LWF LAKE WINNIPEG FOUNDATION

SUBMISSION TO
MANITOBA ENVIRONMENT
AND CLIMATE

water strategy action plan

APRIL / 2023

Evidence-based action for Lake Winnipeg

Evidence-based, strategic and focused action – including both regulatory protection and financial investment – are required from the government of Manitoba to improve Lake Winnipeg's water quality and reduce the impacts of eutrophication caused by excess phosphorus loading.

Over the last 30 years, as a result land-use changes in the Lake Winnipeg watershed that have increased phosphorus runoff into Manitoba's waterways, water quality in Lake Winnipeg has deteriorated rapidly. Increasingly frequent algal blooms have detrimental impacts on recreation and wellbeing, infrastructure, economic development, and ecosystem and human health. The intensity and severity of algal blooms are exacerbated by climate change: increased precipitation carries more phosphorus into freshwater ecosystems, while warming water temperatures accelerate algal growth.

The Lake Winnipeg Community-Based Monitoring Network

The Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is a long-term phosphorus monitoring program designed specifically to generate the data and information necessary to support local, provincial and federal decision-making to improve the health of Lake Winnipeg.

In Manitoba, spring snowmelt and increasingly severe summer storms contribute the greatest amount of phosphorus to local waterways and ultimately to Lake Winnipeg. To effectively monitor these seasonal phosphorus loads and pinpoint their sources, water samples must be collected frequently at many dispersed sampling sites during the spring melt and after large rain events, when phosphorus runoff is occurring.

LWCBMN engages volunteer citizen scientists and watershed partners in water-sampling activities specifically to address these unique monitoring requirements, in order to improve our understanding of phosphorus loading within the Lake Winnipeg watershed. Volunteers and watershed partners live, work or commute near their sampling sites, dispersed throughout the larger watershed, and can collect samples responsively to capture key runoff events. As such, LWCBMN generates high-resolution data to accurately identify phosphorus hotspots – localized areas that contribute higher amounts of phosphorus than other areas.

LWCBMN provides critical evidence to improve water management

Targeting phosphorus-reduction actions within phosphorus hotspots is necessary to prevent and reverse the impacts of freshwater eutrophication and improve water quality in Lake Winnipeg.

To inform the provincial government's development of an action plan for evidence-based agricultural water management, LWF is pleased to provide the province with all available phosphorus data, information and knowledge generated by the Lake Winnipeg Community-Based Monitoring Network.

LWCBMN data is publicly available online at LakeWinnipegDatastream.ca.

LWCBMN information, including annual phosphorus exports by sub-watershed within agro-Manitoba, is shared on the Lake Winnipeg Foundation website.

