Congratulations to the 2021 Salt Symposium Leadership Award Winners

Brown County Public Works Department, WI

Michael Piacenti, in Brown County, Wisconsin, started with education on how salt works and the effects of over salting on the environment. Knowing the harm that salt causes the environment is what motivated Michael to reduce salt usage and start using brine. He did a salt, brine, and salt/brine experiment showing his staff the effectiveness of brine. When he started working in Brown County five years ago, many drivers set their spreaders to 400 pounds/mile and drove. Now, Michael tells drivers what the weather is going to be and the recommended salt distribution (while still giving the driver the ability to adjust their salt usage as necessary). Michael lowered the overall salt usage at night while utilizing the daytime sun to clear the roads. Also, he only had two trucks capable of putting down large amounts of brine. He turned two water trucks into brine trucks and put one of them on a county section that only gets brine (no rock salt) and he put the other on the loop (41,43,172) to run with the regular plows to dispense only brine. Next winter will be Brown County's first winter of being able to add three new mostly brine trucks to section with the idea of seeing significant salt reduction. Congratulations to Michael Piacenti and the Brown County Wisconsin, Public Works Department!

Izaak Walton League of America – Salt Watch Program

In 2018, a Clean Water Fellow at the Izaak Walton League of America noticed a huge pile of salt left by a salt truck sitting directly next to a storm drain. That salt was headed right for the Muddy Branch, a small stream that travels through Maryland and feeds into the Potomac. He cleaned up the salt and contacted the local government to try and address the problem. He quickly discovered that the world of road salt is a complicated one, and that its effects on waterways are not well known or well-studied. Inspired by the success of the League's Save Our Streams community science program, IWLA staff, including Emily Bialowas, launched Winter Salt Watch to mobilize citizens across the country and monitor chloride levels in local creeks and streams over the winter months.

Salt Watch kits come in a standard envelope with 4 Hach chloride test strips, and instructions on how to take a sample correctly and upload the data. Armed with their kits and the Water Reporter app, volunteers head into the field to collect and submit chloride readings four times over the winter months. Since 2018, over 3000 volunteers have requested Salt Watch kits and submitted over 3500 chloride readings from 24 states. By crowdsourcing this data, the Salt Watch program can gather hundreds of data points in a short amount of time. This data provides real-time information on chloride levels across the country. Salt Watch provides advocacy resources so volunteers can share information on chloride pollution and use their data with their local watershed groups, neighbors, and local government. By raising awareness and using real data, Winter Salt Watch and their volunteers can create meaningful behavior change.

Salt Watch has been a success for a few reasons. The program highlights chloride as a significant water pollution issue at a national scale. Salt watch is an easy activity that families can do together that connects to a simple clean water narrative—if they see salt on the ground, it can impact the health of their waterway. There is a low barrier to entry; new and experienced water quality monitors can easily get started at no cost to them and with no training. Kits can easily be included into existing water quality monitoring programs or educational initiatives, and the key to the growth of Salt Watch has been partnerships with community organizations, schools, and state agencies, like the Minnesota Pollution Control Agency. Congratulations to Izaak Walton League of America and their Salt Watch Program!

Minnesota Pollution Control Agency Smart Salting Training Program

In 2005, the Minnesota Pollution Control Agency (MPCA) awarded a grant to Fortin Consulting to create and pilot a training class for private contractor's providing snow and ice management services called '*Winter maintenance training for reduced impacts to waters*'. Since the initial Pollution Prevention grant in 2005, MPCA awarded additional grant funds to expand and grow the training program, creating the most successful training of its kind with many local partners support and commitment to the trainings. While the competitive grant approach allowed Fortin Consulting to create and pilot the trainings there was a need for establishing a sustainable statewide program.

In April of 2017 a team at the MPCA released the internal report called "The MPCA Integrated Chloride Implementation Strategy" with the goal of integrating and aligning the various water program priorities to effectively address chloride in a collaborative and strategic approach that builds on past and existing work and identifies areas for improvement to allow the Agency to successfully protect and improve our groundwater and surface waters. One of the priority recommendations in this strategy was that the Agency transition away from a pilot program funded from grants to a sustainable (staffed and financed) MPCA certified training program. To work towards achieving this goal and the other chloride recommendations in the MPCA Chloride Implementation Strategy, the Agency created a new Chloride Coordinator position to lead the effort.

