NUTRIENT TARGETS REGULATION: REPORT ON NUTRIENT LEVELS THROUGH 2023 AND ACTION UNDERWAY

Water Science and Watershed Management Branch

December 2024

Manitoba
Environment and Climate Change

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INTRODUCTION

The Manitoba government is committed to protecting, maintaining, and improving the health of aquatic ecosystems and water resources across the province. Manitoba is leading by example in developing and implementing legislation protecting surface waters from the impacts of nutrient pollution. Sections 4.0.1 (1) through 4.0.2 (5) of The Water Protection Act enable the development of nutrient targets for Lake Winnipeg and its tributaries, and also commit Manitoba to reporting regularly (every four years) on progress towards implementing the targets. The first such report was released in January 2021, detailing nutrient levels and reduction efforts up to and including 2019. This second report details nutrient levels and reduction efforts up to and including 2023, as well as relevant recent updates from 2024. This is also the first report issued since the August 23, 2024 establishment Nutrient Targets Regulation under The Water Protection Act, setting nutrient loading targets for the Red, Winnipeg, Saskatchewan, and Dauphin rivers flowing into Lake Winnipeg and nutrient concentration targets for total phosphorus and total nitrogen in Lake Winnipeg. The nutrient targets help Manitoba's collective water quality efforts by guiding future nutrient reduction activities and best management practices, identifying priorities and helping track progress and outcomes over time. The nutrient targets were developed based on the best available science over a period of many years through stakeholder input, scientific review, and inter-jurisdictional collaboration. Manitoba will continue to use scientific evidence and an adaptive management approach to guide ongoing nutrient management strategies. Further information on the background and development of the nutrient targets is described in the following documents:

- Nutrient Concentration and Loading Targets for Lake Winnipeg and its Tributaries (2020);
- Setting Phosphorus and Nitrogen Targets to Improve Water Quality (2020); and
- Application of Water Quality Model to Develop Nutrient Targets for Lake Winnipeg Tributaries (2015)

This report fulfills the reporting requirements under The Water Protection Act by providing a summary of nutrient levels (nitrogen and phosphorus) at locations specified by the Nutrient Targets Regulation. This report also describes government policies and programs aimed at

reducing nutrient loading to water bodies from Manitoba sources, and the steps taken by the government to promote and support nutrient reduction policies and programs in other jurisdictions that share a transboundary river basin with Manitoba. Much of the work described also contributes to advancing the October 19, 2023 mandate and priorities for Manitoba Environment and Climate Change, including a commitment to work with experts and scientists to protect Lake Winnipeg and safeguard the health of all our waterways.

BACKGROUND

The gradual, but steady, increase in nitrogen and phosphorus over the past several decades is one of the single, largest water quality challenges facing jurisdictions all over the world, including Manitoba. Although nutrients are vital for healthy lakes and rivers, excessive concentrations can lead to algal blooms that spoil drinking water, ruin beaches, reduce property values, and harm fish and other aquatic life. In addition, some forms of blue green algae (also called cyanobacteria) can produce highly potent toxins that can harm animals (e.g., livestock, pets) and humans.

With its beautiful beaches and wide open waters, Lake Winnipeg is one of Manitoba's greatest freshwater resources. Lake Winnipeg plays a critical role in tourism, recreation, commercial and sport fishing, and hydroelectric generation in Manitoba. Since the 1990s, Lake Winnipeg has experienced an increase in the frequency and severity of cyanobacterial blooms, at times covering more than 10,000 square kilometers of the lake surface area. Although less commonly reported, other lakes (as well as streams and rivers) throughout the Lake Winnipeg watershed periodically experience algal blooms, particularly during warm weather and when flows and water levels are low.

SOURCES OF NUTRIENTS IN LAKE WINNIPEG AND ITS WATERSHED

The Lake Winnipeg watershed is approximately one million square kilometres, and stretches across two countries, four provinces, four states, and many municipalities and counties. Virtually all activities across the Lake Winnipeg basin contribute nutrients to the lake, including point sources such as wastewater and industrial discharges, and non-point source runoff from golf courses, urban and cottage areas, agriculture, and natural areas. Actions to improve water quality

in Lake Winnipeg are challenging given the many small sources of nutrients spread across the very large basin.

A summary of estimated annual total phosphorus and total nitrogen loading to Lake Winnipeg from Manitoba and upstream jurisdictions is provided in Table 1.

In general, about half of the nutrients in Lake Winnipeg originate from within Manitoba with the remaining nutrients being contributed from upstream jurisdictions (Ontario, Saskatchewan, Alberta, North Dakota, Minnesota, and small areas of South Dakota and Montana). Despite only contributing about 15 per cent of the total inflow, the Red River and its tributaries contribute the largest load of nutrients to Lake Winnipeg (Figure 1). Therefore, the Red River has been the primary focus for nutrient management strategies and nutrient reduction on a provincial and international scale. However, other major tributaries discharging into the lake (Winnipeg, Saskatchewan, Dauphin Rivers) also contribute a significant proportion of nutrient load and streamflow to the lake (Figure 1).

Table 1. Summary of estimated annual total phosphorus and total nitrogen loads to Lake Winnipeg from Manitoba and from upstream jurisdictions (1994-2023 average).

	Phosphorus Load		Nitrogen Load	
	Tonnes per year	Per cent Contribution	Tonnes per year	Per cent Contribution
Upstream Jurisdictions*	**3,761**	**53**	**36,843**	**39**
United States - Red River	2,480	35	16,992	18
United States - Souris River	173	2	1,040	1
Saskatchewan and Alberta – Assiniboine and Qu'Appelle	201	3	1,564	2
Ontario and United States - Winnipeg River	834	12	15,880	17
Ontario - Other East Side Lake Winnipeg Rivers	73	1	1,367	1
Manitoba Sources*	**3,352**	**47**	**55,863**	**61**
Red River and Tributaries (Assiniboine, Qu'Appelle, Souris, Pembina rivers)	2,023	29	15,043	16
Winnipeg River	179	3	3,580	4
Saskatchewan River	400	6	10,638	12
Dauphin River	79	1	5,077	6
West and South Lake Winnipeg Rivers	59	1	633	1
East Side Lake Winnipeg Rivers	112	2	2,093	2
Atmospheric Deposition	500	7	9,500	10
Nitrogen Fixation	-	-	9,300	10
Total Lake Winnipeg Nutrient Load	**7,113**	**100**	**92,706**	**100**

*These calculations are based on load estimates for major tributaries at the Manitoba border and in the various tributaries as near as possible to Lake Winnipeg. The exception is the Saskatchewan River where the entire load entering Lake Winnipeg from Cedar Lake is apportioned to Manitoba. Donald et al. (2015)[1] have shown that lakes and reservoirs can be significant sinks for sediment and nutrients. A large portion of the nutrients entering Manitoba in the Saskatchewan River will likely remain in Cedar Lake and not reach Lake Winnipeg. Similarly, estimated atmospheric deposition contributions to the lake are assigned to Manitoba. These estimates do not include the many small unmonitored tributaries around Lake Winnipeg and do not take into account all the in-stream processes which may reduce the nutrient concentrations in the tributaries. As a result, Manitoba's contribution is likely higher than the values shown here. Further background on methodological details on nutrient loading calculations are available in the State of Lake Winnipeg report (2011).

