WSSC Water's Salt Summit IV (January 23-24, 2024)

Salts in Drinking Water Health Considerations, Lisa Ragain, Metropolitan Washington Council of Governments (MWCOG)

- **Salts in Water:** Salts in drinking water have implications for health and water quality from source water to tap
- **Health Effects:** Salts in drinking water can have acute and chronic health effects, including high blood pressure, cardiovascular disease, and kidney disease
- **Drinking Water Guidance:** There is a secondary drinking water standard of 250 mg/L for chloride and sulfate ions for salty taste, and a sodium health advisory level of 20mg/L for people on salt restricted diets
- **Other Drinking Water Effects:** Dissolved ions contribute to disinfection byproduct precursors in drinking water and can contribute to distribution system corrosion
- **Salt Ions:** Salt ions and trace metals contribute to consumer perceptions of aesthetics and water quality
- **Solutions:** Alternate deicing agents have pros and cons, reducing salt loads in source waters is the best solution
- **Discussion:**
    - It was noted that public messaging around high sodium in drinking water is a challenge
    - It can be difficult to find and target vulnerable populations, it was suggested that dieticians could be a good target audience
    - Regional water supplies have spikes of salinity with an increasing trend over time that could contribute to health issues
    - It was noted that filters are incapable of removing salts, reverse osmosis systems are required to remove salt

Extreme Events Alter the Future of Freshwater Salinization Syndrome, Sujay Kaushal, University of Maryland

- **Salinization Syndrome:** Extreme events alter the future of freshwater salinization syndrome
- **Climate Change:** Climate change effects are complex and extreme events are increasing over time, general trend in increasing extreme events to warming atmosphere and higher atmospheric moisture levels
- **Conductance Increase:** Specific conductance increased throughout the monitoring network, with the largest increases in the most impervious watersheds
- **Salt Storage:** Salt applied to deice roadways and other impervious surfaces are retained in the environment and released year-round, which led to specific conductance increases during non-winter months
- **Salt Retention:** Research suggests that flushing effects of high flows from extreme rainfall is inefficient at removing accumulated salts from watersheds

- **Ongoing Efforts:** Ongoing efforts include salt monitoring in key watersheds (e.g. Watts Branch), USGS salt prediction tool, and developing spatially-referenced regional models
- **Discussion:**
    - Sujay noted that the salts from human activities are a different composition than those from natural sources, which enables differentiation from natural background conditions

- Izaak Walton League of America's (IWLA) *Salt Watch* Program, Abby Hileman**Salt Watch Goals:** Salt Watch aims to raise awareness about the connection between salt and stream health, identify chloride hot spots, and advocate for smarter application of road salt
- **Salt Watch Kit:** Salt Watch Kit includes 4 Hach 30-600ppm chloride test strips, sample testing instructions, conversion chart, and data uploading instructions
- **National Results:** From 2018-2024 Salt Watch has collected over 16,000 data points, 29% of samples were "Excellent", 37% were "Good", 19% were "Poor", and 15% were "Toxic"
- **Regional Results:** From 2018-2024 Salt Watch has collected over 3,000 data points in the DC Metro region, 50% of samples were "Poor" (29%) or "Toxic" (21%)
- **Clean Water Hub:** Clean Water Hub is a publicly accessible national water quality database with color-coded, interactive maps
- **Data Use:** Data is shared with US EPA annually and available to government agencies and water quality organizations to identify areas in need of further study and track progress of restoration
- **Salt Advocacy:** IWLA provides advocacy resources of best practices for local communities and for communicating to elected officials, as well as participates in direct outreach in local communities
- **Discussion:**
    - Abby noted the Salt Watch program monitors specifically for chlorides

Salt Outreach Workgroup Updates, Renee Bourassa, Interstate Commission on the Potomac River Basin (ICPRB)

