduce nutrient loadings such as Florida or the Chesapeake Bay

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



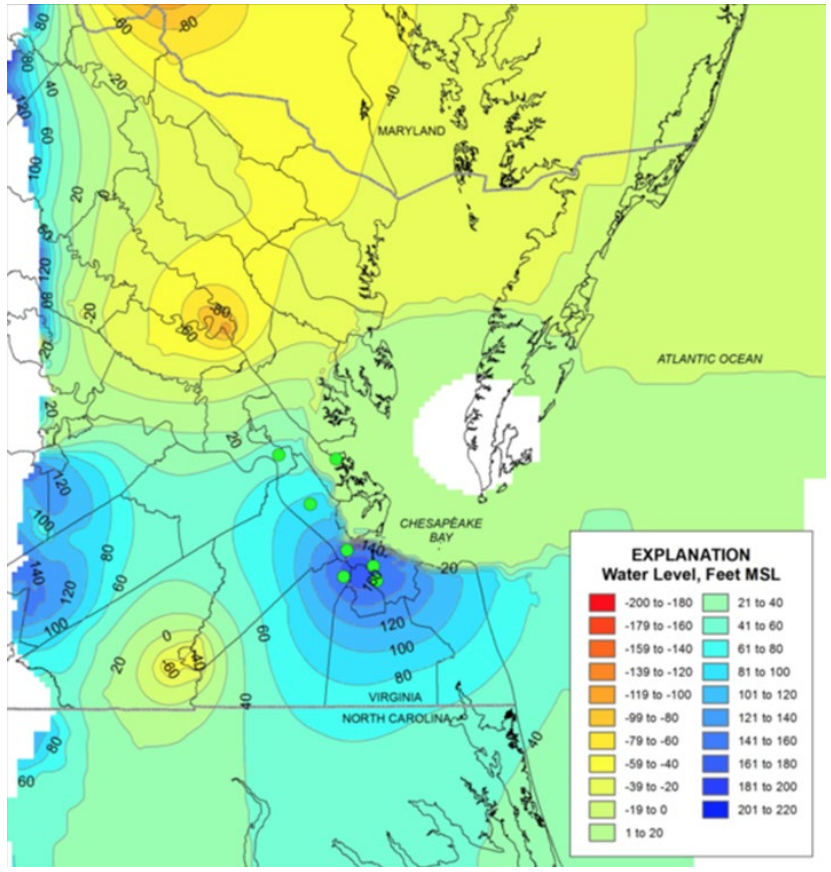
https://www.hrsd.com/sites/default/files/assets/Swift%20Pictures/AdvancedWaterTreatmentProcessGraphic.jpg

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

Source: https://www.hrsd.com/swift/potomac-aquifer-diminishing-resource

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

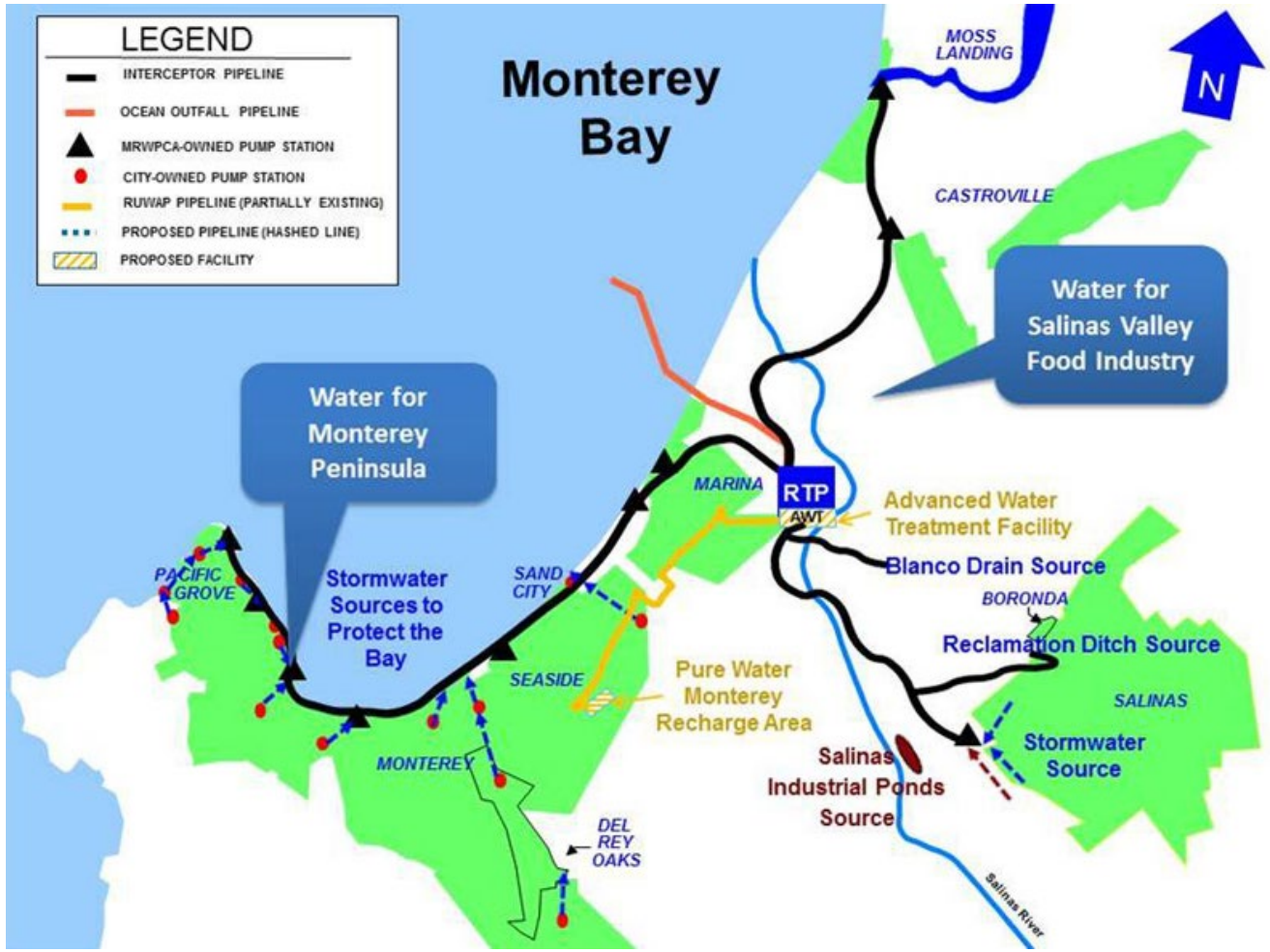
- Opened in 1962
- 44 MGD
- Utilizes soil aquifer treatment through spreading grounds following tertiary treatment

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

Source: https://purewatermonterey.org/reports-docs/maps/

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!

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