[1] Donald, D. B., Parker, B. R., Davies, J. M., & Leavitt, P. R. (2015). Nutrient sequestration in the Lake Winnipeg watershed. Journal of Great Lakes Research, 41(2), 630-642.

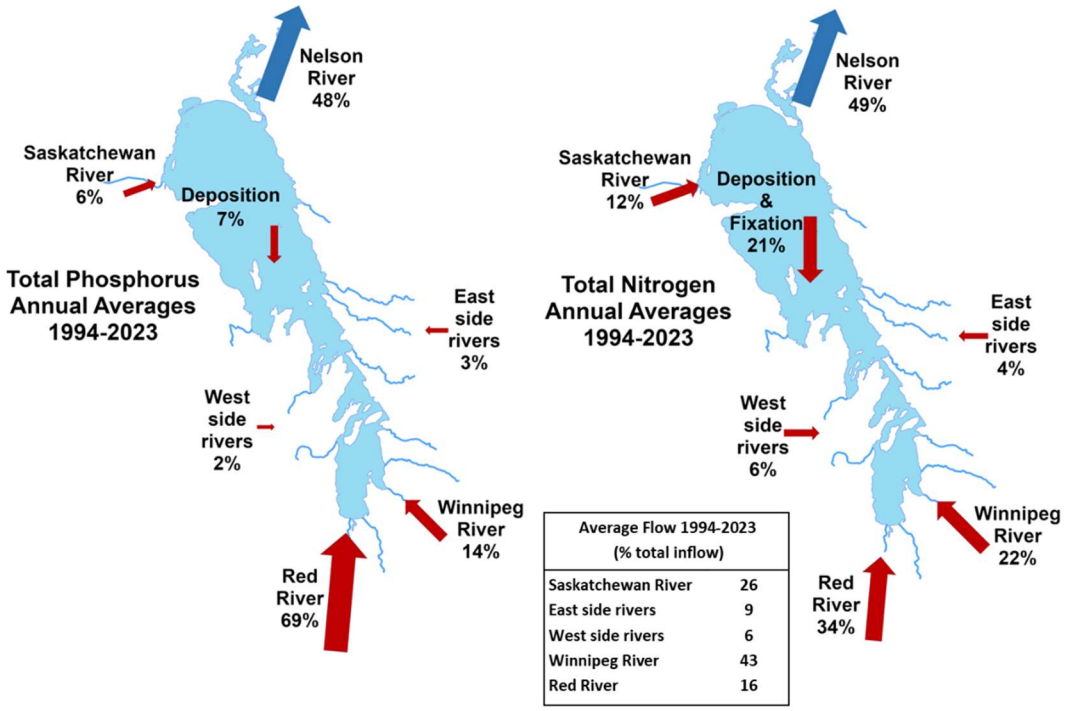

Figure 1. Estimated total phosphorus and total nitrogen loads, and flow to Lake Winnipeg, 1994-2023.

NUTRIENT LOADING FOR LAKE WINNIPEG TRIBUTARIES

Proposed Nutrient Loading Targets

The Nutrient Targets Regulation under The Water Protection Act includes total phosphorus and total nitrogen load targets for the four main tributaries flowing into Lake Winnipeg (Table 2). Nutrient load targets were developed, based on the following nutrient concentration targets, and a water quality model for Lake Winnipeg developed by Environment and Climate Change Canada. The Red River (and tributaries to the Red River, such as the Assiniboine River) is the primary contributor of nutrients to Lake Winnipeg. However, the modelling work showed that further reductions in nutrient loads from the lake's other main tributaries (Saskatchewan River, Winnipeg River, and Dauphin River) will be necessary to ultimately meet the nutrient concentration targets for Lake Winnipeg. All major tributaries contribute to nutrient status and phytoplankton dynamics in Lake Winnipeg.

Table 2. Annual nutrient loading targets for the four main tributaries flowing into Lake Winnipeg.

Location	Total Phosphorus Load Target (tonnes/year)	Total Nitrogen Load Target (tonnes/year)
Red River at Selkirk	2,800	19,050
Saskatchewan River at Grand Rapids	340	8,960
Winnipeg River at Pine Falls	1,050	19,450
Dauphin River midway between Anama Bay and Gypsumville	60	4,550

Comparison of Nutrient Loading Targets to Current Nutrient Loads in Major Tributaries Flowing into Lake Winnipeg

The increase in nutrient concentrations, and more frequent and intense algal blooms in Lake Winnipeg observed since the mid-1990s, has been partially attributed to increased loads due to higher levels of precipitation and runoff, more frequent flooding, and increased river flows (particularly in the Red River). Further, the relationship between runoff volume and precipitation can be altered by changes to surface drainage across the watershed. A comparison of nutrient load targets to measured historical loads to Lake Winnipeg from each main tributary show that during wet years, meeting the proposed nutrient targets is challenging. Wet years with high flows often result in years with the greatest nutrient loads, although some factors such as the timing of snowmelt and peak flow can modify the relationship between total flow and loads.

Of the four major tributaries, nutrient loading from the Red River most frequently exceeded the annual target load of nitrogen and phosphorus. Annual nutrient loads in Saskatchewan River (Figure 3) and Dauphin River (Figure 4) exceeded the total phosphorus and total nitrogen load targets during most years between 1994 and 2023. Similarly, in high annual flow years, nutrient loads in the Winnipeg River were above nutrient load targets between 1994 and 2023 (Figure 5), although the long-term average annual loads were close to or below the load target for both nitrogen and phosphorus.