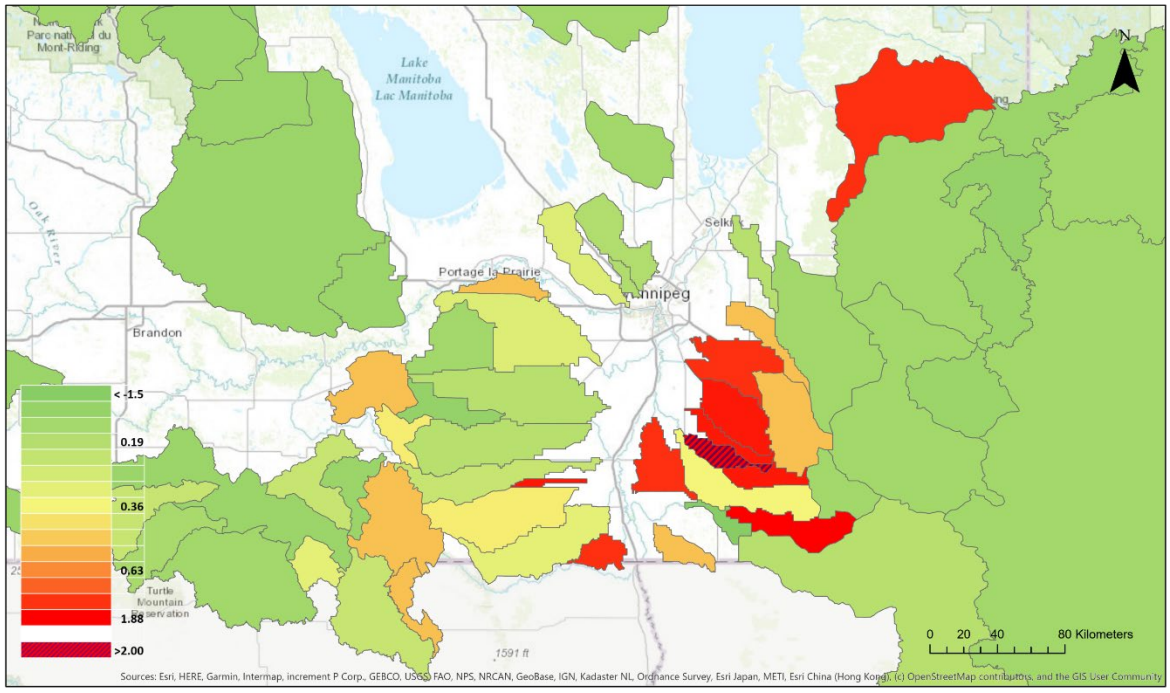

Figure 1. Phosphorus export (kg/ha/y) from Red River valley drainage areas sampled by the Lake Winnipeg Community-Based Monitoring Network (LWCBMN) in 2019. Recurring phosphorus hotspots, shown in red, must be prioritized for phosphorus reduction to improve water quality.

Recognizing the value of LWCBMN data

The value of LWCBMN data to improve water management in agro-Manitoba was repeatedly recognized in the *Manitoba Water Management Strategy Recommendations Report*, produced by EMILI in 2022. In particular, the report recommended that the following short-term actions be completed within less than five years, with the Lake Winnipeg Foundation identified as a stakeholder that could hasten implementation:

- Continue to engage with citizen science program being run by the Lake Winnipeg Foundation as a means to supplement provincial data gathering;
- Step up enforcement of existing regulations around water quality, water use and drainage; and
- Identify hotspots throughout the province that consistently struggle with poor water quality and prioritize mitigating actions in these areas.[1]

The latter recommendation was highlighted by EMILI as a "high-impact action that could be initiated before the end of 2022."

[1] Enterprise Machine Intelligence and Learning Initiative (EMILI), 2022. Manitoba Water Management Strategy Recommendations Report.

Recommended actions to improve agricultural water management

By incorporating LWCBMN data, information and knowledge into provincial decision-making, the government of Manitoba will advance multiple strategic objectives for improved agricultural water management.

LWF recommends that the following actions be included in the water action plan:

1. Invest in the long-term sustainability of LWCBMN as a critical source of phosphorus data to evaluate progress and support adaptive water management in phosphorus hotspots

Lead: Lake Winnipeg Foundation	**Support:** Manitoba Environment and Climate

Timeline: by May 2023 and annually thereafter

Indicators of Success:

- # of years of continuous LWCBMN data collection
- # of flow-monitored sampling sites in the network

Advances Strategic Objectives:

10.1 Ensure that monitoring programs support water management decision-making
10.2 Enhance sharing of data and information about water
10.3 Incorporate adaptive management into water management in Manitoba
10.6 Increase collaborations, partnerships and investment for water research and innovation
11.3 Support engagement and participation of local organizations in water initiatives, including community-based monitoring and citizen science

Based on Guiding Principles:

Commitment to Knowledge: grounded in best available scientific, Indigenous and local knowledge
Continual Improvement: open to innovation and better approaches
Good Governance: an approach to achieving the vision and mission that is principles, accountable, co-ordinated and collaborative

2. Annually, publicly release provincial long-term water-quality monitoring data, effluent data from licensed wastewater treatment facilities, data on manure application and manure management plans and other relevant water-quality data to support evidence-based decision-making by both government and stakeholders

Lead: Manitoba Water Science and Watershed Management Branch	**Support:** Lake Winnipeg DataStream

Timeline: by May 2024 and annually thereafter

Indicators of Success:

- Annual release of provincial water-quality monitoring network data
- Annual release of effluent data from wastewater facilities in the province
- Annual realise of data on manure application and manure management plans

Advances Strategic Objectives:

10.1 Ensure that monitoring programs support water management decision-making
10.2 Enhance sharing of data and information about water
10.6 Increase collaborations, partnerships and investment for water research and innovation

Based on Guiding Principles:

