Anne Arundel County Clean Water Program

Our wAAter
Public Advisory Group Meeting

October 28, 2024

1 Introductions & Agenda

Agenda

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2 Cybersecurity Update

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Break

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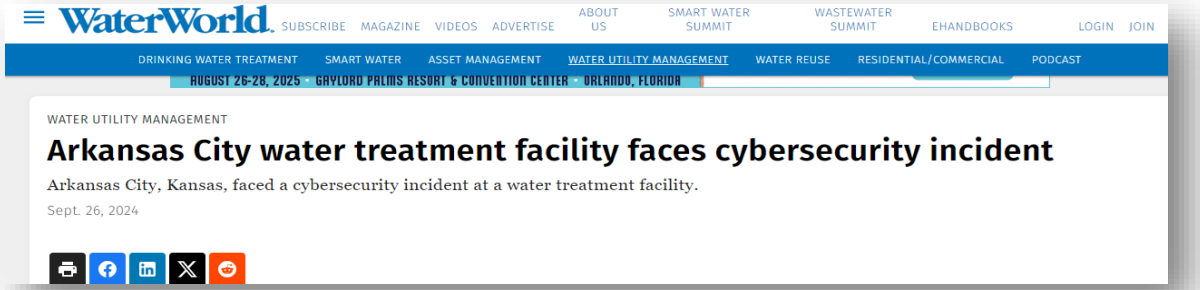
6 Closing Remarks

2 Cybersecurity Update

Cybersecurity Update



- DPW & AACo are members of Water Information Sharing & Analysis Center and receive the CISA alerts, news, and participate in webinars only available to members.
- One strength for DPW is that the IT and OT (SCADA) systems are separate.

- Recent incidents in other areas of the country
- Number of incidents overall on the rise

Operational Technology (OT) Cybersecurity Update

Recent Accomplishments:

- Assessment of OT cybersecurity infrastructure
- Physical security expansion and improvements
- Centralization and adequate documentation of OT procedures

Current Efforts:

- Development of incident response plans
- Risk and resiliency assessment workshops for water & wastewater facilities

Cybersecurity Goals and Vision

County's Vision

- Harden the County's OT network
- Keep up with the fast change in technology
- Systematic and efficient upgrade of OT assets, and standardization of components
- Secure outside funding where possible
- Develop implementation plans clarifying roles

Five Year Plan

- Identify means to strengthen our system
- Update and add policies, continue training and table top events for staff
- Continue to upgrade intrusion monitoring and detection.
- Evaluate staffing levels and position requirements

Maintain Regulatory Compliance:

- Modernized Maryland Act of 2023
- EPA Regulation under safe Drinking Water Act (SWDA)
- America Water Infrastructure Act
- New requirements under development

3

Odenton – Fort Meade Update

**Refer to the website for the most recent information:*
https://www.aahealth.org/environmental-health/wells-and-septic-systems

For More Information:

Anne Arundel County Department of Health

- All information and documents generated by the CERCLA process are available to the public at the Odenton Library:

Odenton Library
1325 Annapolis Road
Odenton, MD 21113
410.222.6277
wco@aacpl.net

**Refer to the website for the most recent information:*
https://www.aahealth.org/environmental-health/wells-and-septic-systems

4 MAR Follow-up

Building a Community of Support

Identify Supporters	Request Support	Update Outreach Materials	Legislative Briefings
• Early supporters • Likely supporters • Other supportive actors	• Email and phone requests • Maintain consistent communication	• Fact sheets *(1 page for legislators, 4 page for details)* • Our wAAter website	• County legislative staff • Elected officials • EPA Office of Chesapeake Bay • MDE and DNR

Status Update

Likely Supporters:

- **CEPA** - Will let us know after their board meeting at the end of October
- **MAMWA** - We are presenting at their next Nov 7th

Have indicated that they cannot or will not support at this time:

- Chesapeake Bay Foundation
- Alliance for the Chesapeake Bay

Have not Responded yet:

- AA County/Annapolis Resilience Authority
- Anne Arundel Watershed Stewards Academy
- Arundel Rivers
- Charles County
- Patuxent Riverkeeper
- Severn Riverkeeper
- Centreville
- DC Water
- Magothy River Association
- Maryland Association of Counties
- MWCOG
- Queen Anne's County
- Severn River Association
- St. Mary's MetCom
- WSSC

Questions From Last PAG Meeting

- What is the concentration of nutrients going to the aquifers? Specifically, TKN, what is the speciation of N as it moves through the pilot and what would be discharged to the aquifers.
- Get examples from HRSD on what they have done about removing contaminants and what they did going through start up of the demonstration facility
- Do we have information showing groundwater depletion?
- List all stages where the public can comment on any legislation, permits, etc…

Pilot System Nitrogen Removal

What is the concentration of nutrients going to the aquifers? Specifically, TKN, what is the speciation of N as it moves through the pilot and what would be discharged to the aquifers.

- Additional information is being collected on the nitrogen speciation through the pilot system, but the pilot system is not designed to optimize the removal of nitrogen.
- TKN specifically measures the combination of ammonia and organic nitrogen. The processes in the pilot can break down some of the organic material and ammonia in the system will be converted to nitrate.
- A small portion of the nitrogen will be used in cell mass for organisms in the BAF step, but mostly we expect to see transformation of nitrogen species and not necessarily removal.
- The upstream wastewater treatment plant is required to remove total nitrogen to 4 mg/L and regularly achieves levels at or below 2 mg/L of total nitrogen (Nitrate + TKN).

HRSD Control Measures

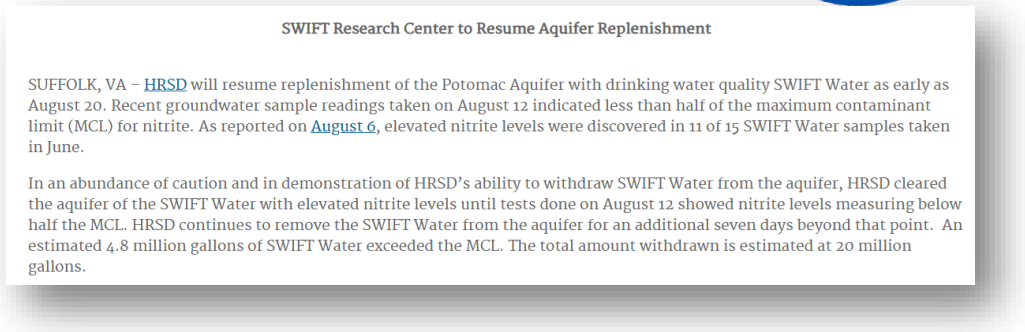
- Hazard Analysis and Critical Control Point analysis
- Develop a comprehensive set of critical control points
- Establishes monitoring requirements, action thresholds, and actions.
- Water can be diverted back into the original treatment train.

