

# LAKE WINNIPEG FOUNDATION

Submission to Manitoba Agriculture and Resource  
Development: Nutrient Targets Regulation

Photo: NASA satellite imaging of Lake Winnipeg, processed by the Lake Winnipeg Research Consortium

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## Lake Winnipeg

Evidence-based, strategic and focused regulatory protection and financial investment are required from the province of Manitoba to improve Lake Winnipeg's water quality and reduce the impacts of eutrophication.

In the absence of this dedicated effort, potentially harmful algal blooms continue to contaminate drinking water, limit economic opportunities in recreation and tourism, decrease property values, infringe on Aboriginal, treaty and inherent rights, and alter the lake's ecological food chain. Rightfully, Manitobans are increasingly concerned about Lake Winnipeg's long-term health. Citizens expect concrete action from the provincial government.

## Manitoba's proposed Nutrient Targets Regulation

Upon review of the proposed Nutrient Targets Regulation, the Lake Winnipeg Foundation (LWF) asks that the province of Manitoba:

- 1) Publish all submissions received through the public consultation process;
- 2) Commit to redrafting the Nutrient Targets Regulation in response to critical concerns raised in this and other submissions received through consultation.

As currently presented, the Nutrient Targets Regulation:

- Sets targets that will not contribute to reducing potentially harmful algal blooms in the north basin of Lake Winnipeg;
- Provides no guidance on concrete actions necessary to meet proposed targets;
- Lacks clarity regarding how progress towards targets will be measured and reported;
- Does not make use of the best available evidence to prioritize efforts in recognition of current resource and capacity limitations.

**The proposed phosphorus target for the north basin is actually higher than current phosphorus levels and is therefore meaningless in efforts to reduce harmful algal blooms.**

The north basin of Lake Winnipeg, with a long-term average phosphorus concentration of 0.039 milligrams of phosphorus per litre (mg/L), currently experiences extensive and persistent algal blooms.<sup>1</sup>

The proposed regulation presents a north-basin phosphorous target that is, problematically, even higher than current phosphorus levels (Table 1) and therefore of no value as a science-based benchmark for efforts to reduce phosphorus concentration and improve north-basin water quality.

**The proposed phosphorus target for the south basin requires a 50 per cent reduction from current phosphorus levels, yet no action plan, regulated activities, or additional resources are provided.**

While reinforcing the government of Manitoba’s important and long-stranding objective of reducing Lake Winnipeg phosphorus levels by 50 per cent (Table 1), the proposed regulation provides no additional guidance or support to achieve this target.

The proposed regulation does not identify new, or increase existing, enforcement of phosphorus-releasing activities. The regulation does not link to existing provincial environmental licensing, or to monitoring and funding programs which, if effectively integrated, could support a cross-departmental framework to achieve identified targets. As presented, without additional regulatory or incentive-based action from the provincial government, it remains unclear how the proposed south-basin target will ever be achieved.

<b>Table 1 - Comparison of target and long-term average phosphorus concentrations</b>	<b>Proposed target</b>	<b>Historical mean (1999-2016)<sup>2</sup></b>	<b>Difference</b>
North basin total phosphorus concentration	0.05 mg/L	0.039 mg/L	28%
South basin & narrows total phosphorus concentration	0.05 mg/L	0.104 mg/L	-52%

<sup>1</sup> Lake Winnipeg Research Consortium, 2020. [Satellite Image Library](#).

<sup>2</sup> Environment and Climate Change Canada & Manitoba Agriculture and Resource Development, 2020. [State of Lake Winnipeg, 2<sup>nd</sup> Edition](#).

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## **The regulation provides no details on the robust monitoring, analysis and reporting that are necessary to monitor progress in achieving proposed targets.**

Regulated targets for both in-lake concentrations and tributary loading are intended to serve as benchmarks against which to measure phosphorus reduction. The proposed regulation lacks important details about how progress towards targets will be monitored, analyzed and reported to the public.

Phosphorus loading is driven by water flow and, as such, effective monitoring must be responsive to snowmelt, spring floods and summer storms, when heavy runoff flushes phosphorus off the land. Frequent, responsive and dispersed sampling is necessary to accurately characterize phosphorus exports and track changes over time; this will become increasingly important with a changing climate.

More robust data analyses and interpretation than those presented in recent provincial nutrient status reports<sup>3</sup> are required to understand trends and changes in phosphorus loading. These analyses must subsequently enable regular, timely reporting to support an adaptive management approach for phosphorus reduction to Lake Winnipeg. The province must not only publish data and analyses annually, but must also share all data within a year of their collection – and ideally, in real time. While notable improvements in reporting frequency have been made in recent years with the publication of annual nutrient status reports, the most recently published phosphorus data from Lake Winnipeg and its tributaries are from 2018 and the analysis is limited. To support effective adaptive management and to assess the success of regulatory approaches, land managers and policy makers need to review data and integrate relevant information from the previous field season.