Commitment to Knowledge: grounded in best available scientific, Indigenous and local knowledge

3. Annually, incorporate LWCBMN's interoperable phosphorus data into analysis of provincial long-term water-quality monitoring phosphorus data, to calculate and map phosphorus loads and exports for sub-watersheds throughout southern Manitoba; release the data and information publicly to track progress on reducing phosphorus loads from existing hotspots

Lead: Manitoba Water Science and Watershed Management Branch	**Support:** Lake Winnipeg Foundation; Lake Winnipeg DataStream

Timeline: by May 2024 and annually thereafter

Indicators of Success:

- Annual publication of integrated LWCBMN and provincial phosphorus data
- % reduction, annually, of phosphorus loads and exports from existing phosphorus hotspots

Advances Strategic Objectives:

10.1 Ensure that monitoring programs support water management decision-making
10.2 Enhance sharing of data and information about water
10.6 Increase collaborations, partnerships and investment for water research and innovation

Based on Guiding Principles:

Commitment to Knowledge: grounded in best available scientific, Indigenous and local knowledge
Continual Improvement: open to innovation and better approaches

4. Target provincial water-quality incentive programs (e.g. Conservation, GROW and GROW Wetlands Trusts) and cost-shared agricultural funding programs (e.g. Ag Action Manitoba) to existing phosphorus hotspots identified by LWCBMN (Figure 1)

Lead: Manitoba Habitat Heritage Corporation, Manitoba Agriculture	**Support:** Manitoba's Watershed Districts, Manitoba Association of Watersheds, Manitoba Watershed Planning & Programs Section

Timeline: By September 2023 and for each subsequent call for proposals

Indicators of Success:

- % of Trusts funding targeted to existing phosphorus hotspots
- % of agricultural funding targeted to existing phosphorus hotspots
- % reduction, annually, of phosphorus loads and exports from existing phosphorus hotspots

Advances Strategic Objectives:

3.4 Improve surface water management at the watershed scale, including retention and drainage
7.3 Reduce excess phosphorus loading to Manitoba's waterways
9.4 Coordinate funding investments to meet defined watershed goals

Based on Guiding Principles:

Commitment to Knowledge: grounded in best available scientific, Indigenous and local knowledge
Continual Improvement: open to innovation and better approaches

5. Conduct robust, site-specific water monitoring of all provincially funded phosphorus-reduction projects to quantify outcomes and evaluate project performance	
Lead: Manitoba Habitat Heritage Corporation, Manitoba Agriculture	**Support:** University of Manitoba, University of Winnipeg, Manitoba Water Science and Watershed Management Branch, Lake Winnipeg Foundation, International Institute for Sustainable Development
Timeline: By September 2024 and ongoing	
Indicators of Success: • % of Trust-funded projects focused on phosphorus reduction • % reduction, annually, of phosphorus load resulting from funded projects	
Advances Strategic Objectives:	
3.4 Improve surface water management at the watershed scale, including retention and drainage 7.3 Reduce excess phosphorus loading to Manitoba's waterways 9.4 Coordinate funding investments to meet defined watershed goals 10.1 Ensure that monitoring programs support water management decision-making 10.3 Incorporate adaptive management into water management in Manitoba	
Based on Guiding Principles:	
Commitment to Knowledge: grounded in best available scientific, Indigenous and local knowledge *Continual Improvement:* open to innovation and better approaches *Good Governance:* an approach to achieving the vision and mission that is principled, accountable, co-ordinated and collaborative	

6. Increase resources available for annual auditing of manure management plans and enforcement of the Livestock Manure and Mortalities Management Regulation within existing phosphorus hotspots identified by LWCBMN (Figure 1); track and report on audit and enforcement outcomes to inform improvements to freshwater-protection regulations

LEAD: Manitoba Environmental Approvals Branch	Support:

Timeline: By September 2023 and annually thereafter

Indicators of Success:

- # of manure management plan audits occurring annually within phosphorus hotspots
- Annual publication of audit and enforcement data

Advances Strategic Objectives:

10.1 Ensure that monitoring programs support water management decision-making
10.2 Enhance sharing of data and information about water
10.3 Incorporate adaptive management into water management in Manitoba

Based on Guiding Principles:

Intergenerational equity: recognize and consider the needs of current and future generations
ESG Values-Driven Economic Development: deliver sustainable economic growth based on environment, social and governance (ESG) values
Ecological Resilience: maintain and restore ecosystem integrity and health

Gaps in provincial strategy subvert its validity and legitimacy

While recognizing potential opportunities for action to improve agricultural water management in Manitoba, the Lake Winnipeg Foundation (LWF) has significant concerns about the water strategy framework released by the Manitoba government on November 8th, 2022. Serious gaps in the framework subvert its validity and legitimacy. Indeed, based on its own guiding principles, the framework fails as a comprehensive provincial water management strategy:

1) Indigenous inclusion: The framework document acknowledges that the inclusion of Indigenous knowledge and expertise "is essential for the strategy to be a success."[2] Despite this recognition, the provincial government has not provided any evidence that Indigenous governments and rightsholders have been meaningfully involved in the development of the strategy's 11 focus areas and 47 strategic objectives. Having failed to include Indigenous perspectives and priorities in the strategy itself, the provincial government now claims it will engage with Indigenous governments and rightsholders through the strategy's action plan – yet again fails to provide any clear plan or process to achieve meaningful engagement. With the knowledge, expertise, rights and jurisdiction of Indigenous peoples absent from the provincial framework, Manitoba's purported water strategy disregards the responsibilities set forth in the numbered treaties and affirmed in Section 35 of the *Charter of Rights and Freedoms* and in the *United Nations Declaration on the Rights of Indigenous Peoples*. Ongoing failure to include Indigenous peoples in water governance will result in economic, social and environmental costs for all Manitobans.
2) Good Governance: The framework document fails to articulate an effective and transparent governance structure for determining provincial water priorities and directing public investment. In particular, the document does not explain how private economic interests will be balanced against environmental, cultural and social impacts in provincial decision-making. Concerning, a number of industry projects are celebrated within the strategy document, even as Manitoba communities' environmental, cultural and social concerns about these projects are ignored. The framework document fails to acknowledge or address harmful impacts of the Lake Manitoba and Lake St. Martin outlet channels project[3,4], of Water Power Act licences for Lake Winnipeg regulation and water diversions[5], and of proposed

[2] Manitoba, 2022. Manitoba's Water Management Strategy.
[3] CBC, June 23, 2022. https://www.cbc.ca/news/canada/manitoba/judicial-review-lake-st-martin-lake-flood-outlet-1.6499430
[4] Winnipeg Free Press, June 13, 2022. https://www.winnipegfreepress.com/breakingnews/2022/06/13/outlet-channels-project-data-still-missing-ottawa
[5] APTN, Sept. 19, 2018. https://www.aptnnews.ca/national-news/we-have-to-live-with-these-changes-everyday-norway-house-still-struggling-from-hydro-development/

silica sand extraction projects[6] – all of which run counter to the stated vision of "resilient, thriving ecosystems and communities."

3) Commitment to knowledge: Unfortunately, the Manitoba government continues to ignore the best available evidence for the management of freshwater eutrophication. The role of phosphorus in driving freshwater eutrophication has been repeatedly demonstrated through multi-decadal, whole-lake research at IISD-Experimental Lakes Area,[7,8] 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.[9] Despite this evidence, the Manitoba government continues to distract from focused action on phosphorus reduction by requiring expensive yet ineffective nitrogen reduction to address freshwater eutrophication. Since the early 2000s, by the provincial government's own data and analysis, neither nutrient has been effectively reduced.

[6] CBC, March 12, 2023. https://www.cbc.ca/news/canada/manitoba/manitoba-residents-silica-sand-mining-project-1.6776538

[7] 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.

[8] Higgins, S.N., Paterson, M.J., Hecky, R.E., Schindler. D.W., Venkitswaran, 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.

[9] 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.

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 commitment of our grassroots membership and the expertise of our science advisors, 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's 2023-2027 strategic plan advances evidence-based action to reduce phosphorus loading, the root cause of harmful algal blooms on Lake Winnipeg. Through this plan, LWF:

- advocates for phosphorus compliance at Winnipeg's North End Water Pollution Control Center;
- coordinates the Lake Winnipeg Community-Based Monitoring Network, generating robust water-quality data to identify phosphorus hotspots within the lake's watershed; and
- engages and educates Manitobans as watershed citizens, providing them with information and tools to advocate for freshwater protection.

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