



Salinization Impacts & Management Strategies in Northern Virginia

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Northern Virginia Regional Commission

5.27.26



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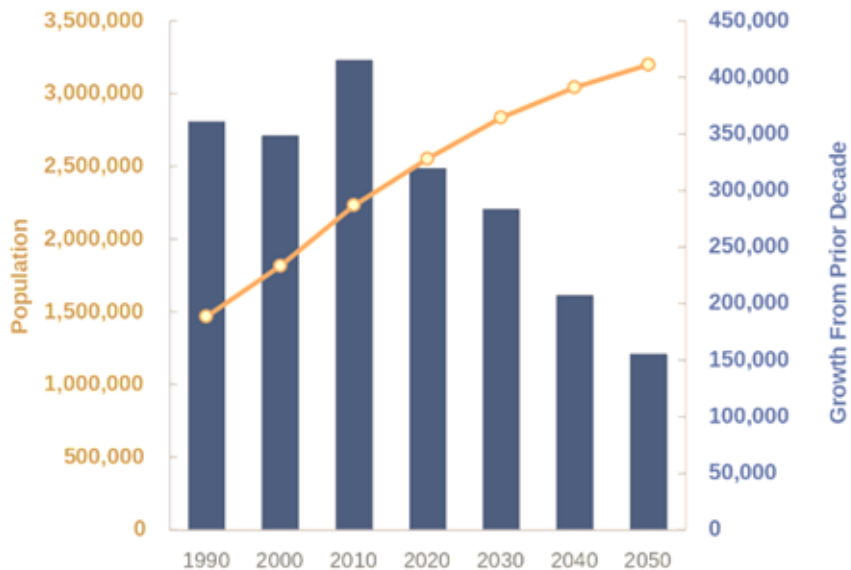


Introduction to NVRC & NOVA Region

The Northern Virginia Regional Commission (NVRC) is a regional council of 13 local governments in the Northern Virginia suburbs of Washington D.C., representing one of 21 planning districts that serve the Commonwealth of Virginia.

- NVRC is a political subdivision (a government agency) within the Commonwealth

Rapidly urbanizing region, home to over 2.6 million residents:

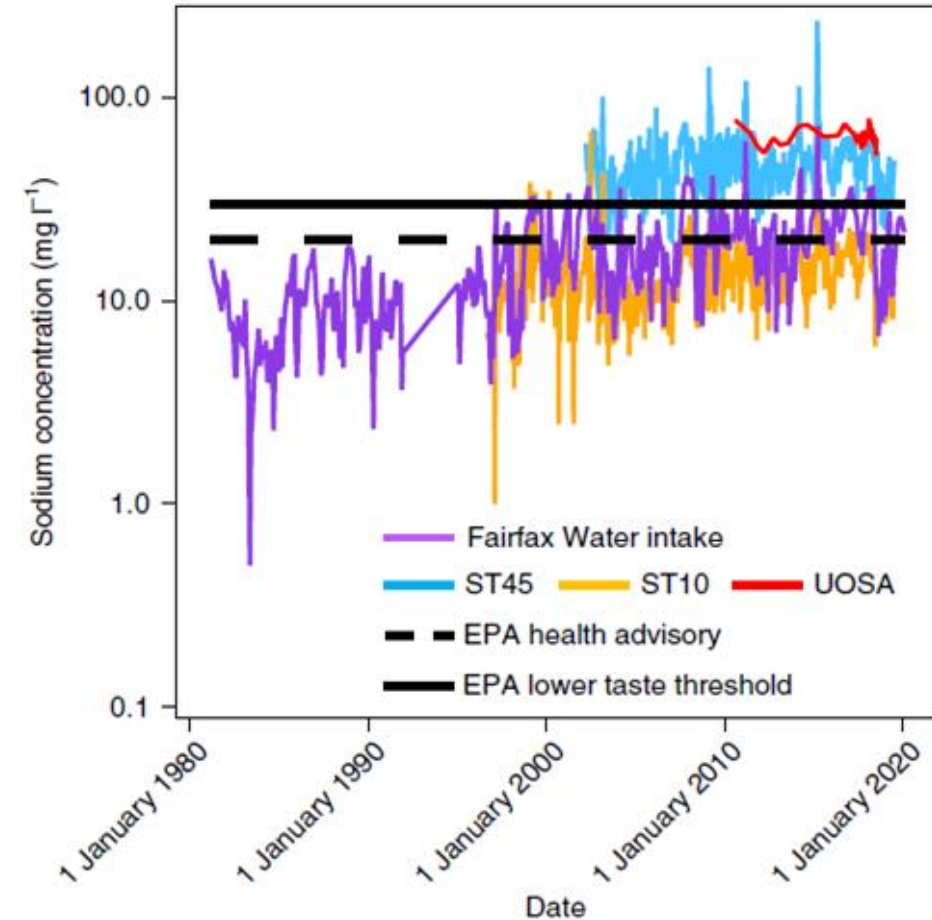
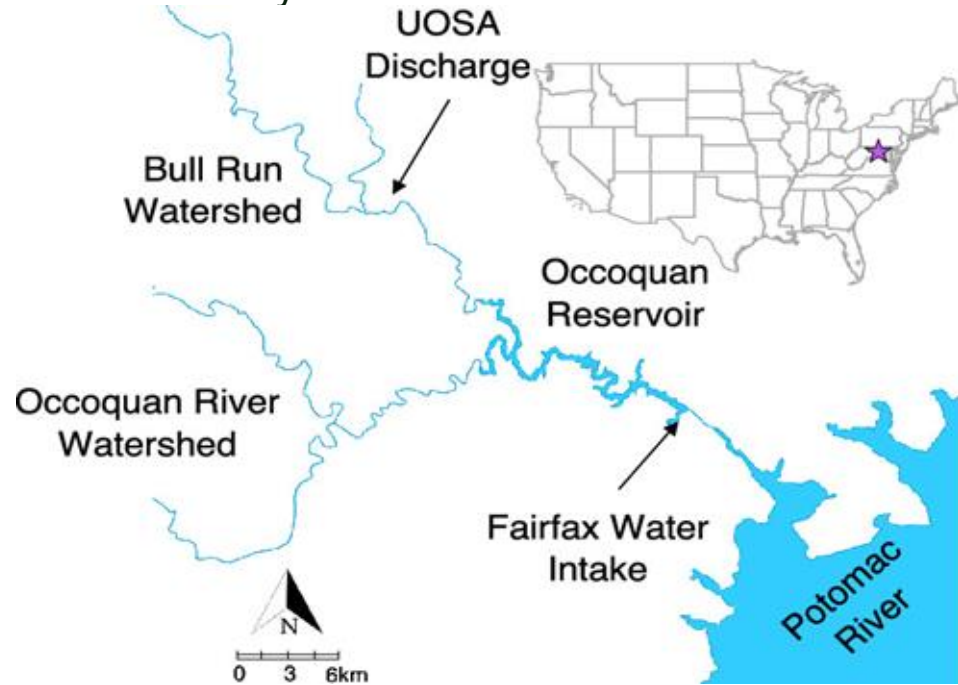