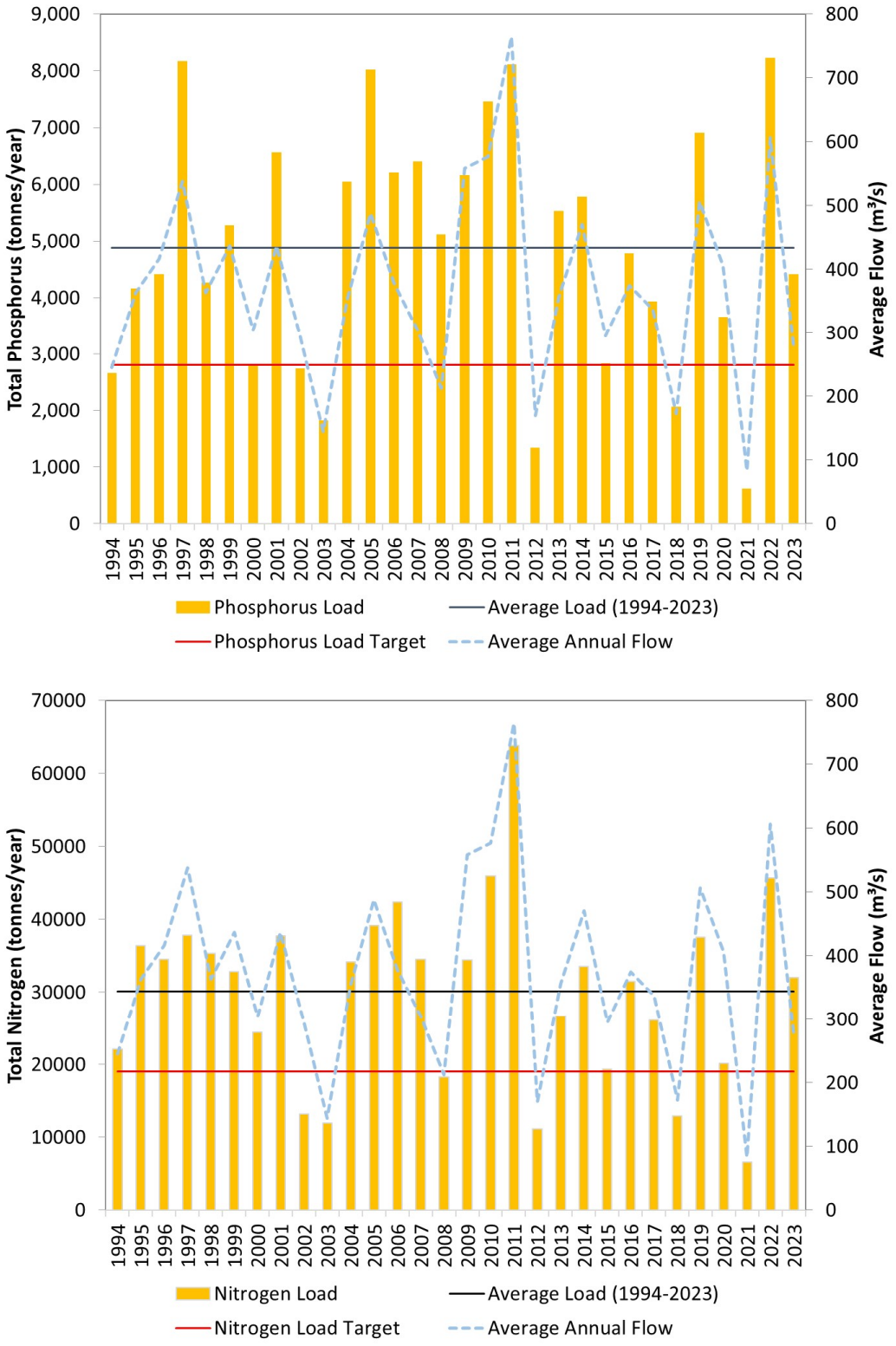

Figure 2. Annual total phosphorus and total nitrogen loads (tonnes/year) and flows in the Red River (at Selkirk), 1994 to 2023, compared to the proposed nutrient loading targets.

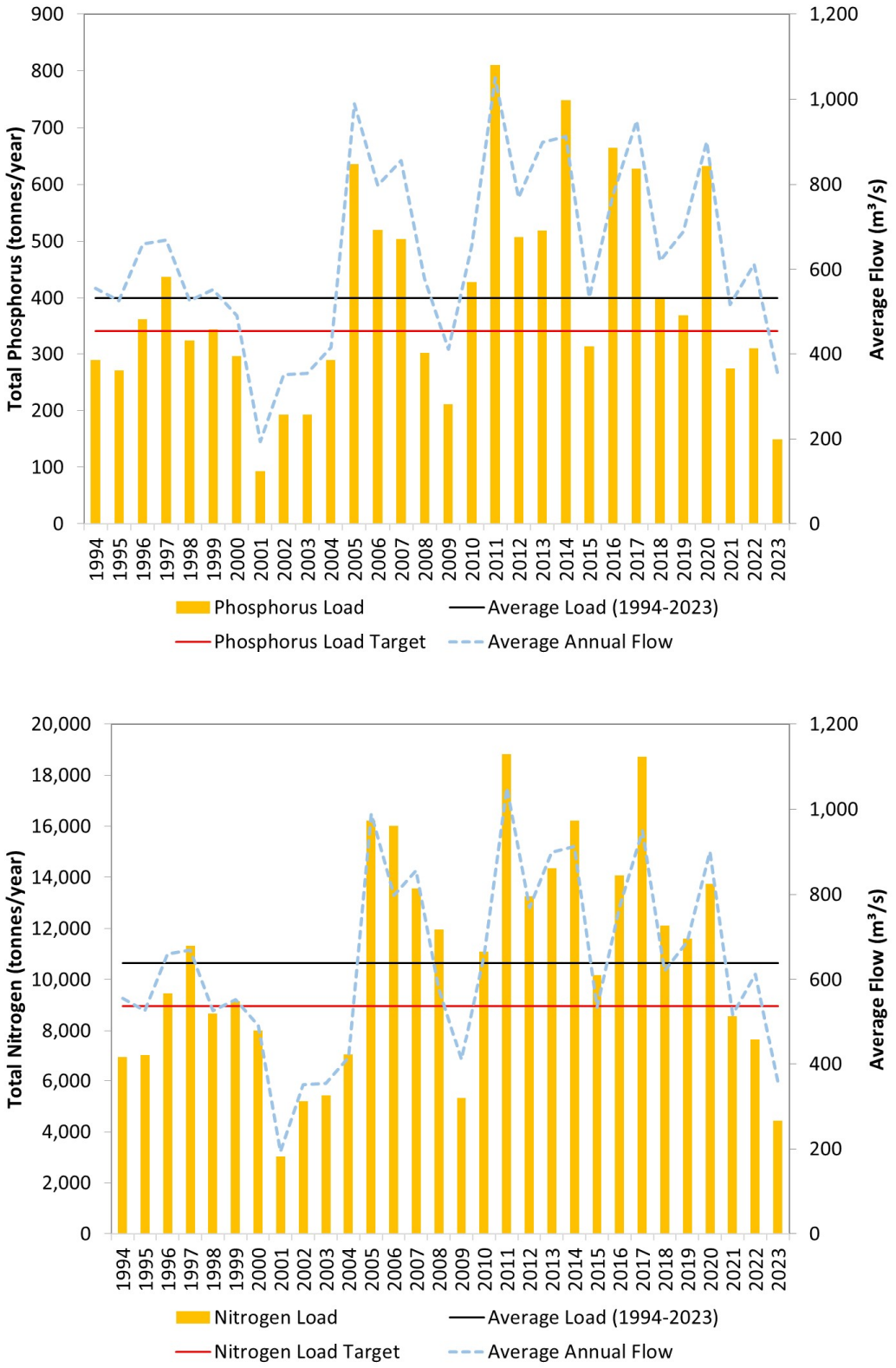

Figure 3. Annual total phosphorus and total nitrogen loads (tonnes/year) and flows in the Saskatchewan River (at Grand Rapids), 1994 to 2023, compared to the proposed nutrient loading targets.