- **Salt Outreach:** Salt Outreach Workgroup members come from NGOs, government agencies, and regional organizations, coordinating messaging across the region since 2021
- **Workgroup Activities:** Collaborate to improve digital media messaging, share events, conduct surveys, and developed a radio public service announcement
- **Regional Campaigns:** Multiple regional campaigns have been launched to promote smart salting practices, including Montgomery County's 1-2-3 Be Salt-Wise campaign and WSSC Water's Be Salt Wise In Winter Media Event
- **Public Education:** Efforts have been made to educate the public on smart salting practices through giveaways, social media posts, tabling events, and partnerships with local organizations
- **Training Programs:** Training programs have been developed for road salt applicators and seasonal workers, including MDE's Smart Salting: Enhanced Winter Maintenance Training Series
- **Regional Collaboration:** Presentation provided updates on outreach activities from WSSC Water, ICPRB, IWLA Salt Watch, Northern VA Regional Commission, Montgomery Co, Gaithersburg, MWCOG, Howard Co, City of Frederick, and MDE

- **Discussion:**
    - A link to the radio spot was provided: WAMU winter salts radio spot.wav
    - A link to the Howard County Salt Reduction page was provided, the bottom of the page has the Salt Savvy Feature Article under More Helpful Tips and Info: https://www.cleanwaterhoward.com/what-your-role/community-stewardship/winter-salt-reduction

Developing Priority Areas for Sources of Drinking Water, Steve Nelson, WSSC Water

- **Priority Areas:** Proposing designating the Patuxent Reservoirs Watershed as a high priority, special salt management area
- **Water Supply:** Two reservoirs make up this supply along the Patuxent River, supplying water for ~30% of WSSC Water's 1.9 million customers
- **Sources of Salt:** Approximately 84% of road miles are managed by County agencies, the remainder by MDOT
- **Salt Management:** Salt Management Plans (SMPs) are required by municipal NPDES Stormwater Permits, and are due by the 3rd year of the current permit
- **Goal:** Focus required salt management efforts in an area of high regional importance
- **Next Steps:** Patuxent Reservoir's Watershed Protection Group's Technical Advisory Committee's (TAC) Winter Salt Working Group to finish justification/proposal for TAC review and approval
- **Discussion:**
    - Amy Stevens (Montgomery Co) noted there are a lot of logistical concerns from an operations standpoint. Montgomery Co's SMP is due in Dec 2024. They are looking at Watts Branch. The plan will be adaptive and improved over time.
    - Kris Jagarapu (Howard Co) noted the county is expanding direct liquid application of salt brine, which includes one area in the watershed (Harding Rd vicinity). Adequate liquid supply is a challenge. Recent back-to-back storm events have been a good stress test for the county.

Salinization of stream water in exurban and suburban watersheds of southeastern Pennsylvania, 1999-2019, Marissa Rossi, USGS

- **Road Salt:** Road salt application has increased twentyfold since the 1940s in the United States
- **Impacts:** Winter chloride (Cl-) concentrations can exceed the USEPA chronic exposure limit for ambient water quality, and result in Na+ concentrations exceeding the health advisory in drinking water
- **Study Objective:** Evaluate Cl- concentrations in six exurban/suburban watersheds in southeastern Pennsylvania to identify the effects of changing land cover over time on long-term ion concentrations
- **Data Sources:** Impervious surface cover from the National Land Cover Database, water chemistry from monthly measurements between 1999 and 2019, and USGS stream discharge
- **Modeling:** Developed flow-normalized ion concentrations using WRTDS (Hirsch & De Cicco, 2015) and the EGRET package
- **Impervious Surface Cover:** Change in impervious surface cover was a strong predictor of increased chlorides; watersheds with the greatest changes in low-intensity development had the greatest changes in flow-normalized Cl- concentrations