Sources: U.S. Census Bureau, 1980-2020 Decennial Census; MWCOG, Round 10.0 Forecasts (2020-2050 population growth), approved June 14, 2023.



The Occoquan River Watershed

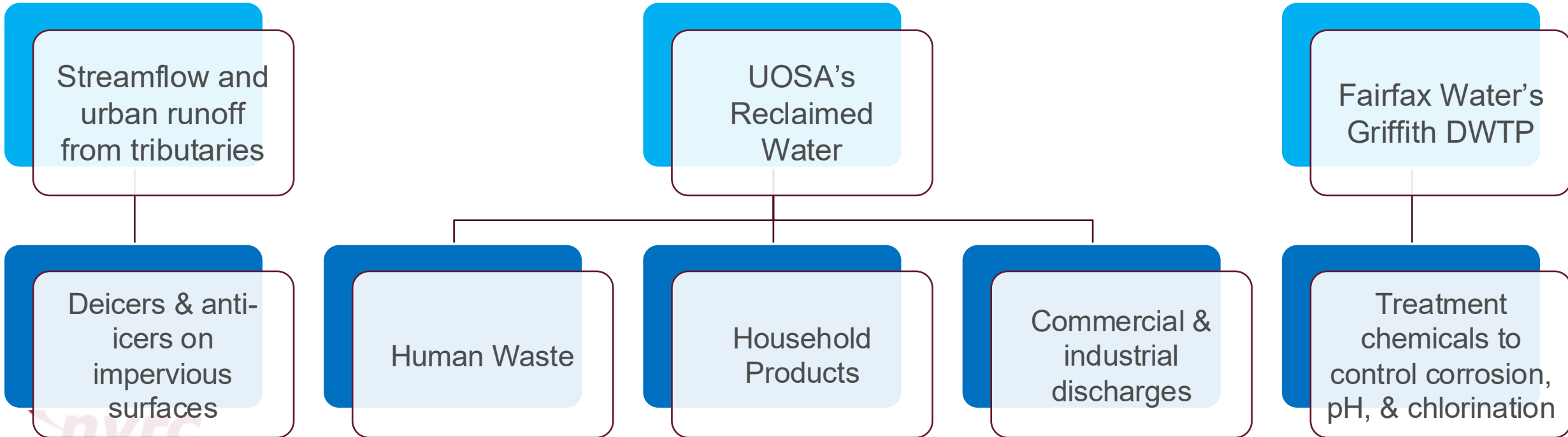
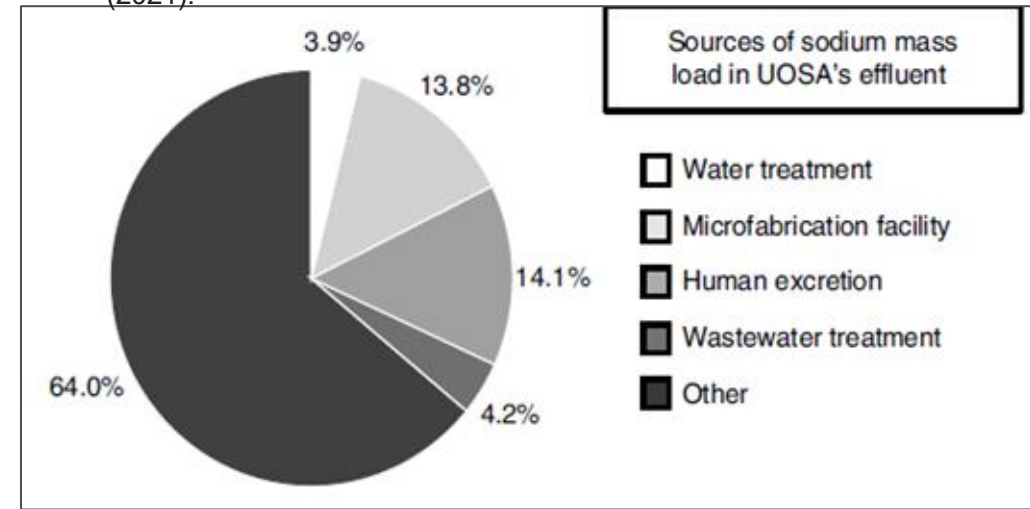
- Serves up to 1 million drinking water customers in Northern Virginia
- Water intake from Occoquan and Bull Run watersheds and Upper Occoquan Service Authority (UOSA)
 - Nation's first large-scale deliberate indirect potable reuse system for surface water