Parameter	Alert Value	Alarm Value	Unit	Action
Critical Control Points (CCPs)				
Influent Pump Station Conductivity	1,200	1,500	microSiemens per centimeter	Divert settled water to drain pump station
Influent Pump Station Total Inorganic Nitrogen	4.0	5.0	mg/L	Divert settled water to drain pump station
Influent Pump Station Turbidity	15	20	NTU	Divert settled water to drain pump station
Preformed Chloramine Failure on Injection	N/A	Failure	mg/L	Divert SWIFT Water
Total Chlorine Post Injection upstream of ozone	2.0	1.0	mg/L	Divert SWIFT Water
Chloramine injection upstream of ozone	2.0	1.0	mg/L	Divert SWIFT Water
Ozone Feed	N/A	Failure	N/A	Open Biofilter Backwash Waste Valve
Ozone Contactor Calculated LRV – Virus	<120% LRV Goal	<100% LRV Goal	%	Open Biofilter Backwash Waste Valve
Biofilter Individual Effluent Turbidity	0.1	0.15	NTU	Place that filter in filter-to-waste mode
Biofilter Combined Filter Effluent Turbidity	0.1	0.15	NTU	Place all filters in filter-to-waste mode
GAC Combined Effluent TOC, instantaneous online analyzer	4.0	~~6~~ 5.0	mg/L	Divert SWIFT Water
UV Reactor Dose	<120% of Dose Setpoint	<105% of Dose Setpoint	%	Divert SWIFT Water
Free Chlorine CT ***(This CCP is not being used since free chlorination of the SWIFT Water is not currently being practiced)***	<120% of CT Target	<105% of CT Target	%	Divert SWIFT Water
GAC Combined Effluent Nitrite	0.25	0.50	mg/L	Divert SWIFT Water
SWIFT Water TN	4.5	~~6~~5.0	mg/L	Divert SWIFT Water
Ozone dose	80	90	lbs/day	Place all filters in filter-to-waste mode

Table 5. Hazard Analysis and Critical Control Point: Critical Control Points

HRSD Control Measures

- The control points, monitoring plans, and contingency plans are all part of the permit application and review process.
- Final option is to withdraw the water that was injected



SWIFT Research Center to Resume Aquifer Replenishment

SUFFOLK, VA – HRSD will resume replenishment of the Potomac Aquifer with drinking water quality SWIFT Water as early as August 20. Recent groundwater sample readings taken on August 12 indicated less than half of the maximum contaminant limit (MCL) for nitrite. As reported on August 6, elevated nitrite levels were discovered in 11 of 15 SWIFT Water samples taken in June.

In an abundance of caution and in demonstration of HRSD's ability to withdraw SWIFT Water from the aquifer, HRSD cleared the aquifer of the SWIFT Water with elevated nitrite levels until tests done on August 12 showed nitrite levels measuring below half the MCL. HRSD continues to remove the SWIFT Water from the aquifer for an additional seven days beyond that point. An estimated 4.8 million gallons of SWIFT Water exceeded the MCL. The total amount withdrawn is estimated at 20 million gallons.

If any of the regulated parameters are elevated above the limits in groundwater samples, HRSD will enact the following contingencies.

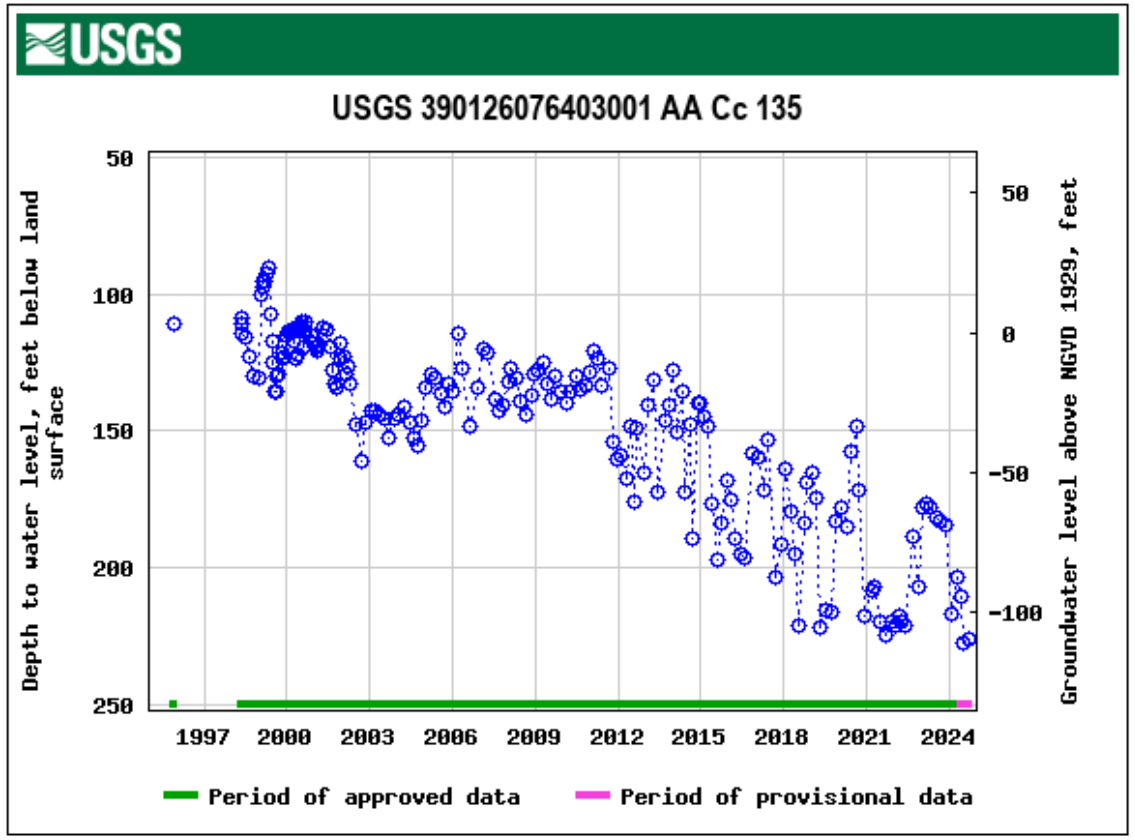
- Retest within one week and provide an report with an explanation if it appears to be lab error or other similar issue.
- If results are confirmed, provide a report describing in detail the potential cause and any corrective measures that may be implemented
- Make all efforts to track the source of a potential contaminant.
- Adjust the treatment process to reduce the reactivity (passivate) of minerals in the PAS in situ.
- Increase sampling frequency at monitoring the wells
- Work with oversight groups to determine what additional measures may be needed including halting recharge operations until an alternative solution is develop