- **Freshwater Organisms:** Based on current trends, five of the six watersheds will exceed the USEPA chronic threshold value for Cl- by the end of the century
- **Discussion:**
    - It was asked how AQUA Pennsylvania responded to the study results. The utility is using the study to adjust treatment processes, in particular looking at reducing corrosivity due to the increasing Chloride/Sulfate Mass Ratio.
    - Has anyone studied how sodium and chloride levels affect water treatment process costs? Corrosion of infrastructure is the primary cost to utilities. For drinking water quality, most utilities can't remove salt without reverse osmosis.
    - The link to Marissa's research publication was provided: Impacts of Road Deicing Application on Sodium and Chloride Concentrations in Philadelphia Region Drinking Water - Cruz - 2022 - GeoHealth - Wiley Online Library

Are Over-Salted Parking Lots a Problem? Estimating Chloride Loads from Roads and Parking Areas in the Potomac River Basin, Margaret Kearns, Corona Environmental

- **Salt Application:** The study aims to understand local, county and state road and parking lot anti- and de-icing practices and estimate salt loadings, inventory salt sources, differentiate roads vs parking lots and map to MS4 systems
- **Study Area:** The study area is the zone of concern for 8 utilities using the Potomac River as a source, plus the Occoquan Reservoir zone
- **Salt Practices:** Salt and brine practices vary widely and a standardized data collection/reporting format is needed
- **Analytical Approach:** Utilized GIS to quantify application areas for roads and parking lots combined with estimates of application rates from state and local government sources
- **Key Findings:** VA has more salted areas in the zone of concern than MD, parking lots contribute higher loads than roads, brine reduces salt loads, and standardized reporting is needed to improve data
- **Data Gaps:** Data gaps include actual application rates for VA roadways and parking lots, and impervious surface data for MD
- **Future Directions:** Future directions include filling data gaps, building a tool to predict chloride loading, and evaluating weather event types most likely to contribute higher sodium loads
- **Discussion:**
    - It was asked whether sidewalks and trails were included in the impervious surface values. Sidewalks would have been included with parking lots, but not trails. Trails are less likely to be salted.
    - The challenge of determining application rates for private contractors was indicated as a challenge.
    - It was asked if there are communal areas to get brine for a private commercial snow plower? MD SHA has big brine tanks, but what about those small entities? There are not communal brine access for the private contractors in MD that we are aware of. It was suggested as a great pilot project idea to try it out along with training and necessary equipment upgrades.

- Margaret made the report available, and it is included with the presentations.

Maryland's SMART Salt Program, Greg Sandi, Maryland Department of the Environment

- **SMART Salt Program:** Maryland's SMART Salt Program is an enhanced winter maintenance program that aims to use the least amount of winter deicer while maintaining public safety
- **Intended Audience:** The primary audience for the SMART Salt Program are crew bosses and decision-makers at companies that provide winter maintenance operations, and large private and public property owners
- **Training Modules:** The training for the SMART Salt Program includes 6 online modules and 1-2 in-person discussion/demonstration classes, covering topics such as reducing salt use, SMART salting techniques, pre-season preparations, site planning, storm operations, and post-storm actions
- **Tools:** Site planning can be conducted using Google Earth mapping of a property
- **Timeline:** The SMART Salting course was developed and beta tested in 2023-2024, with plans to roll out the training to all and continually tailor the content to meet the needs of the target audiences
- **Discussion:**
  - MDE's approach is a "Train the trainer" type of course, focused on private contractors
  - MDE is not considering mandating the applicator certification. It is completely voluntary
  - MS4's are required to provide a "Salt Academy." Does this meet that requirement? Yes, but it is focused on the private parking lots and sidewalks, so look into the snow college for a free program that is more applicable to jurisdictions
  - Are you looking at any additional incentives for applicators to take the training program? Currently exploring better outreach to get the word out to the target audience (property managers, homeowners associations, etc.)