- Challenged by pollutants that haven't been historically regulated (i.e., salt, PFAS, etc.)
- Sodium ion concentrations near Fairfax Water's intake have almost tripled since the 1980's

Key Salinization Drivers

* High degree of seasonal variability in primary sodium contributors: watershed runoff (i.e., deicer use) during wet weather and reclaimed water during dry weather



Salinization Impacts on Drinking Water

Human Health

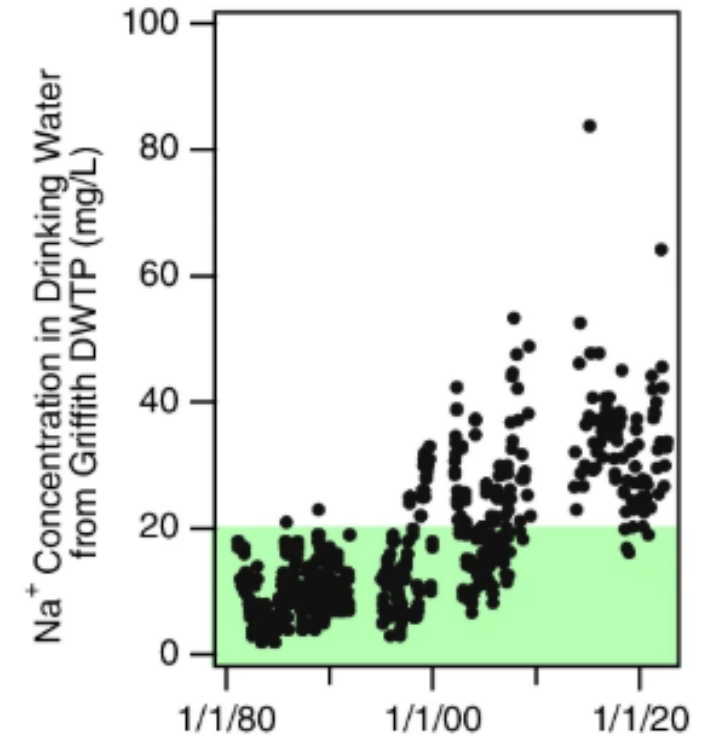
- Now frequently exceeds EPA advisory levels for individuals on low sodium diets (20 mg/L) and lower taste thresholds (30 mg/L)
- Alters taste, broader quality of drinking water for customers

Infrastructure

- Accelerates the leaching of heavy metals, such as lead, from water plumbing and pipes
- Corrosion of concrete

Environmental

- Displace contaminants previously sequestered in sediments
- Mobilizes heavy metals and nutrients into the reservoir's ecosystem and drinking water supplies



40-years of Na⁺ concentrations in finished drinking water produced by the Griffith DWTP

