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Winter runoff adding more than a pinch of salt to North Jersey's drinking water

After a profusion of snowstorms forced road crews in New Jersey to spread nearly twice as much salt this past winter than the year before, the snowmelt and spring rains are now washing that salt into wetlands and rivers, where it has infiltrated the local drinking water supply and could harm the region's vegetation and wildlife.

So much salt has been making its way into the water supply that customers of a number of water utilities in the Northeast, including United Water, which serves North Jersey, have complained that their water tastes salty. "That's a good marker that we've had a tough winter here," said Howard Woods Jr., a private water industry consultant.

The Passaic Valley Water Commission, which provides drinking water to Paterson, Passaic, Clifton and other towns, has also seen sodium levels rise — at one point it was three times normal levels, said Joe Bella, the commission's director. Too much sodium can exacerbate problems for people on low-salt diets for hypertension and other conditions.

In addition to the salt runoff's effect on drinking water, some studies have shown that salt dehydrates trees and bushes near roads. It can also get into vernal pools, where frogs and other amphibians lay their eggs. The temporary pools form as spring rains and snowmelt collect in depressions in the ground. Since there are no outlets, salt that enters the pools remains once the pools evaporate. The salt can affect the survival rate of the eggs.

"Because of the amount of road salt used this year, it could be distributed farther from the roads and have an impact for longer into the spring season," said Lisa Hazard, who chairs the molecular biology department at Montclair State University and has studied the impact of salt on wood frogs. "So species that are particularly sensitive to salt could be hit hard this spring. But for the most part, the impact would be temporary."

The reliance on road salt to keep streets clear has contributed to a growing debate about how to make sure roads are safe while also limiting the effect of salt runoff on wetlands and drinking water supplies. The issue is a particular concern in North Jersey, where most drinking water comes from rivers and reservoirs and other surface sources.

"The real debate here is that we have to balance different types of health and safety issues," Woods said. "Drinking-water utilities say road salt use should be restricted. And people responsible for safety on the roads, as well as police and emergency response people, take the firm position that the risk in not salting the roads is horrendous. The tradeoff is a real public safety issue."

Doses of salt

There were 18 measurable snowfalls over the winter in North Jersey. It wasn't the amount of snow that prompted the heavy use of road salt, but the number of snow events — not to mention storms that dropped freezing rain.

Through the end of February, the state Department of Transportation had used 461,000 tons of salt on roadways, nearly 80 percent more than the 258,000 tons used the prior winter, said Steve Schapiro, a department spokesman. This winter the state DOT sent salt trucks out at least 46 times, compared with 36 times last winter and just 13 times the winter before that.

The New Jersey Turnpike Authority used more than 171,500 tons of salt on the turnpike and Garden State Parkway this winter — nearly twice what it used last winter — and more than six times what it used the winter before that.

That, of course, is in addition to the thousands of tons of salt spread by town and county road departments along the region's local roads.

Typically as winter draws to a close, officials at United Water see increased levels of sodium in the company's three North Jersey reservoirs, which serve 800,000 people in Bergen and Hudson counties. Levels in the water are currently about 170 milligrams per liter — three to four times higher than levels during the summer. By comparison, a liter of Diet Coke contains about 119 milligrams of sodium.

"Some customers have called to say the water has a slightly salty taste," said United Water spokesman Steven Goudsmith.

The EPA's drinking water advisory standard for sodium is 20 milligrams per liter for those on a restricted sodium diet of 500 milligrams per day. "There are no restrictions in place for the average customer," Goudsmith said. "Those on sodium-restricted diets should consult with their physician."

United Water has contacted dialysis centers and hospitals to let them know about the elevated sodium levels in the water supply in case they need to make adjustments to treatment processes, he said.

The threshold for sodium to generate a salty taste in drinking water is between 30 and 60 milligrams per liter. By comparison, the typical salinity of ocean surface water is 35,000 milligrams per liter.

Sodium levels are also higher in other water utilities in the region. The North Jersey District Water Supply Commission operates the Wanaque Reservoir, which sends water to several water utilities. During the year the levels of sodium can range from 18 to 40 milligrams per liter in the reservoir, and they are currently about 39 milligrams, said William Maer, the commission's spokesman. "It's certainly elevated from the average, and we're tracking it closely," he said.

The sodium level is lower than at United Water's Oradell Reservoir because the Wanaque is more isolated from development and major roads.

To address higher sodium levels at the Passaic Valley Water Commission, the water it takes out of the Passaic River at Little Falls is supplemented with water from the Wanaque Reservoir, Bella said.

The higher sodium levels in the region's drinking water is "a transient problem — it won't persist," said Woods, the private consultant. "You need a few good rainfalls and the problem largely resolves."

One of the few water utilities in the region that does not rely on surface water is Ridgewood Water, which serves 20,000 customers in Glen Rock, Midland Park, Ridgewood and Wyckoff. Ridgewood Water uses more than 50 wells drilled down into an aquifer, which pump out water caught in rock fissures.

"We won't see this winter's road salt show up until mid-summer," said Frank Moritz, Ridgewood Water's director of operations. "It takes quite a while for the salt to get down there. Right now half our wells are off, so you don't see the salt levels rising. Once we get into May and people start putting water on their lawns and we start to draw down from the aquifer, then that will move the salt into the water supply."

He said that the average salt levels in the aquifer have been rising over the past 10 to 12 years. In the past, road salt has also contaminated some private wells in Bergen County.

Fragile habitat

Researchers have been studying the effect of road salt runoff on wetlands and the wildlife living near roads.

The extent of the salt runoff's impact "depends on the habitat," said Hazard of Montclair State. Unlike rivers or reservoirs, vernal pools have no outlet, so any salt that enters them remains once the pools disappear from evaporation. The levels can build up from year to year.

Steve Brady, a Dartmouth College researcher, has found that there is a 20 to 40 percent decline in the survival rate of amphibian eggs laid in vernal pools close to roads, compared with those in woodlands just a short distance away. And wood frog eggs hatch at much lower rates in roadside vernal pools than those of spotted salamanders, showing a variation in how the salt affects different species.

Now, he wants to try to track juvenile and adult amphibians to see what impact, if any, the exposure to salt has on development and growth rates.

"Even if we stopped using road salt today," Brady said, "the levels in water bodies would continue to increase because of decades of salting."

"How can the populations of amphibians persist?" he said. "Because of climate change we are seeing an increased variation in weather — winters are becoming warmer on average, but we may get more intense winters, too, along with freezing rain.

"So with climate change we are likely to see more use of road salt," Brady said. "That poses a real problem for organisms — it's hard for them to adapt to such dramatic changes in a short time scale."

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