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UNH Research Says, 'Hold The Salt'

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DURHAM, N.H. -- Researchers from the University of New Hampshire Stormwater Center are testing technologies that may put parking lots on a "low-salt diet" in the future, reducing the amount of salt needed for winter maintenance by as much as 70 percent.

Salt may make road conditions safer after a snowstorm, but it's tough on the environment. On regular asphalt, road salt (sodium chloride) washes away with the runoff, contaminating groundwater, wells, and freshwater streams and lakes. Road salt is also tough on municipal budgets strapped by the costs of cleaning up after one of the snowiest winters in recent memory.

"The systems commonly used to treat stormwater runoff do not remove chloride," says Robert Roseen, the center director. "The answer is to use less salt in the first place. Our research indicates that by using pervious pavement, like porous asphalt or concrete, we can reduce the amount of salt needed for winter maintenance drastically, maybe by as much as 70 percent."

The UNH Stormwater Center provides independent, scientific testing of stormwater treatment systems in a side-by-side setting, as well as workshops and consulting for the stormwater management community. It is supported by the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET), a partnership of UNH and the National Oceanic and Atmospheric Administration (NOAA), and housed within UNH's Environmental Research Group.

In the United States, road salt use can be as high as 12 million tons annually, according to the National Research Council. And the amount of salt used has been going up in recent years, largely due to increases in land development and perceived safety needs. Porous pavements, which use an open-graded aggregate with high porosity, drastically reduce the amount of salt needed to stay clear of snow and ice.

The UNH researchers installed a porous asphalt parking lot at the center's field site three years ago, and have been carefully monitoring its performance as a stormwater management system ever since. Another project, looking at ability of pervious concrete to achieve similar results, began last year.

"Porous asphalt allows snowmelt and rain to drain through the surface and filter through the layers of gravel and sand below," explains Thomas Ballestero, center co-director and UNH associate professor of civil engineering. "So, not only does it appear to need less salt, this infiltration process removes pollutants like sediment, heavy metals, and petroleum products. The lot also does a phenomenal job of reducing the volume of runoff."

Porous pavements are not new, but questions about their performance have prevented its widespread application. The porous asphalt study, now in its third year, has been collecting

data that demonstrates its effectiveness as a stormwater management system and its ability to stand up to the freeze and thaw cycles of New England winters.

"Our data indicates that a well-designed and constructed porous asphalt system is a superior approach to treating stormwater runoff, one that doesn't take up the additional space required by detention ponds," says Roseen. "It's the kind of tool communities need to meet EPA's Clean Water Act Phase II standards."

It is not, he cautions, a magic bullet. It's probably not appropriate for high speed and heavy traffic roads. And like any stormwater system that relies on infiltration, care must be taken before using porous pavements in areas where there is potential for hazardous spills, such as near gas stations. Researchers will continue to evaluate its performance in the coming year.

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Photographs available to download:
The day after a New Hampshire storm of "wintry mix," two UNH parking lots demonstrate the dramatic impact pervious pavement can have on stormwater runoff. Both photos were taken Thursday, Feb. 14.

This photo is of a parking lot paved with porous concrete. Despite lower salt use, it is nearly clear. http://www.unh.edu/news/img/storm_water/concrete.jpg

In this photo, Robert Roseen stands in the slush of a traditional parking lot treated with salt. http://www.unh.edu/news/img/storm_water/slushylot.jpg

Credit: Jamie Houle, UNH Stormwater Center.