Anticipated Public Comment Periods

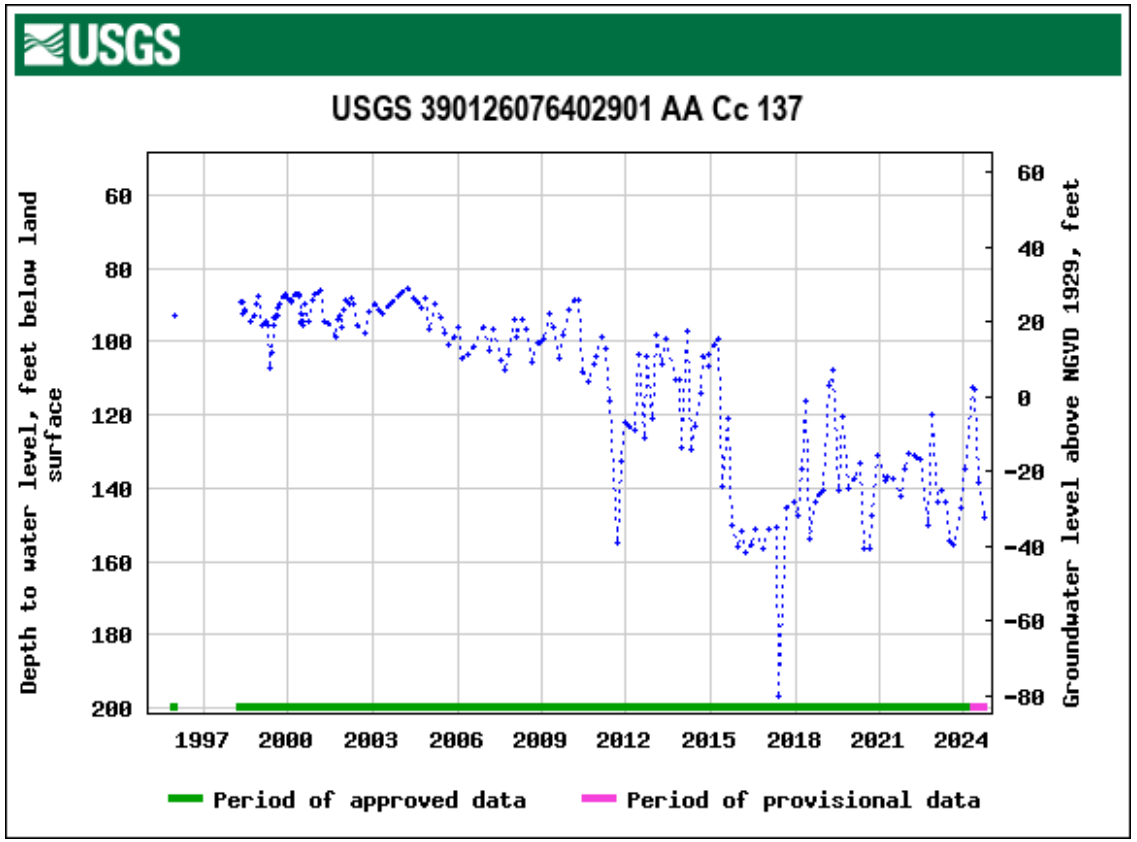
- Legislation process
- Permits for public comment:
  - Groundwater Appropriation Permit
  - It would be expected that whatever new process is set up for aquifer injection would also include a public comment period.