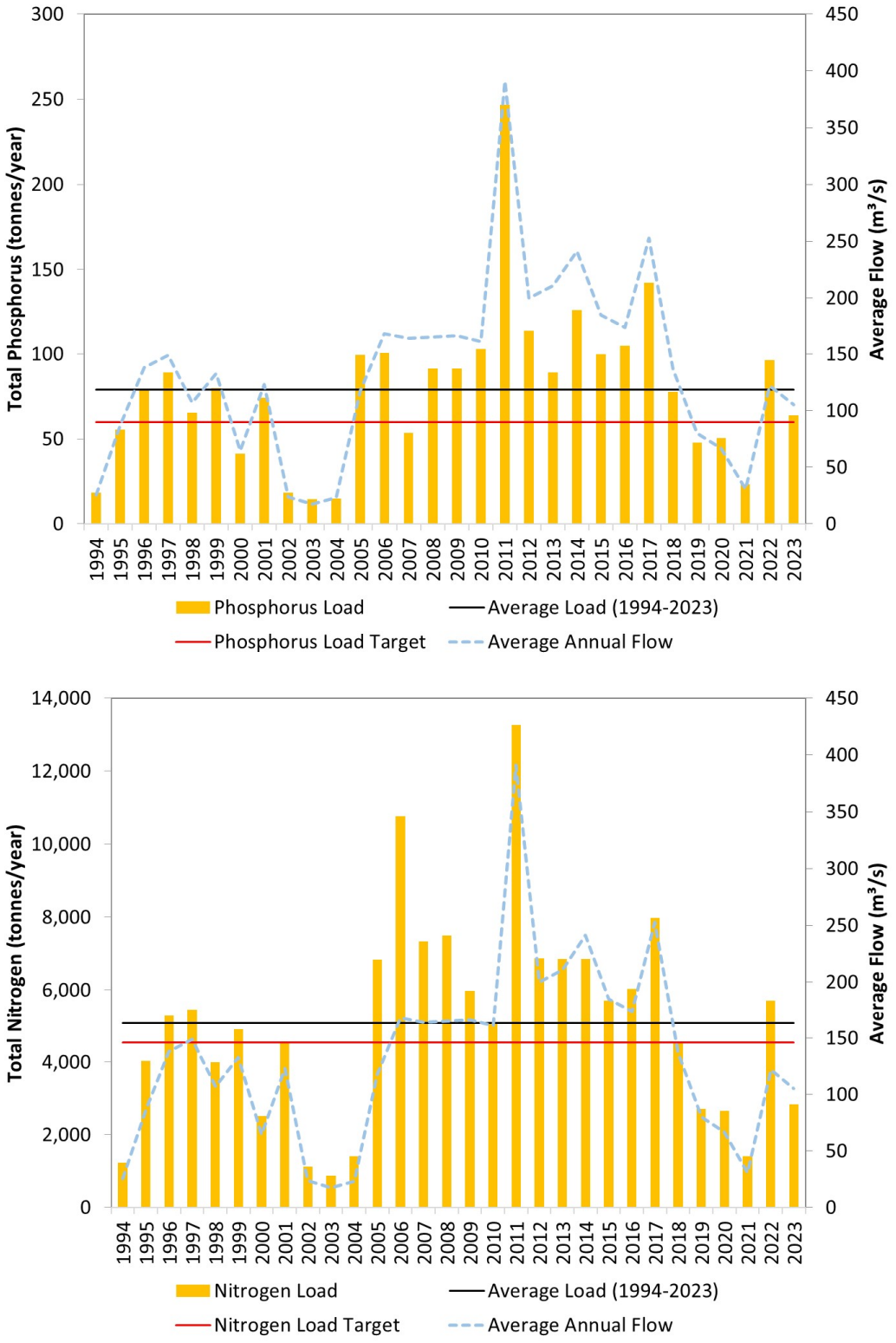

Figure 4. Annual total phosphorus and total nitrogen loads (tonnes/year) and flows in the Dauphin River (midway between Anama Bay and Gypsumville), 1994 to 2023, compared to the proposed nutrient loading targets.

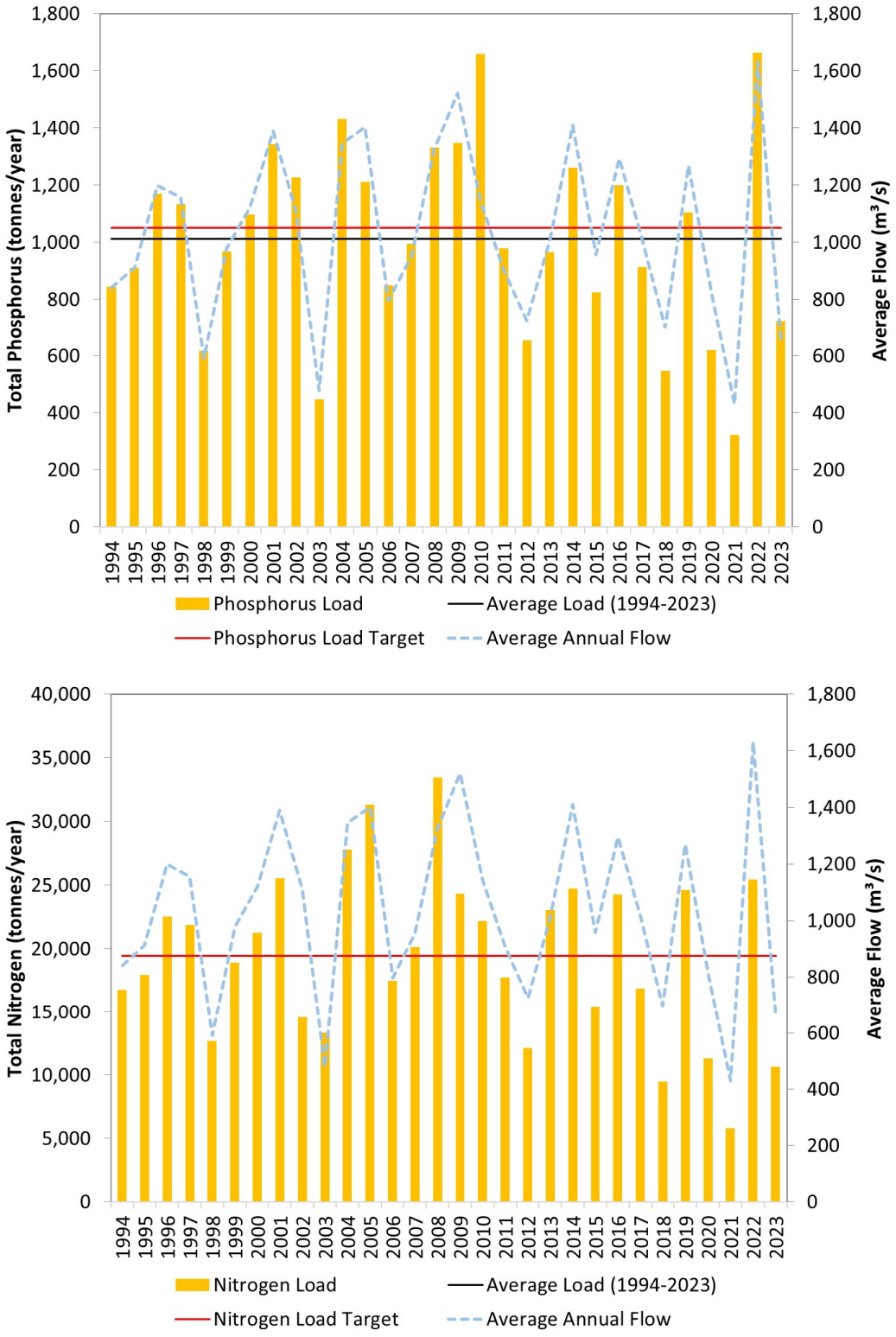

Figure 5. Annual total phosphorus and total nitrogen loads (tonnes/year) and flows in the Winnipeg River (at Pine Falls), 1994 to 2023, compared to the proposed nutrient loading targets.