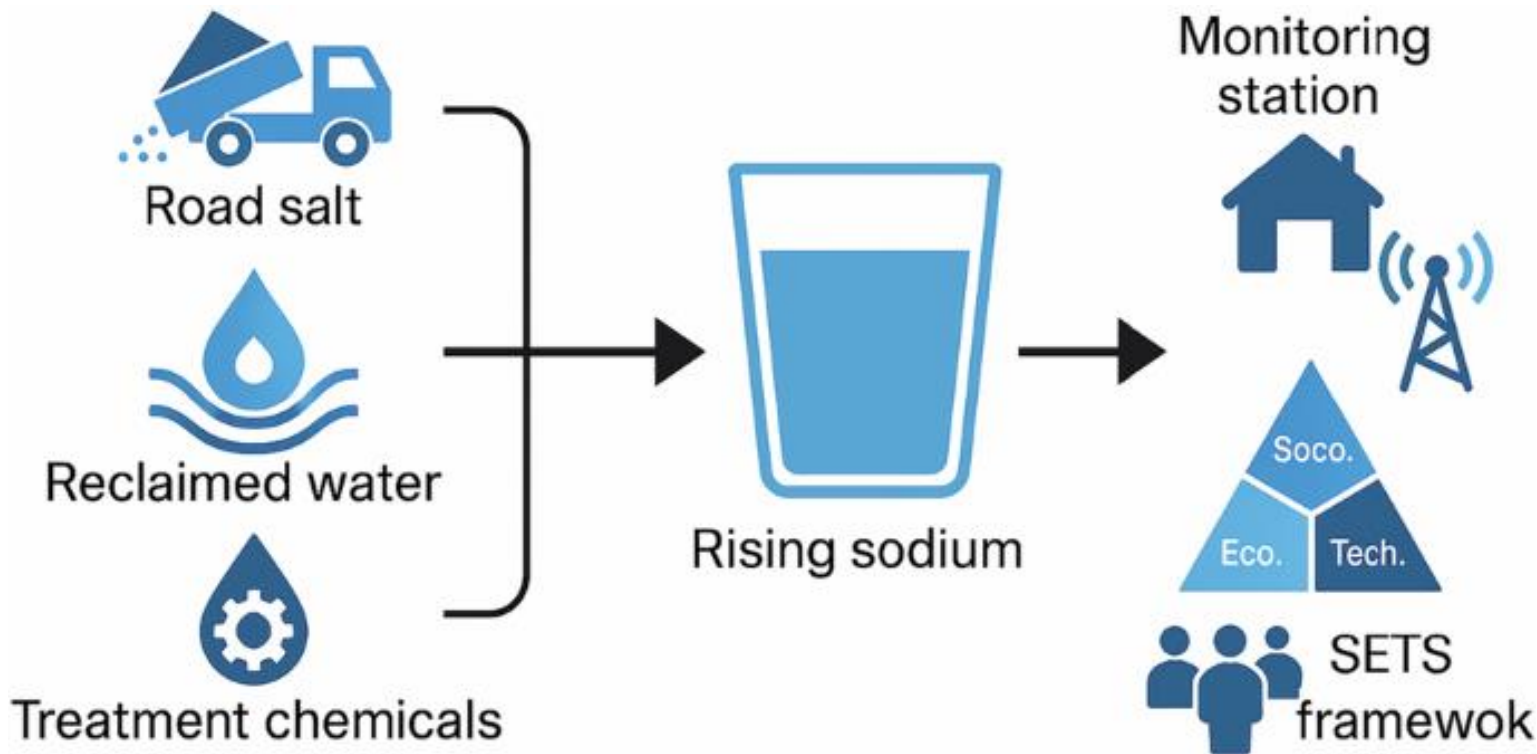
Green indicates concentrations below the EPA recommendation for a sodium restricted diet.

Salinization Impacts on Drinking Water: What about reverse osmosis?

- **Over \$1 billion** in base costs to construct (~\$1,000 per customer)
 - Not including maintenance and operations
- Lost production capacity
- Increases energy consumption and greenhouse gas emissions
- Creates brine waste streams that are difficult to dispose of and pose additional costs
 - Economic impacts of discharge restrictions (VPDES permit)

Strategies to Reduce Salinization in the Occoquan

*Because reverse osmosis is not a practical option, need to look to preventative actions by identifying and mitigating salt sources



Goal of source mitigation through:

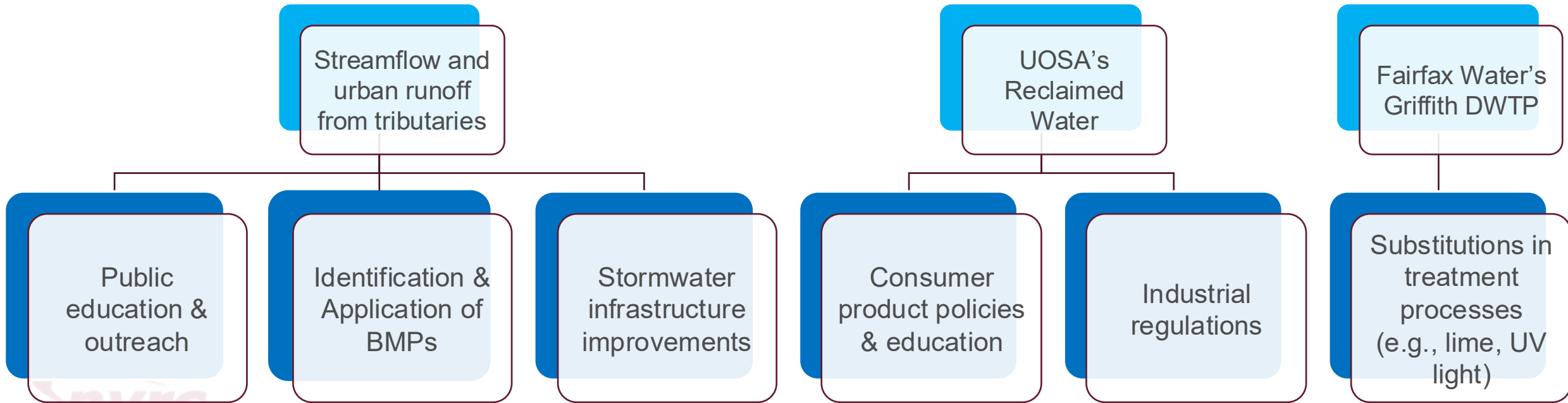
- Ongoing monitoring
- Collaborative decision-making to address different social-ecological-technological (SETS) components of the issue