Finally, the province of Manitoba must actively partner with academic, federal and non-governmental researchers to supplement ongoing monitoring data with targeted research that examines the causal links between diverse remedial actions in the watershed and responsive changes in lake phosphorus concentrations.

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<sup>3</sup> Manitoba Agriculture and Resource Development, 2020. [Lake Winnipeg: Nutrients and Loads Status Report](#).

## **The regulation does not make use of the best available evidence to ensure success despite acknowledged resource and capacity limitations.**

The role of phosphorus in driving freshwater eutrophication has been repeatedly demonstrated through whole-lake ecosystem research at IISD-Experimental Lakes Area,<sup>4, 5</sup> and is supported by broad scientific consensus on the need to reduce phosphorus to improve water quality. Subsequently, case studies from around the world have confirmed that phosphorus reduction alone is effective in reducing algal blooms.<sup>6</sup> Conversely, the benefits of nitrogen reduction remain controversial and unclear, while also entailing high costs.

Background materials presented alongside the proposed regulation emphasize that “since the early 2000s, the government of Manitoba has considered both nitrogen and phosphorus in nutrient reduction strategies.”<sup>7</sup> Since the early 2000s, by the provincial government’s own data and analysis, neither nutrient has been effectively reduced. The provincial approach, which has coupled phosphorus and nitrogen reduction, is having the unintended effect of increasing costs and delaying efforts to improve water quality in Lake Winnipeg – when research indicates the desired result can be achieved by reducing phosphorus alone.

The Red River basin contributes 70 per cent of the total phosphorus load to Lake Winnipeg. Within the Red River basin, consistent phosphorus hotspots have been identified over multiple years of monitoring by the Lake Winnipeg Community-Based Monitoring Network.<sup>8</sup> Targeting remediation efforts in phosphorus hotspots will reduce the amount of phosphorus entering Manitoba’s lakes and rivers, and increase the value-for-money of water-quality investments, making effective use of limited public funds. The collaborative effort and high-quality data generated by this network should be acknowledged and used to inform an evidence-based strategy to meet Red River phosphorus-loading targets.

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<sup>4</sup> Schindler, D.W., Hecky, R.E., Findlay, D.L., Stainton, M.P., Parker, B.R., Paterson, M.J., Beaty, K.G., Lyng, M., and Kasian, S.E.M. 2008. Eutrophication of lakes cannot be controlled by reducing nitrogen input: Results of a 37-year whole-ecosystem experiment. *PNAS*, 105: 11254-11258.

<sup>5</sup> Higgins, S.N., Paterson, M.J., Hecky, R.E., Schindler, D.W., Venkiteswaran, J.J., & Findlay, D.L. 2018. Biological nitrogen fixation prevents the response of a eutrophic lake to reduced loading of nitrogen: evidence from a 46-year whole-lake experiment. *Ecosystems* 21: 1088-1100.

<sup>6</sup> Schindler, D.W., Carpenter, S.R. Chapra, S.C., Hecky, R.E., and Orihel, D.M. 2016. Reducing phosphorus to curb lake eutrophication is a success. *Environmental Science and Technology*, 50: 8923-8929.

<sup>7</sup> Manitoba Agriculture and Resource Development, 2020. [A Proposed Regulation under the Water Protection Act, Nutrient Concentration and Loading Targets for Lake Winnipeg and its Tributaries: Public Consultation Document](#).

<sup>8</sup> Lake Winnipeg Foundation, 2020. [Lake Winnipeg Community-Based Monitoring Network: 2019 Report](#).

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## Recommendation

To date, efforts to manage excess phosphorus entering Lake Winnipeg have produced very little in the way of measurable results. Evidence-based, ecologically meaningful targets are necessary, and must be linked to concrete timelines and integrated with new regulatory and incentive-based action from the provincial government. Without such an overarching framework to enable their achievement, setting targets alone will not effectively address the multi-faceted challenge of freshwater eutrophication in Manitoba.

LWF recommends that the proposed Nutrient Target Regulation be redrafted in response to concerns raised in this and other submissions received through consultation. We encourage increased transparency, strengthened scientific analyses and an acknowledgment of the need to prioritize actions that will be the most efficient in achieving desired results.

## About the Lake Winnipeg Foundation

The Lake Winnipeg Foundation (LWF) advocates for change and co-ordinates action to improve the health of Lake Winnipeg, now and for future generations.

Combining the expertise of our Science Advisory Council and the commitment of our members, LWF is nationally recognized for our unique capacity to link science and action. Our goal is to ensure policy and practices informed by evidence are implemented and enforced.

LWF is the only membership-based freshwater organization in Manitoba, working collaboratively with non-profit, academic, industry and government sectors, First Nations, and the public to restore and protect our great lake.

Our flagship initiative, the Lake Winnipeg Health Plan, identifies eight evidence-based actions to improve the health of Lake Winnipeg – providing a blueprint for cost-effective decision-making and long-term, adaptive freshwater management.

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