NUTRIENT CONCENTRATIONS IN LAKE WINNIPEG

Nutrient Concentration Targets

The new regulation, under The Water Protection Act, includes total phosphorus and total nitrogen concentration targets for Lake Winnipeg (Table 3. Total phosphorus and total nitrogen concentration targets for the south basin (including narrows) and north basins of Lake Winnipeg). Paleolimnological records, used to reconstruct historical water quality conditions in Lake Winnipeg, indicated that total phosphorus concentrations increased from 0.015 mg/L in the 1800s, to more than 0.05 mg/L in the early 1990s, to more than 0.1 mg/L in the present day. Similarly, a shift in the algal community structure occurred in the south basin of the lake over the past three decades, as evidenced by more frequent nitrogen-fixing cyanobacteria blooms. In an effort to reduce the frequency and severity of cyanobacteria blooms, a total phosphorus concentration target of 0.05 mg/L is recommended to return Lake Winnipeg to conditions similar to those in the 1990s (Table 3. Total phosphorus and total nitrogen concentration targets for the south basin (including narrows) and north basins of Lake Winnipeg). A total nitrogen concentration target of 0.75 mg/L was set to ensure that the ratio of nitrogen to phosphorus in the lake will not promote the growth of potentially nitrogen-fixing algal blooms (cyanobacteria that can use nitrogen from the atmosphere; Table 3. Total phosphorus and total nitrogen concentration targets for the south basin (including narrows) and north basins of Lake Winnipeg). If nutrient concentration targets of 0.75 mg/L total nitrogen and 0.05 mg/L total phosphorus are achieved, this would result in a nitrogen to phosphorus molar ratio of 33:1, which helps ensure that the lake is, on average, phosphorus-limited.

Table 3. Total phosphorus and total nitrogen concentration targets for the south basin (including narrows) and north basins of Lake Winnipeg.

Location	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)
Lake Winnipeg – South Basin and Narrows	0.05	0.75
Lake Winnipeg – North Basin	0.05	0.75

Comparison of Nutrient Concentration Targets to Current Total Phosphorus and Total Nitrogen Concentrations in Lake Winnipeg

The proposed nutrient concentration targets were compared to nutrient concentrations in Lake Winnipeg from 1999 to 2023 (Figure 6). While variability between years occurs, nutrient concentrations have not increased or decreased significantly over the long-term monitoring period from 1999 to 2023. In general, the south basin of Lake Winnipeg is rich in phosphorus and is considered hypereutrophic with long-term mean total phosphorus concentrations almost three times higher in the south basin and narrows (0.106 mg/L) as compared to the north basin (0.040 mg/L) of the lake (Figure 6). Average total phosphorus concentrations in the south basin and narrows are approximately two times higher than the phosphorus target of 0.05 mg/L. Meanwhile, concentrations in the north basin have been below the phosphorus target in most years. There are no statistically significant trends (increasing nor decreasing) in phosphorus concentrations in both the north basin as well as the south basin and narrows. Annual variability in phosphorus concentrations may be attributable to large variations in external loading relative to the residence time of the lake (~three years) and annual variation in drivers of internal phosphorus loading. Significant reductions in phosphorus concentrations in the south basin and narrows will be required to achieve the phosphorus concentration target.

Lake Winnipeg is also rich in total nitrogen with higher long-term mean concentrations in the south basin and narrows (0.82 mg/L) as compared to the north basin (0.59 mg/L) of the lake (Figure 6). The large between-year variability in nitrogen may be driven by several factors in Lake Winnipeg including nitrogen fixation and denitrification processes, nitrogen loading from tributary rivers, internal loading, and wind-induced resuspension. From 1999 to 2023, the total nitrogen concentrations had a statistically significant decrease in the north basin (decreasing by 0.01 mg/L per year) while there were no statistically significant trends in the south basin and narrows. Generally, total nitrogen concentrations during the period 2012-2021 remained below the long-term mean in both the north basin and the south basin and narrows. In 2022 and 2023, mean total nitrogen concentrations in the north basin (0.43 mg/L in 2022; 0.49 mg/L in 2023) remained below the total nitrogen target concentration of 0.75 mg/L; mean total nitrogen in the

south basin (0.92 mg/L in 2022, 0.85 mg/L in 2023) rose slightly above the nitrogen target.