Integrated monitoring and governance to manage rising sodium in One Water systems

Strategies to Reduce Salinization in the Occoquan

Building on social capital and regional coordination to improve watershed planning & management:

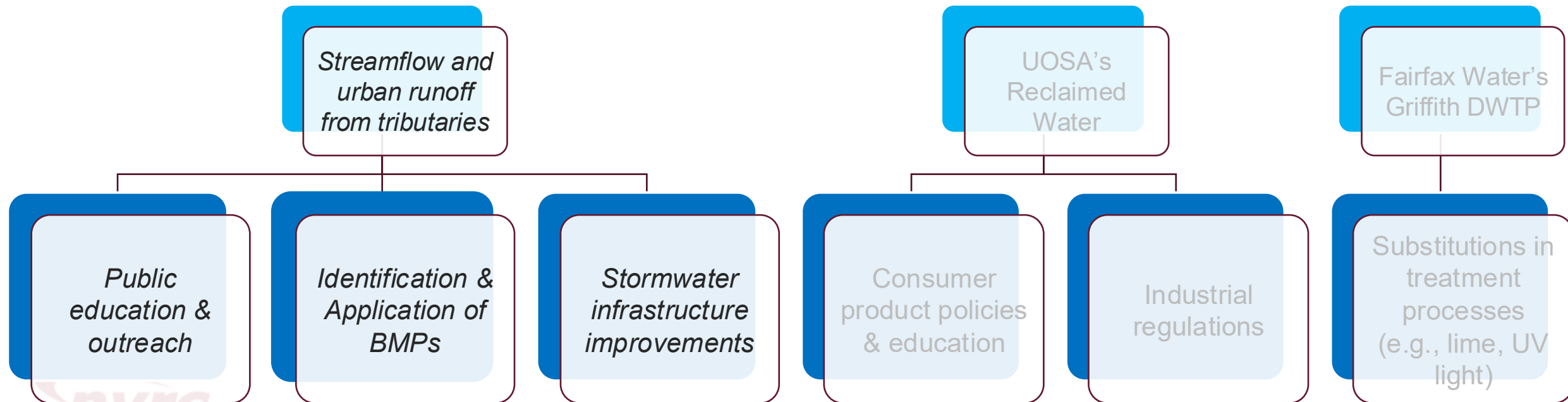
Specific Efforts & Considerations



Strategies to Reduce Salinization in the Occoquan

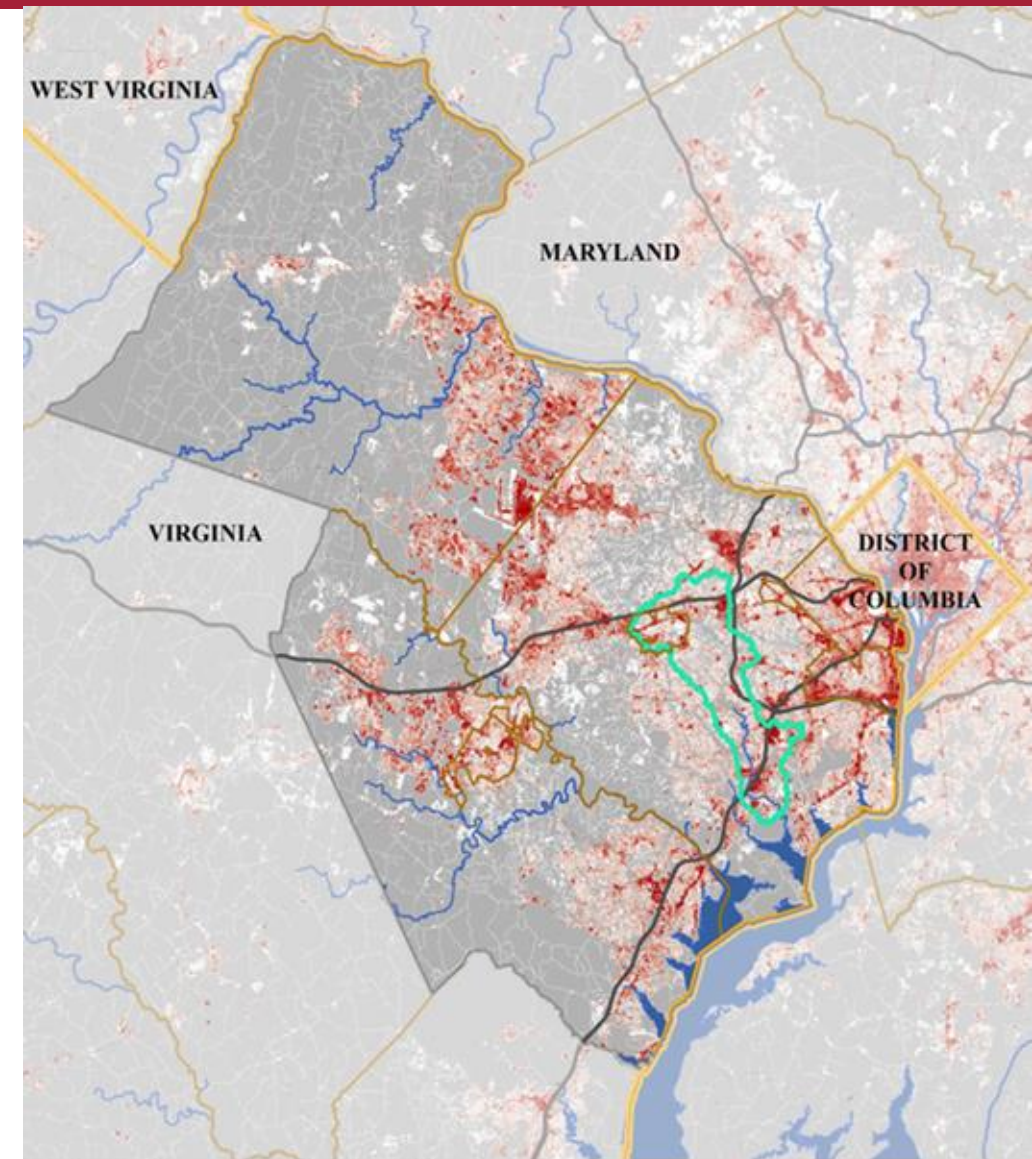
Building on social capital and regional coordination to improve watershed planning & management-