The MPCA also created a first of its kind online Smart Salting Assessment tool that assists winter maintenance organizations, and soon all types of organizations, in evaluating their current practices and provides guidance for improving practices to reduce salt use while maintaining safe conditions. In addition to serving as a tool to create a customized local de-icing and dust suppressant salt reduction strategy, the reports generated can also be used to document and track the progress organizations have made to reduce salt. This innovative tool has received praise and interest from Environment Canada, EPA, and many other states.

In 2018 the MPCA began the process to request 2020 Clean Water Land & Legacy funds to support the development of a statewide MPCA led training program modeled after the highly successful pilot training and create the MPCA Chloride Reduction Program. The MPCA Smart Salting training program has certified over 4,000 individuals in MN since 2017, and many thousands more were trained prior to 2017. By request, Minnesota's training has been offered in other states and used as a model in states creating similar training programs.

Over the years, the MPCA has come to create an exceptional Smart Salting training program and create a new chloride reduction program that supports organizations of all types across the state in their efforts to reduce salt at the source and protect our water resources. Many MPCA staff, managers, and Agency leadership made this possible through their determination and creativity. A few notable individuals that had a particularly influential role at the MPCA include Brooke Asleson, Rick Patraw, Glenn Skuta, Tina Patton, and Dave Benke.

Organizations that have participated in the Smart Salting training program and implemented the recommended practices have achieved salt reductions of 30-70%. With hundreds of organizations trained and certified across the state the overall reductions in salt have no doubt had a significant impact on protecting Minnesota's valuable water resources. As the MPCA works to create and offer chloride reduction assistance to wastewater communities across the state there will no doubt be many more tons of chloride reduced. Congratulations to MPCA and it's chloride leadership team!

City of Pipestone, MN

The City of Pipestone faced a chloride limit at its wastewater treatment facility. The chlorides were not naturally present in the groundwater but were being added through the use of zeolite water softeners in homes and businesses throughout the city. With support from the City Council and City Administrator the City of Pipestone Water Department staff, including Joel Adelman, and Bolton & Menk, they designed and implemented a new centralized lime softening facility to provide hardness removal without the use of ion exchange softeners and salt regeneration. The new facility softens the water to 4-5 grains of hardness, compared to the previous hardness of 40 grains. The improved water quality has allowed users to either turn off or drastically reduce salt use in home water softeners. The improvements have reduced the chloride concentrations in the wastewater discharge to well below the NPDES permit limit. This improves stream water quality in Pipestone Creek, which is home to the endangered Topeka Shiner minnow.

The water plant was unique in using potable water treatment to meet a wastewater limit. The state agencies, Minnesota Department of Health and Minnesota Pollution Control Agency, worked together in an unusual arrangement that saw grants traditionally used at wastewater plants being used for this important project along with traditional water plant financing.

The city has ensured the project was successful via working on communications regarding the softer water and turning down water softeners. The city has direct communications with many of the larger industries to encourage adjusting softeners. Information was published along with a short video on the local cable channel for homeowners. Even though the city is meeting its limits, they are going one additional step further to provide home inspections by plumbers to ensure the softeners that are still running are properly adjusted and not using excess salt, costing the consumer money and harming the environment.

The project has been in operation for 2 years and has reduced chlorides by nearly 50% initially. That is equivalent of approximately 2,000 lbs of salt per day. Congratulations to the City of Pipestone and its consulting engineers!

Smith Lawn & Landscape

In 2009 Smith Lawn and Landscape began experimenting with liquid deicers and by 2011 they had almost completely abandoned the use of granular salt. Pre-treating with liquids was easy and it helped make their mechanical snow removal more effective, thus reducing salt use after plowing. Smith Lawn and Landscape saw an opportunity to take it a step further and use liquids for post treatment as a replacement alternative for granular salt.