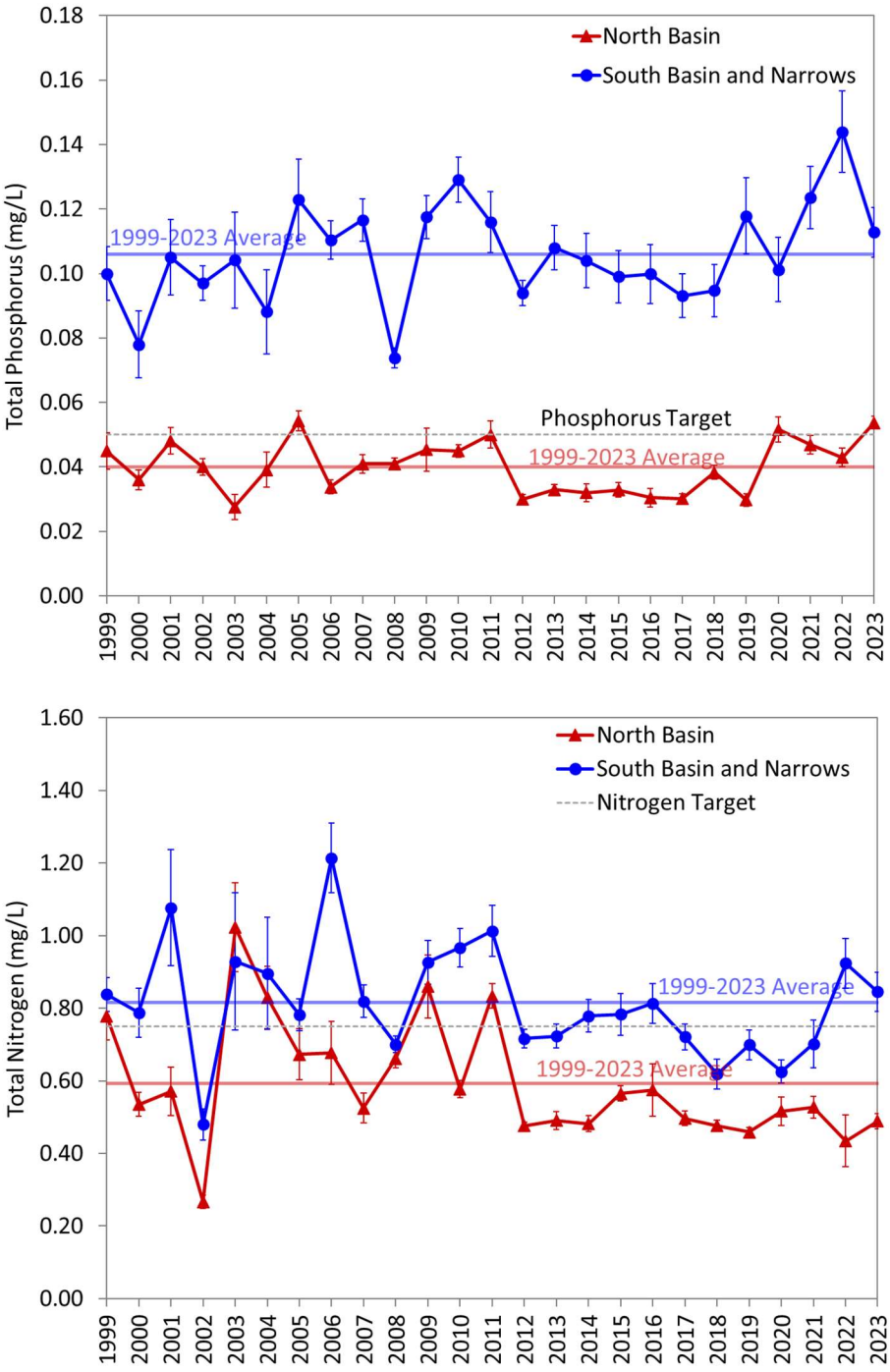

Figure 6. Total phosphorus concentrations (top) and total nitrogen concentrations (bottom) in the north basin and south basin and narrows of Lake Winnipeg, 1999 to 2023 (average during the open water season). Error bars represent the standard error of the measurements. Further background on methodological details for lake-wide nutrient concentration calculations are available in the State of Lake Winnipeg report (2011).

Table 4. Comparison of the total phosphorus target to more recently measured (2020-2023) and long-term mean concentrations (1999-2023) in the north basin and south basin and narrows of Lake Winnipeg (average during the open water season with methods per the 2011 State of Lake Winnipeg Report).

	Year	Lake Winnipeg – South Basin and Narrows	Lake Winnipeg – North Basin
Phosphorus Concentration Target (mg/L)		0.05	0.05
Average Total Phosphorus Concentration (mg/L)	2020	0.101	0.052
	2021	0.124	0.047
	2022	0.144	0.043
	2023	0.113	0.054
Average Total Phosphorus Concentration (mg/L)	2020-2023	0.120	0.049
	1999-2023	0.106	0.040

Table 5. Comparison of the total nitrogen target to more recently measured concentrations (2020-2023) and long-term mean concentrations (1999-2023) in the north basin and south basin and narrows of Lake Winnipeg (average during the open water season with methods per the 2011 State of Lake Winnipeg Report).

	Year	Lake Winnipeg – South Basin and Narrows	Lake Winnipeg – North Basin
Nitrogen Concentration Target (mg/L)		0.75	0.75
Average Total Nitrogen Concentration (mg/L)	2020	0.626	0.516
	2021	0.702	0.527
	2022	0.924	0.434
	2023	0.845	0.489
Average Total Nitrogen Concentration (mg/L)	2020-2023	0.774	0.492
	1999-2023	0.815	0.592

ACTIONS TO REDUCE NUTRIENTS IN MANITOBA SURFACE WATERS

Legislation and Regulations

The Manitoba government has established strong water protection legislation aimed at reducing nutrients from both point sources (e.g., wastewater treatment plant effluents, industrial effluents, household product bans) and non-point sources (e.g., urban and rural runoff) to protect water quality and water resources. Significant efforts to reduce nutrients are ongoing through the implementation of the:

- The Water Protection Act and associated regulations, including;
    - Manitoba Water Quality Standards, Objectives, and Guidelines Regulation
    - Nutrient Management Regulation
    - Nutrient Targets Regulation
- The Environment Act and associated regulations, including;
    - Livestock Manure and Mortalities Management Regulation
- The Pesticides and Fertilizers Control Act
- The Planning Act
- The Watershed Districts Act
- The Water Rights Act

The Water Protection Act: Manitoba Water Quality Standards, Objectives and Guidelines Regulation

The Manitoba Water Quality Standards, Objectives, and Guidelines Regulation, under The Water Protection Act, sets effluent quality standards for nutrients discharged to surface waters from industrial and municipal wastewater treatment facilities. Under the regulation, large and medium-sized municipal and industrial wastewater treatment facilities (discharging more than 820 kg of phosphorus per year) are required to meet a 1 mg/L total phosphorus concentration standard. In 2023, compliance with the requirement to remove phosphorus to 1 mg/L was 87 per cent for facilities across Manitoba (Table 6). This rate of compliance represents a slight increase from compliance between the periods 2020-2022 (78 per cent) and 2016-2019 (73 per cent). The regulation also required major facilities to meet a 15 mg/L total nitrogen standard when building

new, upgrading, or expanding. Sampling frequency and protocols for compliance are based on individual treatment facilities license requirements, and Manitoba wastewater treatment licenses are available on Manitoba Environment and Climate Change's Public Registry.

Table 6. Annual Compliance Review of Manitoba government owned-facilities or facilities serving 2,000 people (or more or equivalent due to industrial contributions) meeting the 1 mg/L total phosphorus standard.

Year	Percent Compliance
2016	71%
2017	83%
2018	67%
2019	72%
2020	78%
2021	78%
2022	78%
2023	87%

As a result of this regulation, upgrades to remove both phosphorus and nitrogen are complete for the cities of Brandon, Selkirk, Headingley and Thompson and for two of the wastewater treatment facilities for the City of Winnipeg (West and South End). Expansion/upgrades to remove phosphorus and nitrogen are planned for the cities of Portage la Prairie and Winkler and have been included in the design and licensing of new facilities such as for the Red-Seine-Rat Wastewater Cooperative.

The Water Protection Act: Nutrient Management Regulation

Although point sources of nitrogen and phosphorus are relatively easy to measure and control, diffuse non-point sources are often more challenging to measure and control. Actions to reduce nutrients from non-point sources have been established through the Nutrient Management Regulation under The Water Protection Act by encouraging responsible nutrient planning, regulating the application of materials containing nutrients, and restricting the development of certain types of facilities (e.g., sewage treatment plants or lagoons, manure storage facilities, septic fields) in environmentally-sensitive areas (e.g., near vulnerable rivers and lakes).

The Nutrient Management Regulation ensures that nutrients (from all sources, including inorganic fertilizer, municipal sludge/biosolids, and manure) are not either over-applied to land (based on soil threshold values for phosphorus and limits for nitrogen) or applied to land between November 10 and April 10 each year. The intent of the seasonal restriction is to eliminate, or at a minimum to reduce, the application of nutrients to frozen land where it may be susceptible to runoff in the spring. Further, within urban and built-up areas (Nutrient Management Zone N5), no one shall apply a fertilizer containing more than one per cent phosphorus by weight, expressed as P_2O_5, to turf. An exception to this restriction includes newly established turf during the year of establishment, as well as, the year following establishment. Flowerbeds, gardens, trees and shrubs are excluded from the phosphorus restrictions. The Nutrient Management Regulation also requires golf courses in Manitoba to soil test and prepare annual nutrient management plans to demonstrate how nutrients will be used and to reduce the risk that excess nutrients will run off into waterways.