Crofton Meadows WTP Area

Patuxent Aquifer

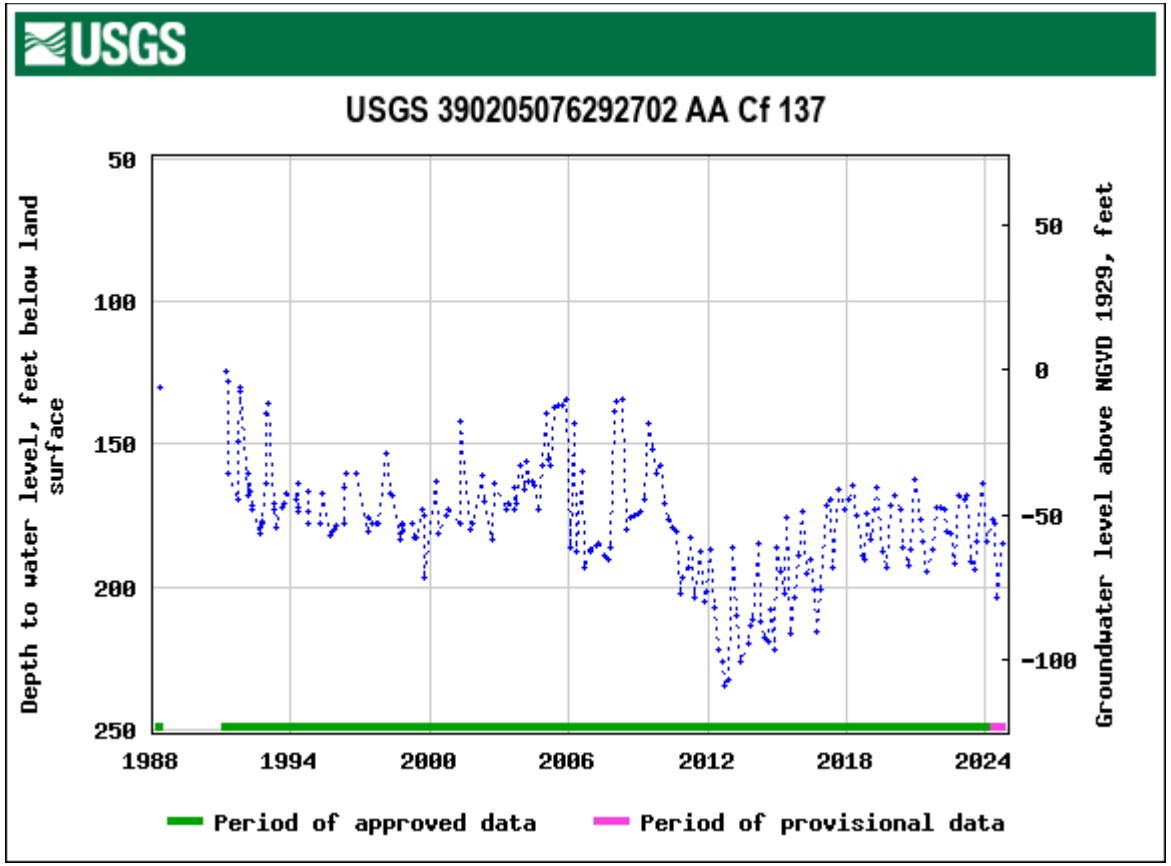


Lower Patapsco

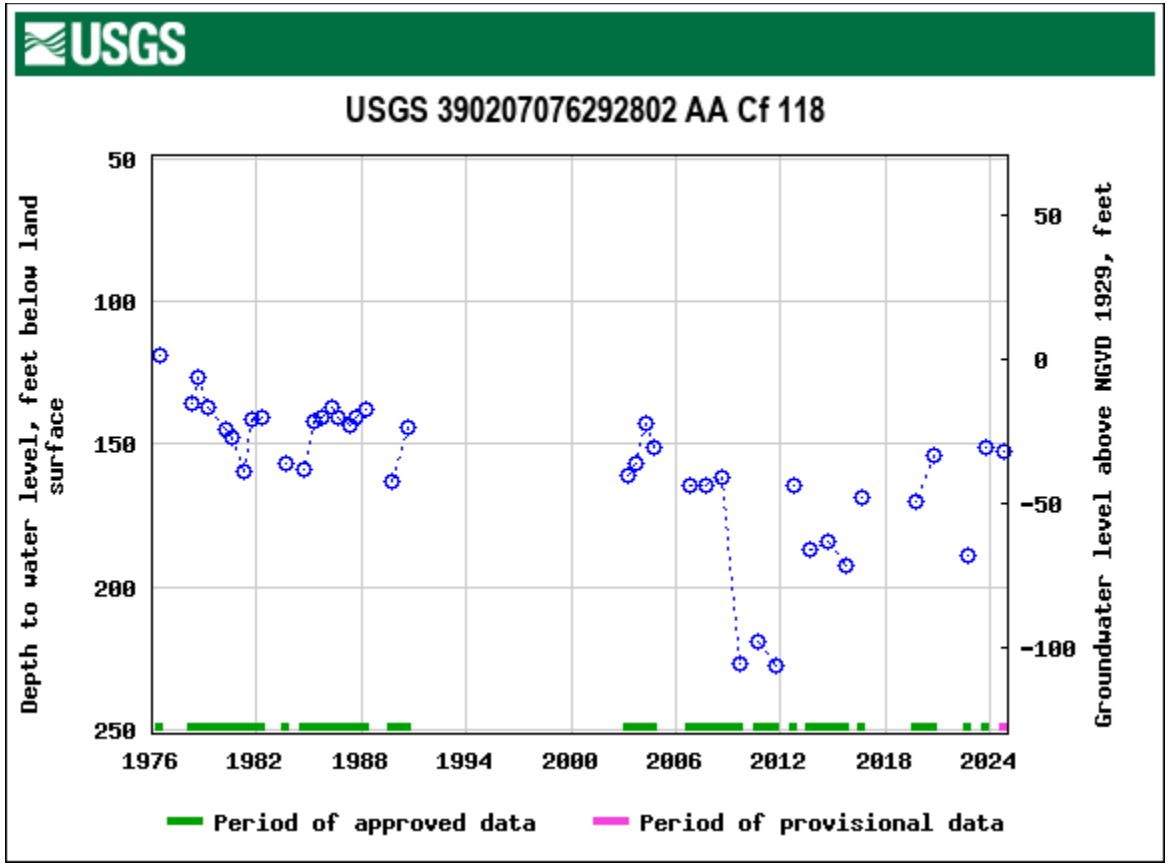


Arnold WTP Area

Lower Patapsco

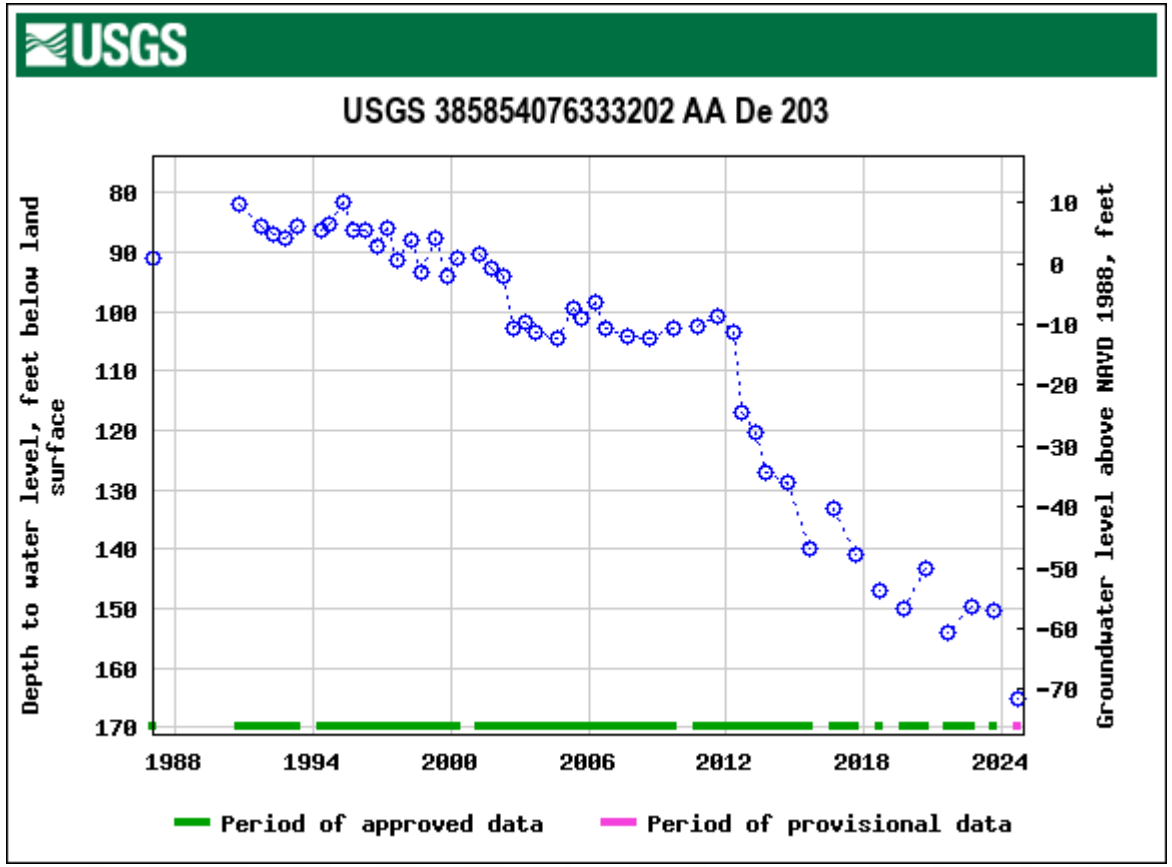


Upper Patapsco

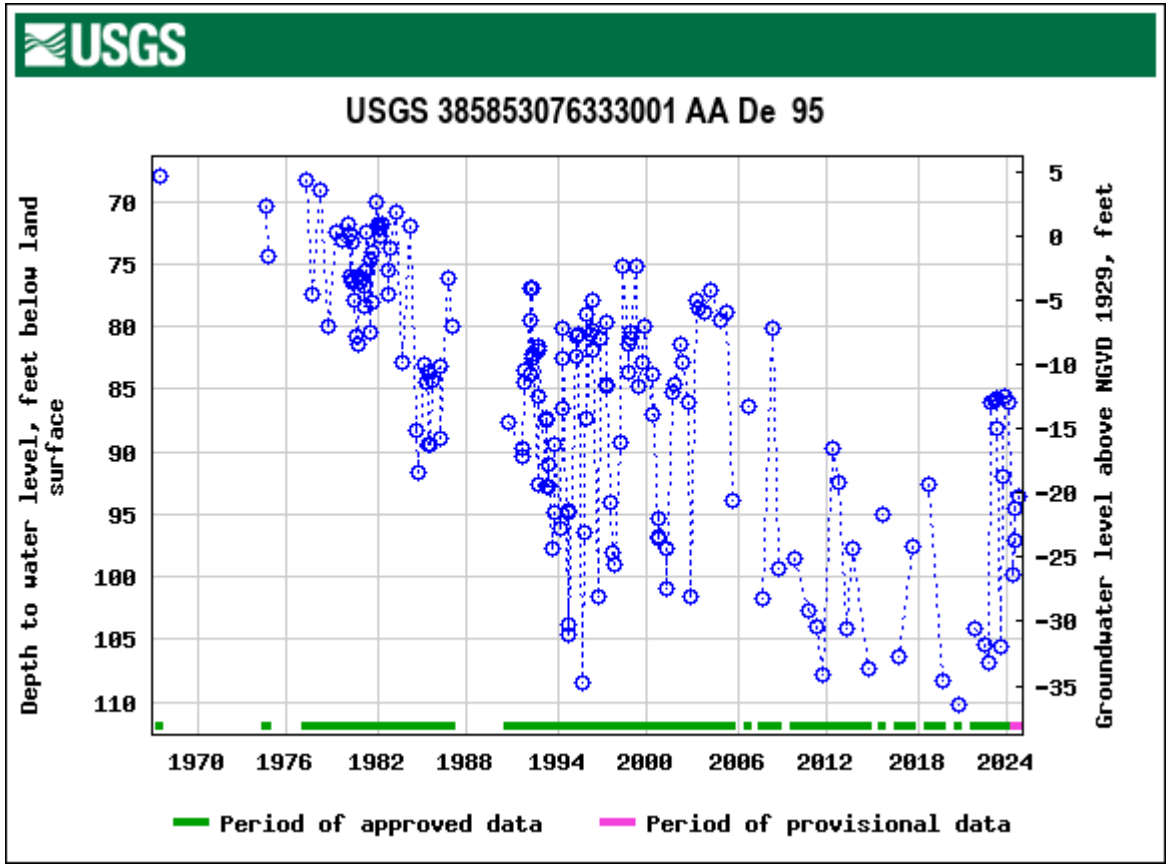


Broad Creek WTP Area

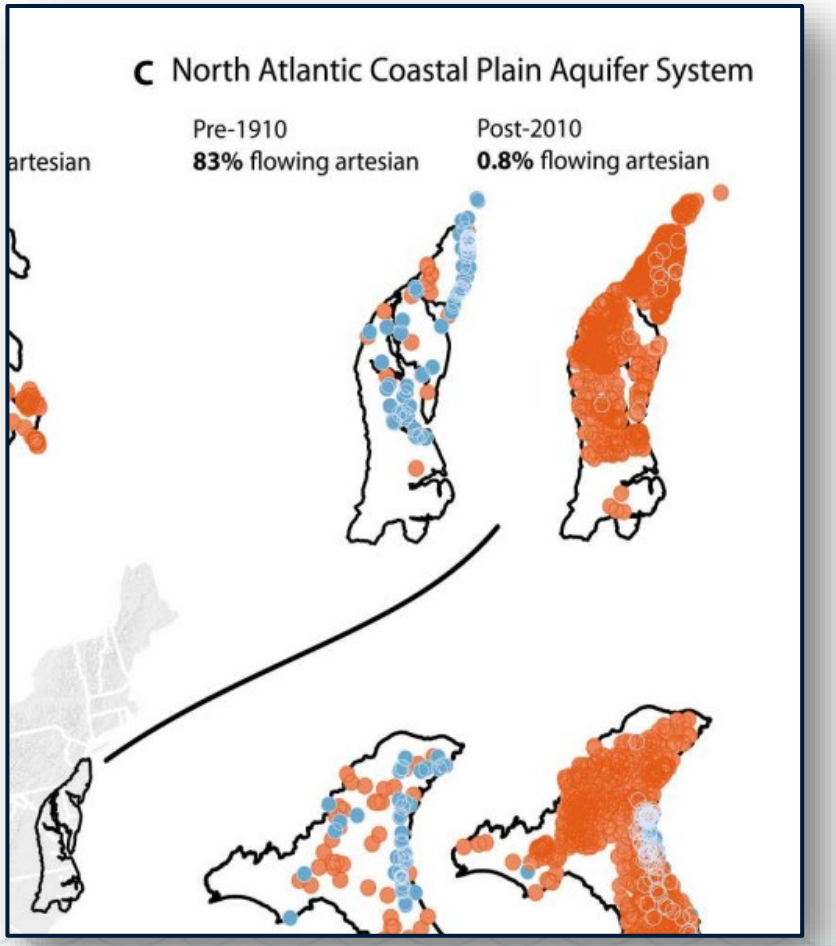
Patuxent



Upper Patapsco



Bigger Picture View



- “The prevalence of flowing artesian conditions has declined substantially in confined aquifers over the last one hundred years, revealing substantial aquifer depressurization in the US.”
- “Depressurization of artesian aquifers is not isolated to a few local areas but is, instead, a continental-scale phenomenon.”
- “Some of the factors that may influence the prevalence of flowing artesian wells and their ability to sustain flowing artesian conditions over time include : (i) geology, (ii) climate, (iii) human intervention.”

