

PFASs from ski wax bioaccumulate at Nordic resort

November 6 2019



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With winter approaching in the Northern Hemisphere, many people are looking forward to hitting the slopes. However, a recent study suggests that ski wax applied during winter months could have consequences that stretch to summer and beyond. Researchers reporting in ACS' *Environmental Science & Technology* have found that certain perfluoroalkyl substances (PFASs) found in ski wax bioaccumulate and

biomagnify in the food chain at a Nordic skiing area.

PFASs are used in a variety of consumer products, including ski waxes. When applied to skis, the compounds enhance the glide on the film of water between skis and snow. Recently, scientists have become concerned about the persistence, bioaccumulation and potential toxicity of PFASs in the environment. As a result, the U.S. and other countries have banned or limited use of the most worrisome forms, [perfluorooctanoic acid](#) (PFOA) and perfluorooctansulfonate (PFOS), but these stable compounds and other PFASs can remain in the environment for many years. Randi Grønnestad and colleagues wanted to examine the levels of various PFASs in soil, earthworms and bank voles, which are small rodents, at a skiing area in Norway.

The researchers collected soil and animal samples from the Granåsen Ski Center in Trondheim, Norway, and from a reference site—a forested area not used for ski sports—about 9 miles away. When the team analyzed PFAS levels in soil, they found that three individual PFASs were present at significantly higher levels at the ski area compared with the reference site. In earthworms, only two compounds were found at significantly higher levels at the ski resort. In contrast, bank voles from Granåsen had 5.7 times higher total PFAS levels in their livers and significantly higher levels of several long-chained PFASs found in ski waxes, including PFOS, than those at the reference site.

Although the detected levels of all PFASs were far below toxicity thresholds, the observed bioaccumulation in earthworms and biomagnification of PFOS from worms to voles suggests that the compounds could accumulate at much higher levels in top predators, the researchers say.

More information: "Levels, Patterns, and Biomagnification Potential of Perfluoroalkyl Substances in a Terrestrial Food Chain in a Nordic

Skiing Area" *Environmental Science & Technology* (2019).
pubs.acs.org/doi/abs/10.1021/acs.est.9b02533

The authors acknowledge funding from the [Norwegian University of Science and Technology](#) and the [County Governor of Trøndelag](#).

Provided by American Chemical Society

Citation: PFASs from ski wax bioaccumulate at Nordic resort (2019, November 6) retrieved 17 July 2024 from <https://phys.org/news/2019-11-pfass-wax-bioaccumulate-nordic-resort.html>

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