Since nutrient application to land is required for crop production, the Nutrient Management Regulation is complemented by extension activities, including those conducted according to the 4R Nutrient Stewardship framework promoted by Fertilizer Canada; see more in the following sections on the 4R program.

The Water Protection Act also includes provisions to regulate the sale, supply, manufacture, or distribution of cleaning products containing phosphorus (e.g., dishwashing detergents) and the Nutrient Management Regulation includes provisions related to the application of cosmetic fertilizers to urban and rural residential areas. These measures are intended to reduce nutrient contributions to Manitoba surface waters from urban and rural residential sources. Cleaning products may contain phosphorus that can flow to wastewater treatment plants and ultimately surface waters. Fertilizers, applied for cosmetic purposes, can also contain phosphorus that can enter surface waters through runoff, particularly when more fertilizer is applied than required, or when it is applied inappropriately to impervious surfaces, such as on sidewalks or driveways.

The Environment Act: Environment Act Licenses for Major Pollution Control Centers

In Manitoba, The Environment Act outlines the environmental assessment and licensing process for developments in Manitoba that may have potential for significant environmental and/or human health effects, including nutrient loading to the environment. For instance, major pollution control centers in the province are subject to Environment Act licensing. The City of Winnipeg, which is a point source contributor of nutrients to the Red River and Lake Winnipeg, has been working to reduce nutrient discharges from its wastewater treatment facilities. The City has upgraded its West End Water Pollution Control Centre and South End Water Pollution Control Centre to meet the 1 mg/L phosphorus and 15 mg/L nitrogen standards.

Significant upgrades are still required to the North End Water Pollution Control Centre, one of the oldest and largest wastewater treatment facilities in Canada, to meet the requirements of its Environment Act Licence, The Water Protection Act, and the Water Quality Standards, Objectives, and Guidelines Regulation. The City of Winnipeg and the Province of Manitoba are working together to accelerate improvements to reduce nutrients in wastewater originating from this facility. In August 2022, Canada, Manitoba, and Winnipeg announced a collective commitment of over $550 million for the second phase of upgrades to the North End Water Pollution Control Centre in Winnipeg. In total, the Manitoba government has committed $197.4 million toward this phase of the project, including $30 million in funding announced in November 2024. The Manitoba government announced plans to strengthen the Environment Act to protect waterways in March 2024, including looking at how mechanisms such as fines can be used to intervene sooner when issues arise.

The Environment Act: Livestock Manure and Mortalities Management Regulation

The Livestock Manure and Mortalities Management Regulation (LMMMR) under The Environment Act prescribes requirements for the safe storage, transportation, composting, and application of livestock manure and mortalities in agricultural operations. The regulation aligns with the requirements of the Nutrient Management Regulation.

The LMMMR contains requirements for the land application of livestock manure. These include setback distances from surface watercourses, soil residual nitrate-nitrogen limits and phosphorous thresholds. In addition, all operations are prohibited from applying manure in the winter and large livestock operations are required to submit annual manure management plans. These plans include information on how manure is managed to meet the soil nutrient restrictions in the regulation. The LMMMR also regulates manure storage, including limitations on new constructions in sensitive areas, setback distances from surface water, and design criteria.

The Pesticides and Fertilizers Control Act

The Pesticides and Fertilizers Control Act specifies the conditions for supply, sale, and distribution of pesticides and fertilizers in Manitoba, and requires the training and licensing of Commercial and Off-farm Manure Applicators. The Manure Regulation describes the types of licenses that may be issued and specifies supervision and record-keeping requirements for Commercial Manure Applicators.

The Planning Act

Land use planning in Manitoba is legislated by The Planning Act and guided by the Provincial Planning Regulation. The Provincial Land Use Policies (PLUPs) state the provincial interest in land, resources and sustainable development, and serve as a guide to planning districts and municipalities in preparing local development plans. The PLUPs include nine policy areas, each focused on a specific area of provincial interest supported by land use planning. For example, the Agriculture, Water, and Infrastructure Policy Areas all recognize the importance of protecting land and water resources to ensure a healthy environment and support climate change mitigation and adaptation. The General Development policy ensures that development minimizes economic risks to the public, anticipates future needs and cumulative impacts, protects ecological integrity and maximizes public investments.

Development plans are required under The Planning Act to consider, and be mutually supportive of, the policies of integrated watershed management plans and aquifer management plans. A development plan must consider a number of factors, including water quality protection. There are formal links between land use planning and watershed planning through The Planning Act and The Water Protection Act. For instance, the establishment or expansion of a livestock operation that has 300 Animal Units or more and requires a municipal conditional use approval. This includes a review by the provincial Livestock Technical Review Committee. The Technical Review Committee Regulation requires a site assessment be undertaken by the proponent to help the committee complete its review and allow the public to comment on the proposal.

The Watershed Districts Act

As one of the most successful land and water partnership programs in Canada, Watershed Districts support healthy and sustainable watersheds through focused, priority-based programs that address water quality, flooding, drought, land use, and climate change. Watershed Districts are established under The Watershed Districts Act and its regulation as a partnership between the Manitoba government and municipalities. Recent program changes, made through the new Watershed Districts Act and its regulation, build on the success of the program and could further benefit water quality.

Through new provisions, watershed districts now have the flexibility to establish meaningful partnerships with non-municipal entities, including Indigenous communities, and to create standing committees to deliver initiatives such as Growing Outcomes in Watersheds (GROW). More information on the districts and their work is available in the following section on incentives.

The Water Rights Act and Regulation

The Water Rights Act includes a requirement to compensate for the loss or alteration of a prescribed class of wetlands. In October 2019, the Water Rights Regulations was registered which

prescribed Class III wetlands (seasonal) as requiring compensation if lost or altered. Manitoba further committed to continuing a policy that prohibits the drainage of Class IV and V wetlands (semi-permanent and permanent wetlands), except in cases that demonstrate broad socio-economic benefits. Wetlands perform a critical function by sequestering nutrients and protecting water quality. Applications and further information are available via the Water Licensing Portal.

Policies

Water Strategy

Released in November 2022, Manitoba's Water Management Strategy guides future actions, decisions, and investments to protect the province's water resources and ecosystems while sustainably growing the economy and communities. There are two main components to the Water Management Strategy. The first is a Water Management Strategy Framework, which is a durable guiding document that sets the stage for future work and decision-making on water for the coming decade and beyond. The framework includes a vision, mission, guiding principles, and key focus areas with corresponding strategic objectives. The second component of the strategy is a Water Strategy Action Plan intended to be a focused guide to specific and time-bound actions that Manitoba is taking to transform the water management strategy framework's focus areas and strategic objectives into concrete actions. The Initial Water Strategy Action Plan was released in June 2023. It summarizes new water-related projects, programming, and initiatives that the government has launched since the release of the Water Management Strategy and began in fiscal year 2023-24. A progress report will track implementation of the actions taken across numerous provincial government departments to support the Water Management Strategy.