Hilton & Jasechko (2023) “*Widespread aquifer depressurization after a century of intensive groundwater use in USA*”, Science Advances, Vol. 9. 2023

Our Roadmap to Renewable Water

2024
- AWT Pilot
- ISAP review
- MAR Demonstration concept
- MDE buy-in

2025
- AWT Pilot
- MAR Demonstration procurement
- Regulation development

2026
- MAR Demonstration design
- Permitting

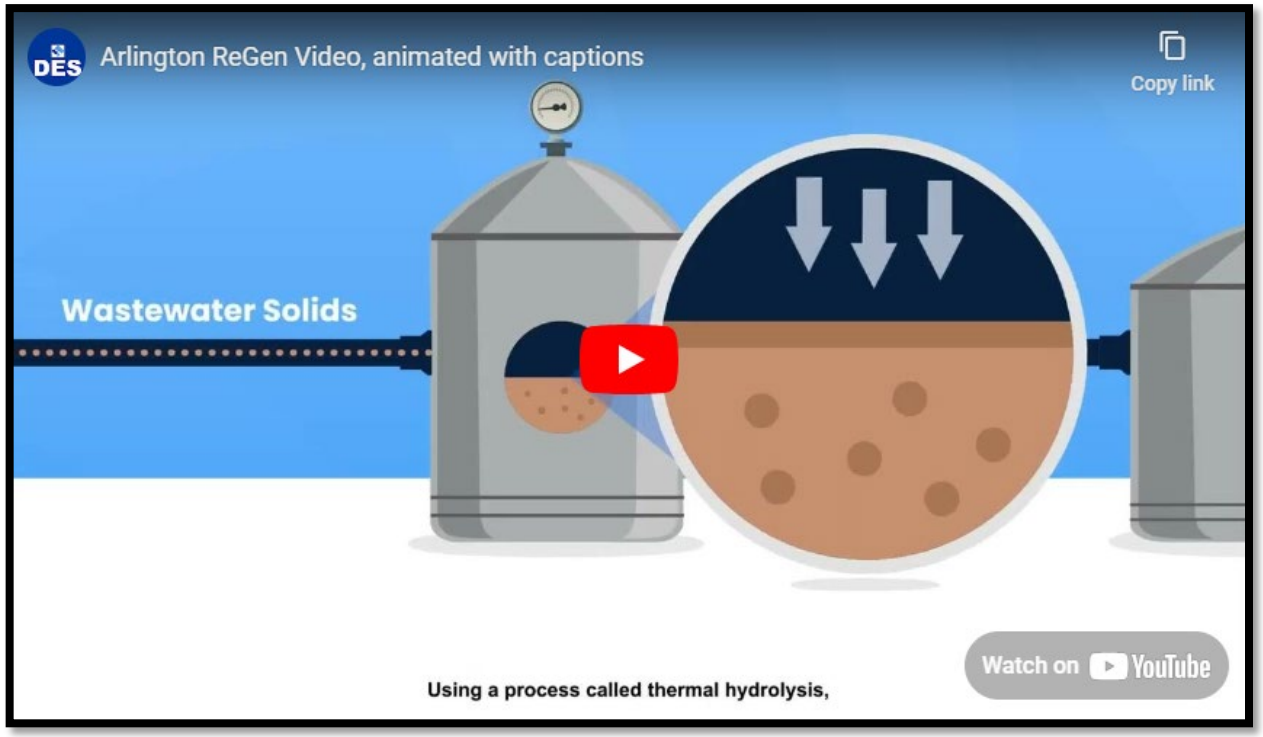
2027
- Initial well drilling
- MAR Demonstration construction

2028
- MAR Demonstration construction

2029
- MAR demonstrated performance
- Well testing using MAR water

Requires collaboration, based on scientific research, between DPW staff, regulators, ISAP, and elected officials.

Break (5-10 minutes)



https://youtu.be/Y4WrOOt4Cro

Arlington Re-Gen

Arlington County, VA Department of Environmental Services developed and implemented a proactive community outreach effort to educate residents and garner support for new Thermal Hydrolysis Process and Anaerobic Digestion facilities.

5 MAR Public Outreach

MAR Public Outreach

Regardless of the outcome with the legislation, DPW will need to broaden the public outreach effort.

Legislation Passes

- Needed to support public comment period for permit applications

Legislation on Hold

- Need to continue to develop awareness and build support

MAR Public Outreach

We are here

Program in Tampa ended

NEWS / TAMPA

Tampa Council plans formal farewell for 'toilet-to-tap'

The city proposal to use wastewater to augment drinking water supplies will end.

Program in Nevada moving forward

What is OneWater Nevada?

OneWater Nevada is a collaboration between regional agencies, exploring a comprehensive approach to extending the resiliency and sustainability of local water resources for future generations. This approach takes into account the interconnected nature of water systems and seeks to balance our community's needs with the protection and preservation of natural resources. Through this effort, OneWater Nevada seeks to identify, understand, and implement water practices, such as:

- Exploring ways to both conserve and extend the use of existing water resources
- Considering long term water-resource and water-quality management issues
- Helping protect the environmental integrity of our watersheds
- Developing technologies and practices that sustain our quality of life

OneWater Nevada's primary goal is to ensure there is enough water available to meet the needs of all users while protecting, and even improving, the region's water quality and environmental integrity. This involves careful monitoring of water supplies, assessing future water demands, and developing strategies to meet those demands while minimizing the impact on the natural environment.

Latest News:
$30 Million Federal Grant for Advanced Purified Water Facility
Construction expected to begin in 2025

Introducing OneWater Nevada's Advanced Purified Water Facility at American Flat

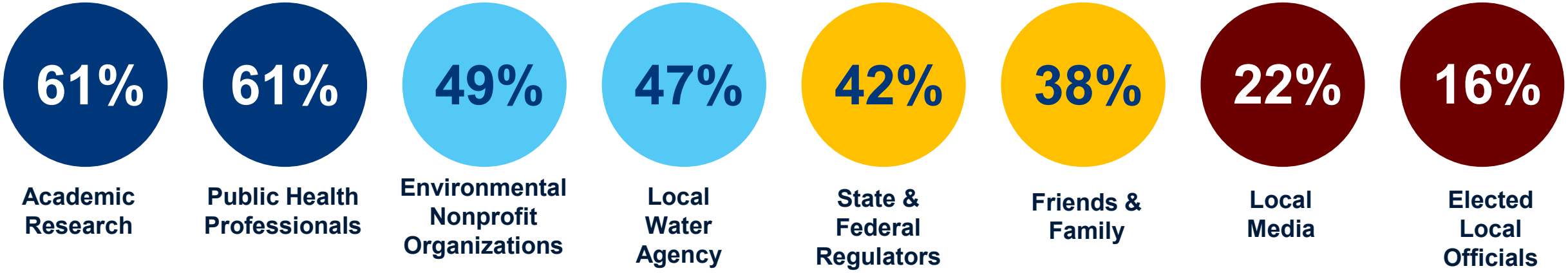
In Northern Nevada we've always taken the long view when it comes to managing our water resources. From building infrastructure to operating our reservoirs, to replenishing aquifers; we've always worked to stay ahead of the needs of a vibrant community facing the challenges of growth, drought, and climate change.