Montgomery County Department of Environmental Protection Conductivity Monitoring, Ken Mack, Montgomery County

- **Conductivity Monitoring:** Montgomery County Department of Environmental Protection monitors conductivity to quantify impacts of development on surface and ground water
- **Special Protection Areas:** Five areas designated by County Council requiring protections beyond standard environmental laws, regulations, and guidelines for land development and certain uses
- **Ten Mile Creek:** five test sites with one reference site in the Patuxent watershed monitoring the shift from ag/forest to residential/commercial land uses
- **Clarksburg Premium Outlets (CPO):** Large retail development with high imperviousness, BMPs didn't attenuate chloride, sodium, or conductivity, chlorides increased in both ground and surface water
- **Patuxent Reservoirs:** Pilot study assessing two major water sources for Triadelphia and Rocky Gorge Reservoirs
- **Watt's Branch:** Partnership between University of Maryland, WSSC Water, and MCDEP to measure the contribution of Watt's Branch ions to the Potomac Water Filtration Plant

- **Findings to Date:** Small streams have higher conductivity and are more prone to sudden swings in concentrations, low salt years have a direct (positive) effect on water quality, spikes can occur in spring/summer, and stormwater BMPs may contribute to groundwater chlorides through infiltration
- **Discussion:**
    - MCDEP's monitoring at CPO is complete, though they are communicating with CPO about improvements. There is a biological monitoring station downstream.
    - It was asked if salts cause any impacts to ESD facilities from the salt? Yes from literature review, but for CPO, they regularly change out the plants so probably not an issue there.

Gaining Traction on Road Salt Reduction, Massachusetts Dept of Conservation and Recreation (DCR), Jamie Carr

- **Watershed System:** The watershed system provides clean drinking water for more than 3.1 million Massachusetts residents in 53 communities
- **Salt Trends:** DCR have seen increasing trends in salt across numerous monitoring locations, even those that are relatively pristine; summer spikes were also observed
- **Salt Reduction Efforts:** DCR is expanding efforts to reduce road salt through improving data collection, modeling impact of reducing inputs, training, public outreach, and providing a salt reduction grant program
- **Salt Reduction Success:** The town of Sterling achieved a 52% reduction in salt applications in the winter of 2022-23 as compared to the previous winter; across the watershed reductions in salt use have been observed over the last three winters
- **Salt Reduction Grant Program:** DCR launched a salt reduction grant program in FY21, providing a 50/50 matching grant of up to $20,000 per town per year to facilitate adoption of salt reduction technologies in Wachusett Reservoir watershed towns
- **Discussion:**
    - It was noted the University of Mass research was important initially to document the scale of the problem
    - The program has used pre-storm social media posts to alert people of salt concerns, and have also gotten some earned media coverage from local news outlets
    - DCR's land acquisition prioritization model is used to select parcels, with the salt concerns there is a higher emphasis in primary protection zones by buying properties that may be developed
    - There was some initial resistance change in the towns but they were able to win people over, tone has shifted to acceptance over the years
    - The DCR grant is from the DCR operation budget and helps encourage local communities to invest in better equipment
    - Five towns so far have made use of the grants
    - In the Potomac region, Fairfax Water has a grant program that is mostly geared toward education and outreach, water quality monitoring or shoreline stabilization and source water protection projects. It could be expanded for similar salt management incentives, but would require Board approval

Links Referenced in the Salt Summit

- MDE Winter Salts https://mde.maryland.gov/programs/water/319NonPointSource/Pages/411-on-Salt.aspx
- Wisconsin Salt Wise https://www.wisaltwise.com/
- Mass DCR Water Supply Protection Spotlight: Salt Smarter, Not Harder! https://www.mass.gov/water-supply-protection-spotlight-salt-reduction
- Mass DCR Make your own salt brine video https://www.youtube.com/watch?v=FH3vrSwRRLM&t=6s
- Mass DCR Make your own salt brine instructions https://www.mass.gov/doc/dwsp-how-to-make-your-own-salt-brine/download
- Marissa Rossi's research publication: Impacts of Road Deicing Application on Sodium and Chloride Concentrations in Philadelphia Region Drinking Water - Cruz - 2022 - GeoHealth - Wiley Online Library
- WAMU winter salts radio spot.wav
- Howard County Salt Reduction website https://www.cleanwaterhoward.com/what-your-role/community-stewardship/winter-salt-reduction