

Implementation of Best Management Practices to Reduce Road Salt in Lake George



(Photo: Jay Petrequin)

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Prepared by the Warren County Planning Department on behalf of the Village of Lake George (Contract #C1000532)

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Project Background

The Village of Lake George was awarded funding through the New York State Department of State's – Local Waterfront Revitalization Program to implement a number of actions to improve the water quality of Lake George. The Village was assisted in the implementation of these projects by the Warren County Planning Department and numerous project partners.

A component of the funding award involved the implementation of best management practices to reduce road salt pollution in Lake George. The road salt reduction initiative, started in the mid-2010's, continues to be a collaborative effort between environmental organizations and municipalities around Lake George.

The funding used in this grant (Contract #C1000532) was focused on procuring specialized winter road maintenance equipment to reduce road salt pollution in the watershed. Aside from the effort in this grant award, the Lake George road salt reduction initiative includes education and outreach, training of winter road maintenance crews, and annual 'Salt Summit' conferences to advocate for more environmentally-friendly practices in the watershed.

Road Salt Pollution in the Adirondacks

Highlighting the importance of reducing road salt pollution is the passage of the [Randy Preston Road Salt Reduction Act](#). The law establishes the Adirondack Road Salt Reduction Task Force and the submission of recommended alternatives to road salt applications, by September 1, 2021.

Dan Kelting, Executive Director of the Adirondack Watershed Institute (AWI) at Paul Smith's College stated to the [Adirondack Daily Enterprise](#),

"We've been using salt on our roads [in the Adirondack Park] for about 50 years, and in that time ... by my math, about 7 million tons of salt have been put on our roads, and a lot of it has accumulated in our soils and groundwater. No matter what we do, it's going to take a considerable amount of time to reverse the contamination of folks' drinking water."

In 2017, Dan Kelting gave a [presentation](#) to the Adirondack Lakes Alliance on the issue. In that presentation, it was discussed that on the 10,555 lane-miles that the State of New York is responsible for 2,830 lane-miles, while local roads account for the remaining 7,725. However, the State of New

York uses an estimated 108,000 tons of salt versus 84,700 tons on local roadways. As a result of traditional practices, it's estimated that 192,700 tons of NaCl are deposited and contaminate the land and waterways surrounding state and local roads in the Adirondack Park, each year.

What is a "lane-mile"?

A lane-mile is mile of roadway in a single lane. For example, a two-lane road is considered to be 2 lane-miles.

Partnership

There is consensus among the communities of the Lake George watershed that pollution from road salt runoff is contributing to a decline in water quality. Work has been on-going to implement a significant change in winter road maintenance practices. Our municipal partners were assisted with the support of our local non-profit-organizations, the New York State Department of State, New York State Department of Environmental Conservation, and New York State Department of Transportation.

Through the New York State Department of Transportation and our regional partners Lake George, along with Mirror Lake (Essex County), took part in a NYS Road Salt Reduction Pilot Program on Route 9N in the Town of Bolton. Data collection is on-going. The goal of the program is to assist NYSDOT determine how to modify road salt applications and practices to reduce road salt pollution.

Implementation of Best Management Practices to Reduce Road Salt Pollution (State Contract #C1000532, Task 11)

In total, nine (9) local highway departments participated on this project, including:

- | | |
|---------------------------|------------------------|
| 1. Village of Lake George | 6. Town of Hague |
| 2. Warren County | 7. Town of Ticonderoga |
| 3. Town of Lake George | 8. Town of Dresden |
| 4. Town of Queensbury | 9. Town of Putnam |
| 5. Town of Bolton | |

Technical assistance was provided by:

1. Warren County Planning Department
2. Lake George Park Commission
3. Lake Champlain-Lake George Regional Planning Board
4. Lake George Association
5. Fund for Lake George

Best Management Practices

Throughout the mid-2010's Warren County DPW drafted Snow and Ice Operation Plans for each of the participating communities in the Lake George watershed.

As an example, appended to this report is the operational plan for the Town of Hague. The plan provides guidance to highway departments on:

- Level of service
- Snow and ice control/removal
- Guidelines for the use of salt and abrasives
- Guidelines for 'Pre-Wetting'
- Use of 'Live-Edge Plows'

As part of this funding award, communities purchased equipment that will enable the implementation pre-wetting of highways and the purchase of plow technologies, such as live-edge plows and Joma blades.

Pre-Wetting

Pre-wetting is the practice of applying a brine (salt water) mixture on roadways, before a known storm event and when the surface air temperature is less than 20°F. The brine dries (in place) on the road surface preventing the formation ice. This practice reduces the amount of coarse rock salt applied during storms, thereby reducing stormwater pollution of adjacent streams, waterbodies, and groundwater.



Advancements in Snow Plow Technology



Each of the participating municipalities in the Lake George watershed are using live-edge plow technology.