Conceptual Architectural Rendering

Sources of Information

Sum of "Mostly Trust" and "Somewhat Trust" Survey Categories

Level of trust in entities to provide information on water reuse



Distler et al. (2021), "Public Engagement on Water Reuse Beyond Community Surveys", Journal AWWA, May 2021

Public Outreach to Date

- NACWA
- CWEA Water Reuse attendees
- Mid-Atlantic utilities conference attendees
- CBF
- Our wAAter Public Advisory Group
- Patuxent Riverkeeper
- Arundel Rivers staff
- Magothy and Severn Riverkeepers
- County Executive
- MDE Secretary
- Watershed Stewards Academy staff
- Regional Health Dept Directors
- Resilience Authority
- SERC Public Engagement Tour
- Philadelphia Water
- Department of Natural Resources
- Septic to Sewer Community Meetings – Chestnut Hill, Crain West, Gingerville Manor, Glen Eden/Indian Hills, Popular Point, Ulmstead Estates, Oak Court
- 5 River Days events
- DPW Outreach Day
- Environmental Youth Summit
- Pilot Tours
- 3 Public Advisory Group Meetings

Past Outreach

General Public

- River Days
- Website
- Youth Summit
- Indirect – news articles

Environmental Groups

- CBF
- Riverkeepers
- Watershed Stewards
- CEPA
- and more

Government

- County DPW Directors
- County Health Depts
- MDE
- DNR
- EPA

Key Takeaways

General Public

- Samples from treatment plants - effective
- Most discussion generally about aquifers
- Occasional questions regarding MAR
- Terminology

Environmental Groups

- Interest in removal of emerging contaminants
- Some hesitancy regarding risk
- High interest in data
- Why hadn't they heard about the program?

Government

- High interest in data
- Other municipalities generally favorable
- Concerns about some specific risks

Outreach Considerations…

- **Goals**
- **Know the audience**
  - Pasadena vs. Annapolis
  - Technical vs. public
- **Tiered approach**
  - Phases/Quarters
- **Engaging content**
- **Value**
  - How does it relate to me?
  - Why should I care?
- **Terminology**

Outreach Status

Outreach Status	Action
Inform residents about the need and opportunity for purified recycled water	***Partially Done***
Lead tours for key stakeholders while introducing advanced water purification	***Done***
Educate customers about the water cycle (in nature, and the urban water cycle)	***Minimally Done***
Enhance the utility's reputation in the community	***????***
Encourage water conservation habits	***Not Done***
Host the local school community	***Not Done***

Water Research Foundation (2023) "*Purified Recycled Water Demonstration Design & Reuse Communication Toolbox*", Table 2-2.

Outreach Techniques

Venue	Status
Webinars	*Not Done*
Lunch & Learns	*Not Done*
Conferences	*Done*
HOA / Community Meetings	*Not Done*
Social Media	*Partially Done*
Videos	*Not Done*
Bill Inserts	*Not Done*
Website	*Done*
Partnership	*Not Done*
Offsite Outreach	*Partially Done*

Offsite Outreach

Possible Approach	Description
Mobile Exhibits	A mobile unit can be a trailer, van,or bus that can be delivered to various locations and events.
Public Buildings	Municipal buildings may have central locations and built-in foot traffic that can help a utility reach more people, sooner.
Local Museums (Baltimore Public Works, Annapolis Children's Museum)	Local museums may be willing to host your exhibit on a temporary, permanent, or traveling basis. They offer relevant expertise in exhibit design and production.
Virtual Tour	A well-designed virtual tour of the operating plant could accomplish similar goals and be more convenient for both the public and the utility.

Water Research Foundation (2023) "*Purified Recycled Water Demonstration Design & Reuse Communication Toolbox*".

Mentimeter

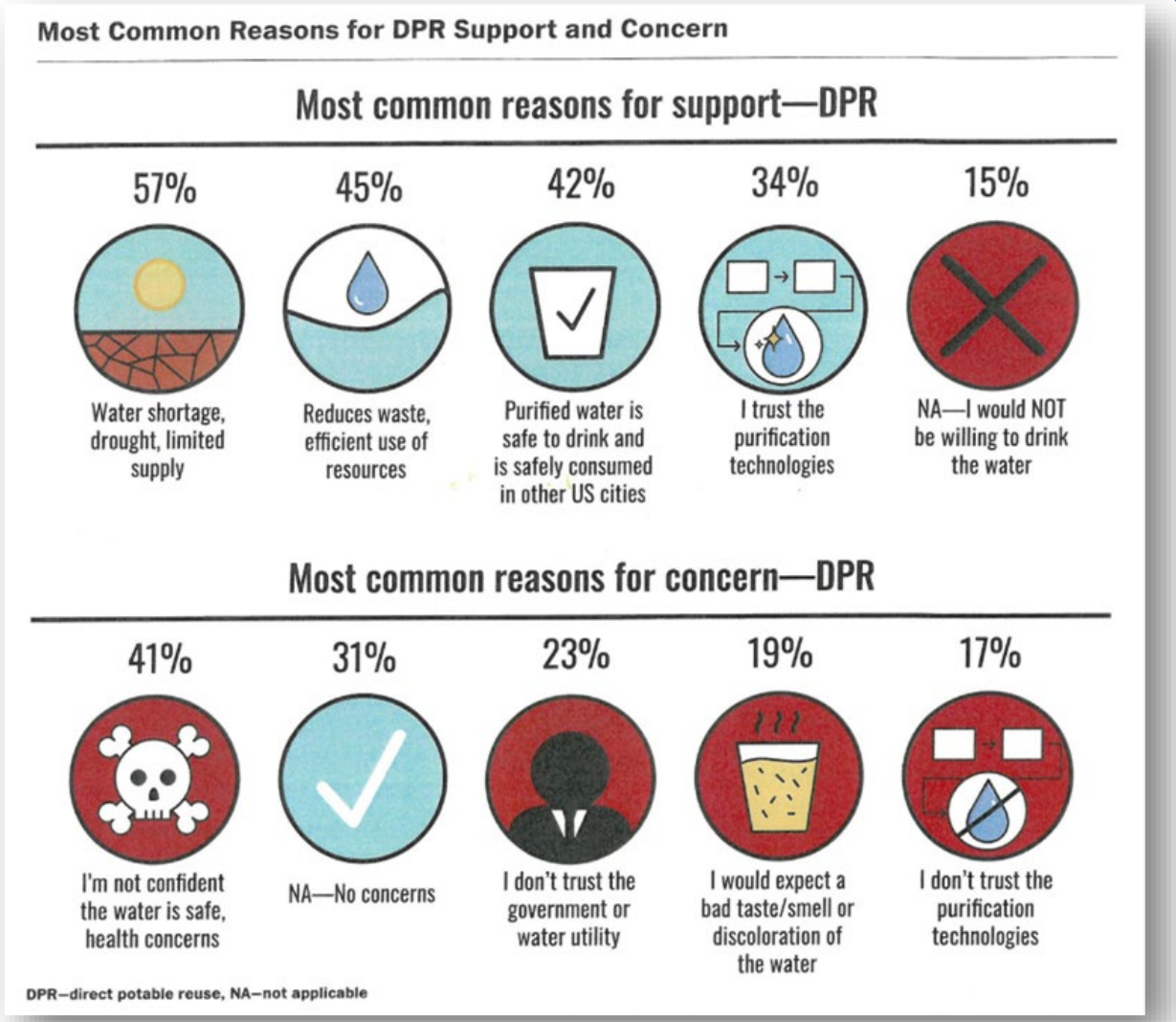
What outreach techniques should we use with MAR?

