Pavement sealcoat a source of toxins in stormwater runoff

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Sealcoat applied to pavement may be contributing to PAHs in stormwater runoff. Credit: UNH Stormwater Center

Driveways and parking lots may look better with a layer of sealcoat applied to the pavement, but the water running off the surface into nearby streams will be carrying more than just oxygen and hydrogen molecules. New research conducted at the University of New Hampshire Stormwater Center (UNHSC) indicates that sealcoat may contribute to

increasingly significant amounts of polyaromatic hydrocarbons entering waterways from stormwater runoff.

Polyaromatic hydrocarbons, more commonly known as PAHs, are found in diesel and crude oil and are considered to be carcinogenic. Although small amounts of PAHs are typically found in the waters around the New Hampshire Seacoast, the sudden spike in the hydrocarbon concentrations in water draining from a university parking lot used for research caused Tom Ballestero, UNH associate professor of civil engineering, to be concerned about unknown impacts.

"Our society has been sealcoating pavement for decades and there are things we've never asked about," he says. "Now we're starting to probe and ask these questions."

Although it is intended to remain on the pavement surface, much of the sealcoat eventually washes or scrapes off and ends up in nearby streams and rivers, says Alison Watts, affiliate faculty member at the UNHSC. The PAHs from the sealcoat attach to organic matter, such as leaves or sediment, where they may be ingested by organisms or buried in other sediments.

As part of this N.H. Sea Grant-funded research, one-quarter acre of a parking lot located near the UNHSC was covered with coal tar-based sealcoat and one-third acre was covered with asphalt-based sealcoat. The remainder of the nine-acre lot was left unsealed. On-site stormwater drains off the parking lot and into a nearby swale. The PAH concentration was measured in the water and sediments coming from the sealcoated and unsealed parking lot sections.

Both types of sealcoat led to a surprisingly rapid increase in PAH concentrations in the initial runoff — up to 5,000 parts per billion (ppb), significantly higher than the 10 ppb levels released from the unsealed lot,

although concentrations decreased after several rainstorms. The PAH concentrations in the sediments mirrored these trends; the concentrations immediately downstream of the coal tar-sealed lot increased by nearly two orders of magnitude within the first year.

Unlike other compounds, PAHs do not break down easily and thus persist in the environment for decades. Even a small amount of PAHs coming off sealcoated parking lots may overwhelm an aquatic ecological system already stressed by other contaminants.

Increased PAH concentrations in waterways could be a human health issue if people are exposed to it regularly. In addition, dust particles coming from a sealcoated driveway could potentially be troublesome for children who play on the sealed surface. Ballestero cautions that it should not be a major source of concern, but nevertheless he and Watts will be investigating PAH levels in dust from sealcoat later this year.

"You don't see people falling over from PAHs in sealcoat, it's not that big of a health issue," Ballestero says. "But it could be a cumulative exposure problem that gets uglier over time."

Ballestero says he has sensed an interest by the sealcoat industry to offer more environmentally friendly, less toxic alternatives in the future. There should be options that allow workers in the industry to continue to make a living, but without causing additional harm to the local ecosystems and human health, he notes.

"There are much bigger environmental problems out there than PAHs from sealcoats, but the bottom line is that it is easily preventable," Watts adds. "All you have to do is not apply it to pavement."

Source: University of New Hampshire

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