Unlike traditional single plow carbides, live-edge plows have multiple carbides that articulate independently of each other. The design allows plows to remove more snow on the first pass, as each carbide conforms to the roadway. Removing snow on the first pass results in less ice formation, thereby requiring road salt application.

Equipment

The participating communities purchased equipment to reduce road salt applications. Local match was provided by the value of the trucks these communities purchases for winter road maintenance.

The following is a description of the equipment purchased.

Mobile Brine-Making Machine

Warren County purchased a Henderson BrineXtreme Infinity mobile brine making machine.

During the 2019-2020 winter season the former supplier of brine went out of business, leaving many of the communities in Warren and Washington County without access to brine. Warren County DPW conducted an analysis and found that the cost



(Photo: Jay Petrequin)

to purchase brine would be \$0.50/gallon compared to \$0.06/gallon if it could be produced in-house. Superintendent of Public Works, Kevin Hajos, estimates that only 100-200 pounds of salt/lane mile are being used now, compared to 200-300 pounds before. One ton of salt can make 1,000 gallons of brine and the brine maker can produce up to 1,600 gallons of brine an hour.

Warren County owns and maintains the mobile brine-maker. Warren County has entered into agreement with Washington County and other communities in the Lake George watershed to share use of the machine. The arrangement allows individual highway departments to produce their own brine and keep in storage tanks.

Live-Edge Plows & Joma Blades

Metal Pless is the manufacturer of live-edge plows, TruckMaxx and TruckMaxx Pickup Retrofit Kits. These plows have individual articulating carbides that allow for better removal of snow.

Joma Blades are similar to live-edge plows, with individual articulating blades. However, these systems replace standard plow carbides, instead of the entire plow.

Water/Brine Storage Tanks

These tanks are filled with brine for deployment on roads before storms.

Truck Mounted Road Temperature Sensors

The Snow and Ice Operational Plans provide guidance for appropriate temperatures to apply brine. If the brine is not applied at the correct temperature it's application will be less effective. These road temperature sensors allow plow drivers to monitor road temperature, in real-time, which allows the driver to adjust application.

Concrete Block Stackable Barriers

The Town of Lake George and Town of Hague do not utilize the regional brine maker. Rather these towns produce their own brine mixture. These blocks were purchased to construct a "brine farm". The storage tanks are set at the top of these blocks and allow the highway department to mix brine and permit brine-spreading trucks to drive under and fill with the mixture.

Brine Spreaders

These tanks are plumbed to spread the brine mixture on highways and rest in the back of truck.

Vehicle Camera System

These camera systems are mounted to the trucks and assist drivers with calibrating road salt application. Additionally, the availability of video allows for review of storm events to improve future performance.

Cab Protector

These racks are installed along the back window of a plow truck to prevent the brine spreading tanks from damaging the window or injuring the truck driver.

Equipment Purchase by Municipality		
Municipality	#	Equipment Purchased
Warren County	1	Mobile brine-making machine
	1	Live-edge plow
	2	3,000-gallon water/brine storage tanks
	2	Road temperature sensors
Village of Lake George	1	Live-edge plow, pick-up truck kit
Town of Lake George	4	Road Temperature Sensors
	3	3,000-gallon water brine/storage tanks
	1	Poly-caster sander
	3	Poly spinners
	3	Plowguards
	3	Vehicle camera systems
	1	Plow Hitch
	1	Live-edge plow
	25	Concrete stackable block barriers
2	Cab protectors	
Town of Queensbury	1	Live-edge plow
Town of Bolton	2	Live-edge plow
Town of Hague	2	Road temperature sensors
	2	3,000-gallon water/brine storage tank
	1	Brine spreader (750-gallon)

Equipment Purchase by Municipality		
Municipality	#	Equipment Purchased
	13	Concrete stackable block barriers
Town of Ticonderoga	1	Live-edge plow
Town of Dresden	3	Road temperature sensors
	3	3,000-gallon water/brine storage tanks
	1	300-gallon truck mounted brine spreader
	3	Joma Blade System
Town of Putnam	3	Road temperature sensors

Conclusion

The Lake George Road Salt Reduction Initiative will continue to be a major priority of the Lake George Partnership. Kevin Hajos, Superintendent of Public Works for Warren County, has separately purchased a stationary brine maker and is in the process of implementing the practice of pre-wetting with brine on all County highways. In Washington County Deb Donohue, Superintendent of Public Works, is working towards the same goal.

Similar to many other environmental issues, these solutions bring along significant cost savings. Greater utilization of brine will result in less salt purchased. Additionally, through the use of technologies like live-edge plows – fewer passes are required to provide the adequate level of service, which results in less overtime for highway departments.

Lastly, the implementation of this program would not be possible without the involvement of all stakeholders around Lake George and the willingness of highway departments to try these new technologies. The Lake George Partnership encourages the New York State Department of Transportation and other highway departments to review their snow and ice operational plans to reduce harm to ecosystems and human health.