Go to: **menti.com or scan the QR code**

Code: 3755 1734

Common Reasons for Support / Concern

- Information presented for Direct Potable Reuse
- Responses also indicated a need for more information
- Risk perception



Distler et al. (2021), "Public Engagement on Water Reuse Beyond Community Surveys", Journal AWWA, May 2021

Risk Mitigation Strategies

RISK	MITIGATION STRATEGY
Chemical interaction of finished water with native geology	County established an independent science advisory panel of with reuse experience and expertise.
Emerging contaminants	County is monitoring effluent quality from the AWT pilot plant to understand presences and removal. Currently meeting all drinking water MCLs. County is performing rapid small-scale tests to understand how to make progress on difficult to remove compounds – will expand on separate slide.

6 Closing Remarks

Our wAAter Website

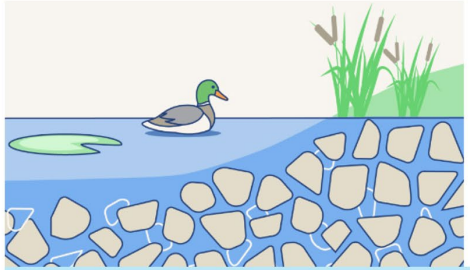
ourwaater.aacounty.org

What?

Just like you balance your household budget with income, savings and exp
precipitation, storage, evaporation, and discharge. In Anne Arundel Count
because our community withdraws water at a rate that exceeds natural r
imbalance is a priority for groundwater resiliency and protection of our f
stored in underground aquifers. We are currently evaluating innovative ap

Replenish groundwater supplies

Resist the intrusion of saltwater into local aquifers as sea levels rise



How?

Anne Arundel County has a multi-pronged strategy to protect our long-term groundwater supply and resiliency.

Our Wastewater Treatment Enhancements have greatly reduced the amounts of nutrients in our discharged water. We've been over 50% be
the required limit since 2018, helping protect the Chesapeake Bay and groundwater beneath us.

The County has also implemented an advanced water treatment pilot program that will help treat our wastewater effluent to the national
drinking water and potable reuse water quality standards, providing us with the ability to perform managed aquifer recharge (MAR) and in
clean water back into our aquifers, which would essentially result in zero surface water discharge of nutrients.

Learn About Our Pilot Program

What can you do?

There are plenty of ways individuals help protect groundwater through small changes

Reduce Your Usage

Dispose of Household Chemicals Properly

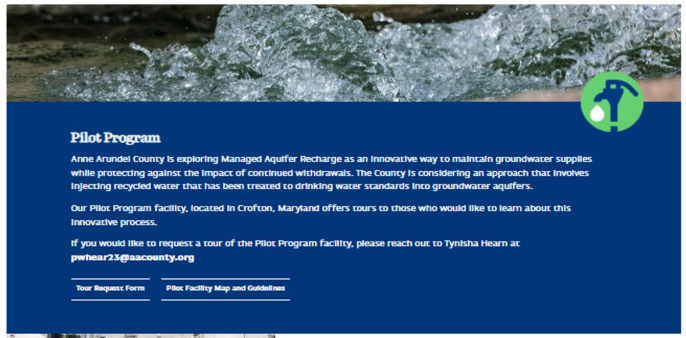
Reduce Chemicals in Your Yard and Garden

See the Maryland Department of the Environment's

See the Environmental Protection Agency's Indoor

Why?

As our climate continues to change and regional weather patterns become
predictable and more extreme, we expect new strains to affect the source
on which we rely. When water seeps into the ground, it creates a reserve t
vulnerable to warmer temperatures and drought than surface water in riv
streams. The County relies on groundwater as its sole source of drinking w
for both the large regional network and private wells.



Pilot Program

Anne Arundel County is exploring Managed Aquifer Recharge as an innovative way to maintain groundwater supplies while protecting against the impact of continued withdrawals. The County is considering an approach that involves injecting recycled water that has been treated to drinking water standards into groundwater aquifers.

Our Pilot Program facility, located in Crofton, Maryland offers tours to those who would like to learn about this innovative process.

If you would like to request a tour of the Pilot Program facility, please reach out to Tynisha Hearn at pwhear23@aacounty.org

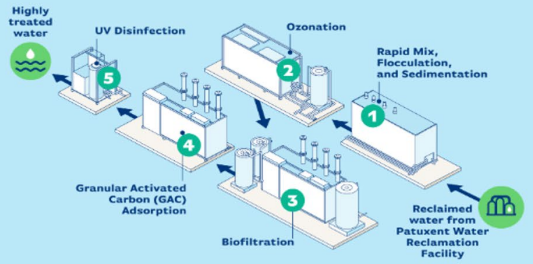
Tour Request Form

Pilot Facility Map and Guidelines

What is the Advanced Water Treatment Pilot System?

Anne Arundel County is exploring Managed Aquifer Recharge as an innovative way to maintain groundwater supplies while protecting against the impact of continued withdrawals. The County is studying an approach that involves injecting recycled water that has been treated to drinking water standards into groundwater aquifers.

How does it work?



Our wAAter.

THE ANNE ARUNDEL CLEAN WATER PROGRAM

Thank you!