

Intermediate: Earth & Environmental Sciences

Effects of Road Salt on Brook Trout and Aquatic Invertebrates in Harper Creek

Road salt is widely used as a de-icer on roads. When ice and snow melts, it carries this salt into bodies of water. High levels of salinity due to road salt may have a variety of negative consequences for aquatic biodiversity. It was hypothesized that road salt would reduce habitat quality for brook trout, *Salvelinus fontinalis*, by reducing the diversity and abundance of aquatic invertebrates, which are important trout food. This hypothesis was tested by conducting three different experiments on the Harper Creek system, a watershed in Peterborough, Ontario, containing native brook trout.

In the first experiment, salinity was sampled and the number of stream invertebrates from different sections of Harper and adjacent Byersville creeks throughout the winter of 2017-18 to test for a relationship between salinity and invertebrates. In the second experiment, a salinity gradient was identified arising from the confluence of two streams (one with a high level of salinity), and sampled both salinity and invertebrates along the gradient at a regular distance interval to identify whether the level of salinity correlated with the number of invertebrates. Finally, I used a laboratory experiment to test for effects of different salt concentrations similar to those observed in sections of the creek system on amphipods (*Hyallorella* spp.) collected from the creek.

Salinity varied across different sections of Harper and Byersville creeks between about 300 -

5000 parts per million (ppm). *Hyalella* abundance was higher at sample sites that had a lower level of salinity. In the confluence cross-section experiment, fewer *Hyalella* were observed on the side of the creek with higher salinity (the side at which the saltier tributary entered the confluence). In the laboratory experiment, containers with salinity exceeding 6000 ppm reached the lethal concentration required to kill 50% (LC50) of *Hyalella* within 4 days. In contrast, the LC50 was not reached within the 2-week experiment in containers with salinity < 2500 ppm. Based on these results, I can conclude that in a freshwater trout stream, high levels of salinity limit the abundance of aquatic invertebrates. *Hyalella* are a major food source for the brook trout so a lower population of *Hyalella* could be a stressor for these sensitive fish. Application of road salt should be limited or carefully managed to protect the sensitive organisms which inhabit aquatic ecosystems.