Specific Efforts & Considerations:



Regional Efforts: Virginia Salt Management Strategy (SaMS)

- Monitoring conducted in the Accotink Creek watershed indicated that chlorides, hydromodification, habitat modification, and sediment were the most probable stressors of the biological communities across the watershed.
 - Exceeded aquatic life chronic and acute water quality standards for chloride
- TMDL finalized in 2017 to address sediment and chloride causing benthic impairments
 - Approved by EPA in May 2018
- **First chloride TMDL in VA that addresses this type of pollution**



SaMS Development

- With completion of TMDL, local, state, and regional stakeholders determined that a regional strategy focused on implementing a broad range of best management practices (BMPs) would be the most effective strategy for addressing the TMDL
- **Non-regulatory, voluntary and largely proactive approach**
- **Three primary goals of the strategy:**

Use a stakeholder-driven process to address salt loads

Increase public awareness and promote positive winter salt behaviors

Maintain balance between public safety and winter salt impacts reduction

SaMS Toolkit

- Developed SaMS, including a published toolkit, for a broad range of audiences to address salt management practices
- Provides a combination of technical information on winter BMPs as well as recommendations relating to outreach and education, water quality monitoring, and several other topics



Planning BMPs	BMPs	Potential Cost ¹		Potential Cost Savings ^{1, 2}	Are there opportunities to partner between organizations?
		On Staff Time	Other Costs ³		
Winter Operations Planning	Develop a winter maintenance plan	High	n/a	High	No
	Preseason meetings	Medium	n/a	Medium	Yes ⁴
	Postseason meetings	Medium	n/a	Medium	Yes ⁴
	Accountability at every level	Low	n/a	High	No
	<i>Transportation Audience</i> - Plan snowplow routes	Medium	n/a	Medium	Yes
	<i>Property Management Audiences</i> - Visit the property before the season	Low	n/a	Medium	No
Levels of Service	<i>Transportation Audiences</i> - Communicate levels of service internally	Medium ⁵	n/a	Medium	No
	<i>Transportation Audiences</i> - Communicate levels of service externally	Medium	Medium	Medium	Yes ⁴
	<i>Property Management Audience</i> - Discuss and agree upon levels of service	Low	n/a	Medium	No

- Finalized in 2020, responsibility transferred from Virginia DEQ to NVRC for implementation

Full SaMS Report



Current SaMS Approach: 2020 - Onward



Enhance public education around winter salt practices

Provide training opportunities for winter salt operators to understand and implement BMPs

Improve regional communications and coordination around winter salt programming

Identify opportunities to better track local and regional salt impacts

Enhancing Public Education: Northern Virginia Clean Water Partners



- A partnership of 20+ local governments, drinking water and sanitation authorities, schools, and businesses in the region

Goals:

- Municipal Separate Storm Sewer System (MS4) Phase 1 and 2 Permit Compliance
- Keep Northern Virginia residents healthy and safe by reducing the amount of pollution from stormwater runoff that reaches local creeks and rivers.
- Empower individuals to take action to reduce pollution.

Outreach Mechanisms:

- Social Media (Twitter/X, FB, Instagram)
- E-Newsletters
- TV Advertisements
- Online Advertisements, e.g., Google Ads, Reddit Ads
- Local “reminders” (e.g., storm drain stenciling, markers)
- OnlyRain website
- Outreach at local events, sharing of materials and resources



Consejos para el despeje de la nieve y el hielo para los residentes Invierno 2023

¿Sabía esto?