Trial and error led them to recognize that there was no need to use granular products as the liquid post-treatments actually performed better than granular. Not only did this allow Smith Lawn and Landscape to save money and reduce chloride pollution, it also provided higher quality results for their customers. No salt left behind, less corrosion, no tracking into buildings, and no winter kill along the edges of parking lots and sidewalks.

All of Smith Lawn and Landscape's liquid de-icing spray units utilize automatic GPS rate control. This means the right amount of product is applied every time, regardless of operator driving speed or experience. Over application will never occur, compared with granular salting equipment that depends on operator experience and inputs.

They also converted their entire fleet of snow plows over to Live Edge technology in 2017. These plows contour to the pavement even over high and low spots. This has allowed the company to dial back liquid applications even further, widening the gap between a typical winter maintenance contractor spreading granular salt and their liquid-based operation.

Smith Lawn and Landscape achieved such exciting and consistent results with liquids and live edge plows that they even started a separate company that manufactures and distributes this equipment, as well as travels all over North America training other contractors to do these things.

Based on Smith Lawn and Landscape's commercial property portfolio size, they have saved an average of 1350 tons of salt per year compared to if they had spread granular salt. Take this over the course of 10 snow seasons and the total salt savings is 13,500 tons. As a visual representation, this equals 540 semi truck loads of salt. Congratulations to Smith Lawn and Landscape for leading the way!

City of Wyoming Public Works Department, MN

Chuck Almhjeld took the position of City of Wyoming Public Works Superintendent in June of 2019. Under his leadership, the city's public works employees were very motivated to have a brine, pre-wetting program because of the different classes they attended on smart salting techniques. At that time, none of the trucks were set-up with brining equipment. The public work employees took on the brining project and received quotes to implement it. The public works superintendent took the quotes to the City Council and used the salt budget to fund the project. As part of the project, the Fire Department had purchased a new tanker. The public works department took the old tanker and made a brining system for applying brine to the streets. The employees also found a used brine maker from a Municipality that had purchased a new one and rehabilitated it. Additionally, the employees started using Beet Heet for pre-wetting the salt as an additive to the brine. All of this was financed from the

department's regular salt budget, and they have been able to reduce their yearly budget for salt by $10,000 a year. In addition to saving money, they have also reduced salt use by 150 tons of salt so far.

The City of Wyoming's Public Works Superintendent would like to recognize the following public works employees: Eric Rydeen, Travis Parson, Pat Parenteau, Richard Giesthardt, Dave Torma, and Jason Lumsden. Congratulations to the City of Wyoming and their public works crew!

Xianming Shi - Washington State University

Dr. Xianming Shi is a Professor in Civil & Environmental Engineering at Washington State University and a Fellow of American Society of Civil Engineers. As an internationally recognized expert, he has conducted dozens of research projects related to various aspects of winter road maintenance best practices and published extensively on the environmental, corrosion, infrastructure, mobility, and economic implications of road salts. Motivated by the opportunity to reduce the footprints of winter road maintenance operations, he started research in this interdisciplinary field in 2003 and served as the Founding Program Manager of Winter Maintenance & Effects at the Western Transportation Institute until 2014. He was the lead editor of the book titled "Sustainable Winter Road Operations" published in 2018 by Wiley Blackwell, which was the first and only comprehensive guide to best practices in winter road maintenance operations.

Dr. Shi's research has contributed to the public and industry's knowledge about issues surrounding salt use, especially the risks to durability of civil infrastructure and to the integrity of metals and the toxicological effects. His research has also revealed the opportunities in reducing the use of road salts and in mitigating the negative impacts of road salts. For instance, he has recently patented a technology that derives "green chemicals" from agro wastes (e.g., grape and cherry pomaces), which can be used to formulate "greener" anti-icing products. These products can reduce the salt usage by approximately 30 percent, while providing performances comparable to salt brine. He has also developed an anti-icing overlay that effectively prevents "black ice" and reduces the reliance on mobile operations for snow and ice control on pavements.

Dr. Shi's outstanding work in this field has been recognized by the American Association of State Highway and Transportation Officials 2020 High Value Research award and the 2011-2012 Best Paper award by the American Society of Civil Engineers *Journal of Cold Regions Engineering*. Congratulations to Dr. Xianming Shi for his leadership in winter maintenance research!