

Fighting Salt with Science

Community scientists make the difference

BY DR. NORMAN YAN AND SANDY LOCKHART



Community Scientist Carol Latimer and her daughter Alison Hanson sampling chloride levels on Three Mile Lake in Muskoka.

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AS A SMALL ENVIRONMENTAL CHARITY, Friends of the Muskoka Watershed (FOTMW) recognizes the value of community scientists. These volunteers play an integral role in helping FOTMW address two widespread threats to Muskoka's lands and waters: calcium decline, a legacy of acid rain, and excessive use of road salt.

"We are a science-based organization focused on protecting Muskoka's watersheds, and it's not just professionals that can be scientists," explains Dr. Norman Yan, director and founder of Friends of the Muskoka Watershed.

Community scientists are community members who volunteer to help collect the data or support the experiments that underpin the knowledge that FOTMW and the

community need to act to tackle these threats.

Recently, Yan made the decision to rename citizen scientists as community scientists in his work. He explains, "With this change, we make it clear that everyone, not just citizens, are welcome to take part in our community science projects."

Current chloride levels (from road salt) may be toxic in one-quarter of Muskoka lakes and levels are rising in many developed lakes according to data from the provincial and district governments. Our community scientists are helping us identify the sources of this problem. A recently completed report on this threat led by Dr. Neil Hutchinson, FOTMW director, included 600 road salt measurements in 26 Muskoka locations—streams, ditches and other drains feeding the Muskoka River. Most of that data was collected by community scientists, and their work has identified the land use types that contribute the most salt-contaminated inputs to the river.

"Knowledge is not enough to solve our problems," explains Yan. "It also takes the will to act." When community members are involved in creating the knowledge, then they are more likely to participate in turning that knowledge into action.

Community science helps make science easier to comprehend. Calcium decline affects half the lakes in cottage country, to the point where animals are in danger and forest health is in decline. "If the public is generating data, they understand it," he says. At FOTMW, many community scientists are involved in the ASHMuskoka project to restore their forests. Those who dedicate their time to save their fireplace wood ash and donate at a drive on a cold winter morning, are invested. "We've collected tens of tons of ash for forest restoration experiments because people are engaged with the issue to the point where they are participating in the experiments," says Yan.

Community scientists give FOTMW the ability to conduct large-scale experiments. "With their help, we've identified a dose of ash to restore forest health, thanks to ash additions," says Yan.

These volunteers know that decades of acid rain left Muskoka lakes and forests short on calcium. They know that the calcium rich woodstove ash is 25-30 per cent calcium and adding it to the forest floor helps our trees recover from what we call "environmental osteoporosis."

Working with community scientists also "democratizes" science. Hundreds of members of the public agree by their participation in the ASHMuskoka project that widespread calcium decline is a threat worth tackling.

Others have helped FOTMW find large-scale solutions. Community scientists both contributed and helped spread ash so Trent University academics and students could identify how



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much ash to add—enough to address nutrient deficiency without causing any new problems. They learned that roughly one 750 gram yogurt container of ash is enough to restore one square meter of forest floor. Everyone is excited to share that it takes one dose—ever! It's not something you need to do every year. They are educated and share their knowledge.

Yan says there are many practical reasons to have community scientists. "We save a tremendous amount of money by using volunteer community scientists. We generated 600 road salt measurements at 26 sites," he says. "We couldn't do that alone."

And those volunteers accomplished a lot. They generated a broad swathe of curated information quickly. They helped us learn which land use types were responsible for high salt levels in waters draining into the Muskoka river system.

With so many environmental concerns and the passion many Muskokans feel for their lakes, there are community members who want to participate and make a difference. As a community scientist, they can get involved and take action. Community involvement generates ongoing support and interest, and event grants for the FOTMW charity.

With all these active community scientists, the result is a broad segment of the voting public that understands the issue. "Interested locals likely have a greater opportunity to influence politicians than scientists do," says Yan.

As a science-based environmental charity, it's very important that FOTMW is tackling questions that matter to the community. "Why should the general public care about environmental



During the winter months, Community Scientists Sandy Cairns (left) and Clarke Smith test the water entering into Gull Lake in Gravenhurst to help discover chloride hot spots.

issues?" asks Yan. "Change happens all the time, but if the change matters to the community, then it's important," he says. Community scientists get involved when they understand that it matters.

FOTMW has learned community scientists will participate in various kinds of applied science. A larger-scale ash addition is planned for the future and community scientists will play a vital role.

FOTMW's new SALTYMuskoka program also depends on community scientists. Often people think excessive road salt usage is something that is out of their control. A key knowledge gap is that about 20 per cent of excessive road salt is used by individuals and small businesses. This is an area for improvement. SALTYMuskoka will engage students and teachers to reduce excessive salt use at schools and in communities, establish a SALTY network to track excessive uses of road salt, engage with lake associations to reduce excessive use of salt and engage with owner/operators of parking lots to reduce excessive use of salt and start a conversation about SMART ABOUT SALT certification. It will also work with store owners to provide

alternatives to salt, track changes in salt levels in streams feeding Lake Muskoka area and engage and collaborate with Indigenous peoples and youth on the issue. Community science is obviously a big part of this.

Yan recognizes that with community science, the professionals give up some control, "But that's worth it," he says. "You gain more than you lose by democratizing the goals of the work." Any variation added by having many different people generate the data needs to be quantified, so training and auditing are key parts of the work.

Over the past few years, Yan and Hutchinson have learned how to involve the community in the science:

- You need to communicate differently—keep it simple, appealing to the heart and gut, not just the head.
- Branding matters, and brands must be carefully crafted. Being cheeky can work.
- Share what you learn with many audiences. Community scientists are everywhere.
- Report back to the community, not just other scientists. Involve youth and all ages.
- If possible, let your community science

colleagues lead in your communications with government.

A District of Muskoka resolution carried in February of 2025 was presented by our citizen scientists with FOTMW scientists for support. The resolution asked the District to reduce road salt use as much as safely possible and report on its annual use, to develop limited liability legislation with contractor training and develop best management practices for snow and ice management. It also asked them to urge the Ontario government to create and fund an expert advisory committee charged to identify best approaches to protect fresh and drinking waters from salt. This presentation was community science in action.

Hundreds of years ago, Sir Francis Bacon coined the phrase "Knowledge is power." But knowledge is just step one in protecting our environment. It's useless without subsequent action. FOTMW has learned that working with community scientists can generate the knowledge of trends in environmental conditions and also speed the application of that knowledge where environmental action is needed. **WC**

Friends of the Muskoka Watershed is a charity with a focus of protecting Muskoka watersheds forever. To learn more visit fotmw.org