El uso de las sales para carreteras puede hacer que caminemos y conducamos de manera más segura en invierno. Ayuda a mantener las carreteras abiertas y permite que las empresas, el gobierno y los servicios sociales permanezcan abiertos sin demasiadas interrupciones.

Sin embargo, sólo se necesita una cucharadita de sal para contaminar de forma permanente 5 galones de agua.

La sal que se filtra en el medioambiente puede provocar lo siguiente:

- Elevar los niveles de sodio en el agua potable y aumentar los costos de tratamiento.
- Hacer daño a los peces, las plantas y otros animales salvajes.
- Corroer vehículos, carreteras, puentes y estacionamientos.

Dado que no hay una manera fácil o económica de eliminar la sal de nuestro medioambiente, todos podemos colaborar para formar parte de WintersSaltSmart si seguimos los siguientes consejos para limpiar la nieve y el hielo.

¿Cómo se debe preparar para una tormenta?

Tenga preparada su pala o quitanieves

- Es posible que las palas sean todo lo que necesita para pasar el invierno en Northern Virginia. Para que no se dañe la espalda, puede elegir palas con ruedas. Recuerde tomar descansos y evitar sobrecargar la pala con nieve húmeda.
- En caso de grandes tormentas o nieve pesada, los quitanieves también pueden ser útiles.
- Siempre asegúrese de tener preparada un kit de prevención para casos de emergencia o tormentas.
- Tenga preparados sus sales y materiales de tracción, y asegúrese de guardarlos para cuando llueva o nieve.

Asegúrese de abastecerse de suficiente comida, bebida y medicamentos (incluidas recetas) antes de la tormenta.

