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## Road salt use deemed damaging to environment, drinking water

Officials say salt use high because community expects roads to be too clean

By Aaron Munzer •Correspondent

Every time a winter storm hits, area highway departments load up their plow trucks with tons of road salt to de-ice the roads and keep drivers safe. But the heavy use of salt on Tompkins County roads is affecting roadside ecology and is contaminating the drinking water supply, according to recent studies and data from the city's water department.

All told, at least 13,000 tons of road salt is spread on roads within Tompkins County each winter -- some 200 to 300 pounds per mile, every snowstorm, according to highway superintendents. The amount of salt spread has been steadily rising by about 10 percent for at least the past 10 years, according to a recent Cornell University study.

The problems start when the snow melts. The tons of road salt crystals dissolve into nearby drainage ditches, streams and ponds, eventually making their way into Six Mile Creek, and Cayuga Lake -- the sources of water for half the county.

"You've got to realize anything we put on the road gets into our drinking water," said Cornell University plant biology professor Peter Davies.

That's when it stops being helpful and turns into an environmental nightmare, Davies said. He's seen salt laid a half inch thick on Cornell's campus paths, and although he recognizes some salt as necessary for safe driving, calls road salt use by certain highway departments "horrendous" in the winter.

It's because road salt, or sodium chloride, inhibits water uptake and damages plants up to 650 feet from a road. That's why blue spruce and white pine trees on the road side often have brown, dead needles in spring -- about 50 percent of woody plants are sensitive to salt, according to a 2001 report in the journal *Stormwater*. It can cause health problems for people with hypertension, by raising blood pressure-- even though humans also need the substance in small amounts. It's bad for other animals, too -- it can cause them to be attracted to roadsides, but they often end up as road kill in the process.

Roxanna Johnston, the lab director for the city of Ithaca's water plant, has seen salt levels rise so high in recent years that since 2007, the city has been required to send out notices to customers, explaining that if they have hypertension, or high blood pressure, they should limit their intake of the city's water.

"We may have to stop using [salt] in the future," she said. "For the environment, it would be more sustainable if people stayed home, and didn't expect to have the roads perfectly clear."

Salt can also be an economic nightmare -- it costs local government hundreds of thousands of dollars each year. For 2009-2010 Tompkins County Highway Department road de-icing, the cost was around \$474,000. Spraying salt degrades bridges, sidewalks, roads and cars. Davies said a car driven in the Northeast, where salt use is prevalent, will last a third of the time of a car in a salt-free area like Florida because of the rusting of the car's undercarriage.

### Salt in the water supply

Though the city's water supply is nowhere near too toxic to drink, the sodium level has been steadily increasing since 1991 -- doubling from 9.8 milligrams per liter then to 20 milligrams per liter in 2009. Sodium levels in drinking water also spike from December to March, Johnston says, to about 33 milligrams per liter, as the snow melts.

Johnston said the Bolton Point water system -- which serves the towns of Dryden, Ithaca, Lansing, and the villages of Cayuga Heights and Lansing -- also has salt levels in drinking water high enough to require sending notices.

The city and Bolton Point are still within Environmental Protection Agency recommendations that drinking water contain between 30 and 60 mg/L of sodium. While it will take more than 100 years, at present rates of increase, for sodium levels in city water to reach 250 mg/L, which is considered too contaminated to drink, Johnston said the need to issue warning notices was a harbinger of the future for her, when municipalities dependent on salt for road clearing may have to find new solutions to avoid contaminating their water further.

Johnston said some of the sodium in the water supply is added by the water treatment plant itself, as a part of a chlorine solution added to sterilize the water.

The side effects of salt use have started to reach the desks of local elected officials, too, as costs for salt and labor add up. "We are using less salt than in past years, and that is better for the environment, and saves money," wrote Lansing Village Mayor Donald Hartill in a recent newsletter.

### Community expects clean roads

Jim Weber, the town's director of public works, said he thinks there's an expectation by the community here that roads will be as close to bare pavement as soon as possible after a storm, which hinders efforts to use less salt.

"So there's a dilemma you're put into," he said. "You have to balance the safety of your community and the costs to provide that. Whether it's the environmental cost or the financial costs, there will be costs on either side."

Weber said the situation in Colorado, where he used to work as a highway superintendent, was completely different. The state doesn't use salt because it's too expensive, and plow drivers

spread only small amounts of volcanic pumice to increase traction on intersections and sharp curves. Police issue tickets for not using snow tires, and neighbors would give you a hard time if you didn't use them, he said.

"There, people put snow tires on. Here, you can find nine out of 10 cars running on summer road tires [in the winter]," he said. "If you're not prepared for it, then you're putting responsibility on road maintenance people."

There's another compelling reason the area uses so much salt -- because Cargill's rock salt mine is only miles away, salt has become the cheapest and most effective form of road ice control for the area's frigid winters.

Other substances, like sugar or calcium chloride, have the same effect on ice and snow that salt do, without as many harmful environmental effects. The only problem is they're hundreds of dollars per ton, and a ton of salt cost Tompkins County only around \$44 last year, according to Bill Sczesny, the county's highway manager. Some municipalities mix sand with salt, but sand is more expensive and can lead to sediment build up, which also causes environmental issues.

Sczesny said he tries to be environmentally conscious as much as possible. He has drivers do as much pre-salting in advance of a storm as possible, which uses less salt and costs less money.

He and other highway superintendents have also started using substances like Magic Ice, a non-toxic brewery byproduct that allows salt to stick to the road, allowing plow drivers to use less salt, and Ice Ban, another additive.

"We use a lesser amount of salt when we use Ice Ban," he said. "It's a cost factor."

#### Salt use in other areas

Recent research out of Canada shows that in the peak of snow melt, road salt runoff can cause bodies of water to become almost as saline as seawater. The University of Toronto report, published this year, was based on 7,600 tons of salt applied annually in the area of Pickering, in a 17-square mile watershed, which washed into a lagoon that fed into Lake Ontario, killing most of the fish life there.

For comparison, the Six Mile Creek watershed is 52 square miles.

"It's a toxic material and yet we continue to throw it with gay abandon on our roads," said Nick Eyles, the lead researcher, according to an article in The Globe and Mail newspaper.

In the U.S, California and Nevada have chosen to restrict salt use in certain areas to reduce damage to roadside trees, and Massachusetts has started using non-salt deicers to prevent salt poisoning of drinking wells near highways.

Scott Lourey, the legislative director for the Adirondack Council, advocates for smarter salt policy in New York state, which collectively used one million tons of salt to clear its roads in 2008.

"There's an unofficial clear roads policy that DOT will try to clear off all roads they can in the quickest amount of time," Lourey said. "We need to go back to requiring snow tires. We're not trying to create unsafe road conditions, but people shouldn't expect dry conditions immediately after a snowstorm."

Lourey said there are a number of technological tools to help use less salt, in addition to less harmful substances. Although they all come with higher costs, they're worth it, he said.

When you look at the long term -- environmental health, bridge repair, or well contamination, all those have costs associated with them," he said.