analytical accuracy, and raw data are publicly accessible through Lake Winnipeg DataStream.

Today, LWCBMN data are being translated into action. Academic researchers, such as Darshani Kumaragamage (see sidebar), are using the data to guide studies of phosphorus runoff from agricultural landscapes, while watershed districts are leveraging the information to secure funding for targeted phosphorus-reduction projects. Most recently, the Canada Water Agency's Lake Winnipeg Freshwater Ecosystems Initiative combined LWCBMN data with federal SPARROW model outputs to identify priority areas for focused investment.

When stakeholders view phosphorus hotspot maps, the most common question is "What is driving the high phosphorus exports in these areas?" While LWCBMN data clearly identify where phosphorus is entering the system, they do not explain the underlying sources and mechanisms of phosphorus release. To address this gap, LWCBMN data are now being integrated with land-use data in a spatial correlation analysis aimed at identifying the drivers of elevated phosphorus exports.

Long-term monitoring programs are essential because they reveal patterns and trends that persist despite year-to-year variability. Within the Lake Winnipeg watershed, LWCBMN provides the empirical foundation for targeted phosphorus-reduction efforts, supporting both the prioritization of subwatersheds for intervention and the evaluation of management effectiveness over time.

This dataset exists because of the commitment of community volunteers and watershed partners who enable frequent and responsive sampling. As pressures from climate change and land-use continue to intensify, empowering people on the ground to generate trusted data will remain essential to protecting the health of Lake Winnipeg.

Chelsea Lobson is programs director at the Lake Winnipeg Foundation.



Installing snowmelt collection devices in farmers' fields. *Photo by Doug Goltz.*

Managing phosphorus for healthy soils and clear lakes

Phosphorus is a nutrient essential for crop production, but when excess phosphorus leaves the fields and reaches water bodies like Lake Winnipeg, it contributes to algal blooms and poor water quality. The main goal of our research is to reduce phosphorus loss from agricultural lands in the Red River Basin to protect Lake Winnipeg and other water bodies. This research is funded by the Canada Water Agency with partner contributions from the University of Winnipeg and the Lake Winnipeg Foundation and will be carried out in collaboration with Agriculture and Agri-Food Canada, University of Manitoba, the Lake Winnipeg Foundation, Environment and Climate Change Manitoba, and Seine Rat Roseau Watershed District.

In the Canadian Prairies, including the Red River Basin, most of the phosphorus runoff doesn't happen during rainfall, but during snowmelt. That's why our work specifically targets phosphorus loss in snowmelt runoff. Our previous research has shown that phosphorus loss from agricultural soils to snowmelt is highly variable across the region. We now aim to assess and map regions with excessive phosphorus loss via snowmelt in Manitoba's Red River Basin and facilitate more targeted management approaches to retain phosphorus in soil and reduce losses. For this research, we aim to collect 300–400 soil samples from fields with varying cropping and management histories over three years, focusing more on regions identified as phosphorus hotspots by the Lake Winnipeg Community-Based Monitoring Network. To date, we have contacted many farmers in the region who have shown strong support for the project by allowing us to take soil samples from their fields and letting us install snowmelt collection devices.

If we can reduce phosphorus loss from agricultural lands during snowmelt in the Red River Basin, we will keep more of the phosphorus on the land, where it is needed, and less amounts in the lakes, where it is not. That would be a win-win situation.

By Darshani Kumaragamage, University of Winnipeg, and Nelum Jayarathne and Inoka Amarakoon, University of Manitoba.