

Road salt guidelines need review to protect food chain in lakes, study finds

April 9 2015



Lake Lucerne. Credit: Ttrainer/Wikipedia/CC BY-SA 3.0

Salt used for winter road maintenance in Canada could wipe out water flea populations that keep our lakes clear of algae and feed the fish, a recent York University study has revealed.

"These [water](#) fleas are like little living lawnmowers in our lakes. They 'graze' the entire volume of lakes many times during the summer,

passing what they've eaten up the [food](#) chain to fish," explains Professor Norman Yan, to stress the importance of the [water flea](#)'s role in the ecosystem.

The study, conducted at Yan's lab in the Department of Biology, Faculty of Science, suggests that [lake](#) and highway authorities consider adjusting [road salt](#) use protocols to protect [aquatic life](#) such as the water flea, by taking the nutritional status of the lakes into account. In particular, the study suggests revising the Water Quality Guideline for chloride, especially for lakes near winter-maintained roads on the Canadian Shield that tend to have very low nutrient levels.

"Considering both the algal concentrations in lakes near the highways, not just road salt application rates, will ensure that aquatic life is not damaged by winter road maintenance," notes Yan.

According to the researchers, animals used in lab-based bioassays almost always have abundant food, but in nature, they rarely do. "If the sensitivity to road salt is influenced by how well-nourished the animals are, the current [water quality](#) guideline would not protect aquatic life," points out Yan.

"To study the difference, we reared Daphnia (water flea species) in the lab across a range of both chloride levels and food levels," says lead author Arran Brown. "That is, a range of algal concentrations from levels as low as in most of Canada's lakes to high levels normally seen only in nutrient-rich lakes and used in most lab-based bioassays."

Brown adds, "We found a direct relationship between how well fed the animals were and their sensitivity to road salt. The less food they had, the more sensitive they were to the chloride."

The study titled Food Quality Affects the Sensitivity of Daphnia to Road

Salt, which was published recently in the peer-reviewed journal *Environmental Science & Technology*, found that at food concentrations below 0.6 mg of carbon per litre, chloride concentrations below the current Canadian Water Quality Guideline were lethal to the daphnia.

More information: Food Quality Affects the Sensitivity of Daphnia to Road Salt, pubs.acs.org/doi/abs/10.1021/es5061534

Provided by York University

Citation: Road salt guidelines need review to protect food chain in lakes, study finds (2015, April 9) retrieved 25 April 2024 from <https://phys.org/news/2015-04-road-salt-guidelines-food-chain.html>

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