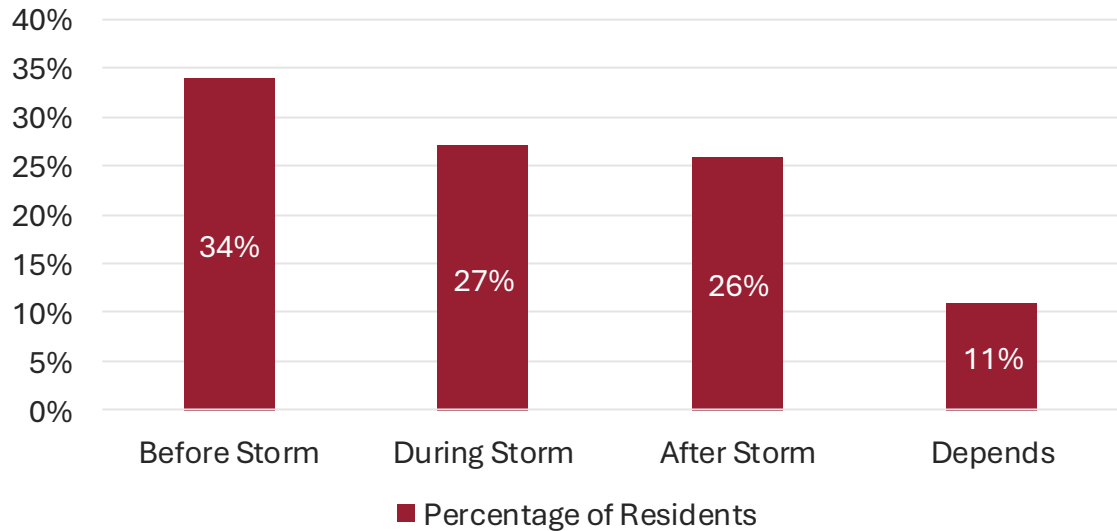
www.wintersaltsmart.com

Enhancing Public Education: Northern Virginia Clean Water Partners

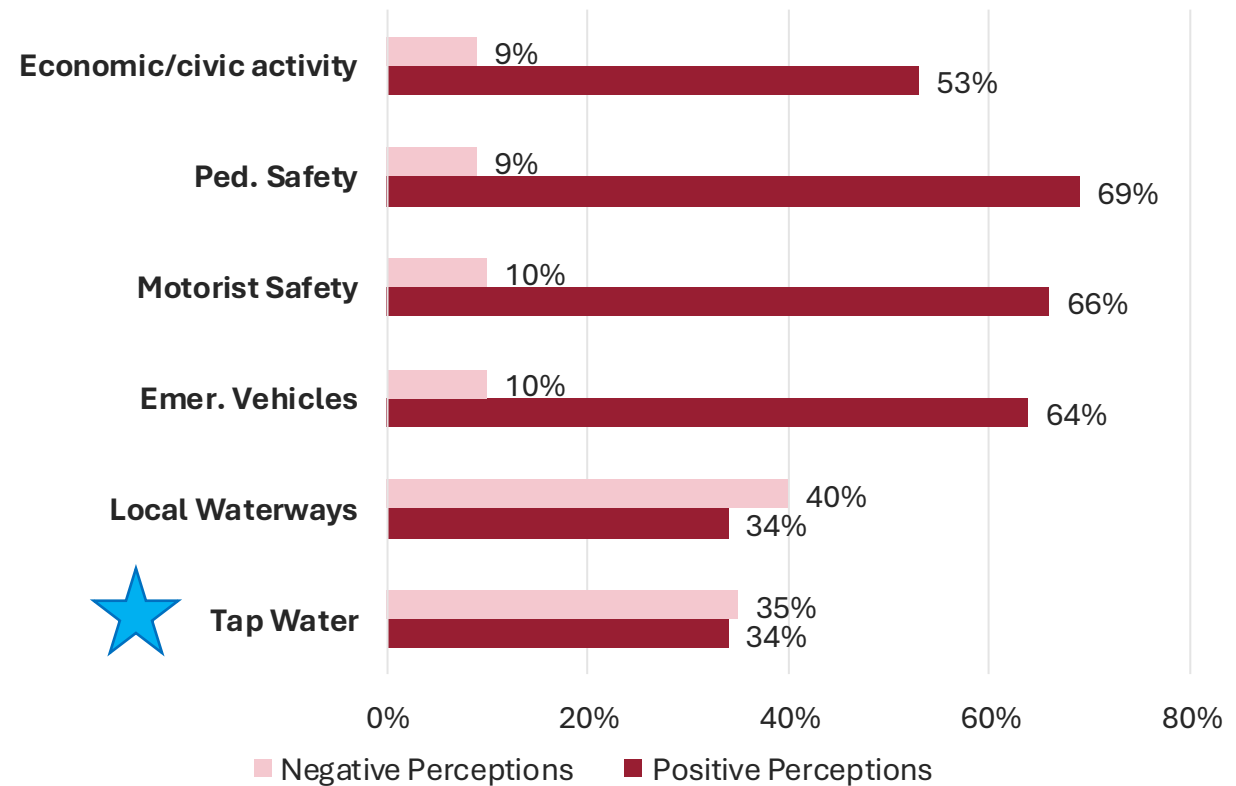


- Serves as a mechanism to measure long-term changes in Northern Virginia residents' knowledge and behaviors
 - Social Media Tracking
 - Annual Resident Survey

When Residents Apply Deicer For Storm Events (2025)



Perceptions of Impacts from Winter Salt (2025)



Promoting Smarter Winter Salt Operations: Salt Applicator Trainings & Educational Events

Received DEQ funding in 2022 to develop and host a training program on winter salt management for private contractors (E.g., those that contract with commercial property groups, HOA's, and other non-resident specific properties)

- Facilitated by AMT Engineering with goal to educate on best management practices based on SaMS toolkit
- Included daylong, in-person training event as well as a condensed training video for those that were unable to attend

Continuing to work with localities and other partners for new training events to encourage SaMS BMPs:

- Prince William County Smart Salting Training
- SaMS Toolkit training to other Virginia planning districts
- Winter Salt Week & WSSC Water Salt Summit Presentations
- And more!



SAVE THE DATES!

2026 DMV WINTER SALT WEBINARS

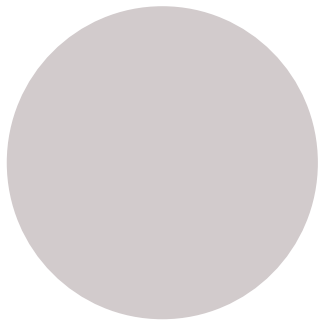
Join representatives from the D.C. Metro Region for two mini-webinar events to learn how you can take action around your community to stay safe and reduce salt impacts to the Potomac and other DC area water sources:

**SAFE SIDEWALKS, CLEAN WATER:
SMART SALTING FOR RESIDENTS**
January 21, 2026 | 1 – 1:30 pm

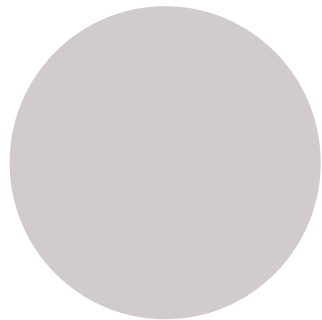
**COMMUNITY WINTER SALT MANAGEMENT
IN ACTION**
January 23, 2026 | 1 – 1:30 pm

**REGISTER AND LEARN MORE AT
LINKS IN BIO**

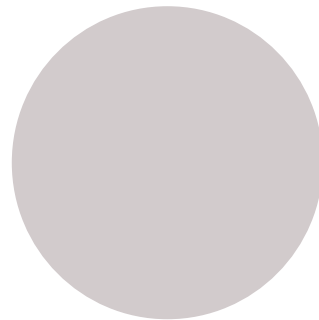
Broader Impacts of Regional Strategy



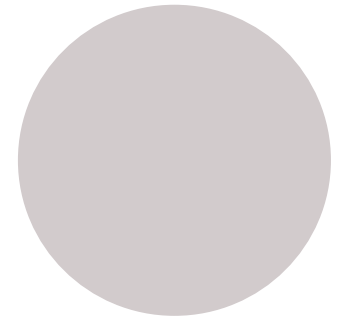
Reduces burden (i.e., staff time, funding, other capacity) from localities and other salt management stakeholders



More consistent messaging and outreach = stronger behavior enforcement



Opportunity to build and strengthen partnerships



Engage and educate a broader reach of winter salt applicators

Thank You!

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