The Nutrient Targets Regulation aligns strongly with the provincial Water Management Strategy, including with efforts to improve water quality and reduce nutrient loading, to share information and report on progress, and to coordinate actions across watersheds and basins. Registration and implementation of the Nutrient Targets Regulation was a key action item in the Initial Water Strategy Action Plan.

Incentives and Research

Establishment of Three Conservation-Based Trusts

Three conservation-based trusts, established with a total initial investment of $204 million, and managed by The Winnipeg Foundation and administered by the Manitoba Habitat Conservancy (formally known as Manitoba Habitat Heritage Corporation), help to support conservation efforts throughout the province. Interest generated by the Conservation Trust, the GROW Trust, and the Wetlands GROW Trust, is used to enhance ecological goods and services on working landscapes through activities such as wetland conservation and restoration, water retention projects, grassland conservation, soil health improvements, buffer establishments (e.g., shelterbelts), and riparian area conservation and restoration. Over time, enhancing ecological goods and services will improve water quality and nutrient management.

Two of the three trusts directly support a Manitoba initiative called GROW (Growing Outcomes in Watersheds). GROW builds on the ALUS Program and is a way of encouraging the delivery of ecological goods and services (EG&S). GROW promotes conservation of natural areas or changes to land uses that provide EG&S by helping landowners develop projects that maintain or improve local watershed health and work for their land. GROW is a made-in-Manitoba approach on working lands that focuses on "farming the best, conserving the rest." With a focus on watershed health, management and resiliency, GROW will directly improve water quality and nutrient management in Manitoba. Manitoba's watershed districts are leading the implementation of GROW.

Several rounds of projects have already been supported by the three trusts. Since the program's inception, over $35 million in Trust funding has been dedicated to GROW activities ($5.6 million in 2020; $5.5 million in 2021; $7.5 million in 2022; $7.5 million in 2023; and $9.8 million in 2024). Local GROW programs delivered by watershed districts in 2023-24 included upland area conservation, wetland conservation, enhancement and restoration, riparian area conservation, tree planting, water retention, soil health project, and livestock programming.

Watershed Districts Program

Manitoba's Watershed Districts Program, established through The Watershed Districts Act and its regulation, is an incentive-based program, funded primarily by the Province of Manitoba and local municipalities. Through the program, a locally-appointed watershed district board is responsible for developing and implementing programming and delivering on local solutions contributing to healthier and more resilient watersheds. As of December 2024, there are 14 watershed districts in Manitoba.

In 2023-24, the Manitoba government provided more than $6.7 million in funding to watershed districts across the province. Participating municipalities are required to match the provincial grant distribution at a 3:1 ratio. In 2023-24, a total of $2.2 million was provided by municipalities. An additional $9.4 million in funding was obtained from other sources, including environmental organizations, industry, and other municipal, provincial, and federal government programs. It is the responsibility of the watershed district board to use the funding to implement projects and programs relevant to their local integrated watershed management plans.

In 2023-2024, watershed district funding was used to deliver on a variety of management projects, such as water retention, erosion control, livestock programming, and education. In 2023-24, watershed districts:

- completed 38 riparian area management projects excluding 4,112 head of cattle from riparian habitat and 18 streambank stabilization projects to protect 32 hectares of riparian habitat;
- completed 35 water retention projects, storing 665 cubic decameters of water;
- completed 112 total projects related to pasture pipelines (n = 14), rotational grazing systems (n = 76), and livestock crossings (n = 22); and
- led 88 environmental education initiatives, demonstrations, or tours, reaching 4,476 people.

Progress on Integrated Watershed Management Plans

Integrated Watershed Management Plans are led by watershed districts and provide a decision-making framework for the protection, restoration, and management of water, aquatic ecosystems, and drinking water sources. Governed by The Water Protection Act, the planning process engages watershed residents, stakeholders, and governments to identify and prioritize watershed issues, gather and analyze local, technical, and traditional knowledge, and develop recommendations to address priority issues in targeted areas. Plan implementation is shared by watershed districts, all levels of government, stakeholder organizations, and watershed residents. Watershed Districts are formally designated under the Watershed Management Regulation as water planning authorities responsible for watershed management planning.

Twenty-four integrated watershed management plans have been completed to date and another eight are in development. Two watershed planning processes were initiated in October 2022: Brokenhead River and Pembina River (second generation). In addition, Netley-Grassmere, Willow Creek, Shell River, and Souris River second generation plans are underway, as are first generation plans for the Plum-Marais, Lower Assiniboine, Boyne-Morris and Northwest Interlake watersheds. An enhanced surface watershed management plan is being developed as an amendment to the Dauphin Lake Integrated Watershed Management Plan. The plan will include a detailed analysis of sub-watershed drainage and retention actions, including a review of existing infrastructure and drainage and retention planning. A distributed water retention study will support this project.

Although plans are implemented by any organization or person within a watershed, Watershed Districts are required, under The Watershed Districts Act, to ensure that their programs and priorities meet those identified in their integrated watershed management plans. All of the plans include information on water quality in the local area and specific actions to improve water quality and reduce nutrient loading.

Distributed Water Retention Studies

The purpose of this work is to develop water retention plans for watersheds across Manitoba. Many individuals and organizations see distributed storage projects as solutions to local watershed management goals including improving water quality and mitigating flooding and drought. When the cumulative impacts of many projects are combined, benefits can occur at the basin scale. This activity supports two initiatives. The first is Manitoba Environment and Climate Change, Watershed Planning and Programs' integrated watershed management planning process. The second is the larger basin scale goal of the Red River Basin Commission to reduce flooding on the Red River through distributed storage projects.

A pilot study was completed in the Roseau River watershed. The project started in summer 2015 and was completed in fall 2016. The main goal was to identify surface water issues and to provide ideas for potential water retention opportunities in the watershed by:

- providing general hydrology information of the watershed
- summarizing previous reports and plans to identify surface water issues such as water supply
- identifying potential water retention study sites and propose possible projects
- evaluating the potential local and basin scale flow reductions the projects would achieve

Based on the success of the Roseau River pilot study, two more studies have been completed (Cooks Creek, 2018, and Boyne River, 2019) and future studies are planned to coincide with integrated watershed management planning processes in both the Souris River Watershed (completed in 2023) and the Turtle River Watershed (ongoing in 2024) using LiDAR analysis and hydrologic modelling.

Environmental Farm Planning

The Environmental Farm Plan (EFP), now accessible via an Internet portal, is a voluntary, confidential, self-assessment, conducted by an individual producer, of the environmental risks

and resource assets of a farm. Environmental Farm Planning, supported through the Sustainable Canadian Agricultural Partnership, is delivered in partnership with Keystone Agricultural Producers. An EFP informs and guides the management of risks to water quality and supply, soil health, air quality and biodiversity. By completing an EFP a farmer becomes eligible to apply for incentive funding that supports the adoption of beneficial management practices. An EFP is also a requirement for some specific commodity contracts (e.g. potato and field pea).

Sustainable Canadian Agricultural Partnership: Resilient Agricultural Landscape Program

The Sustainable Canadian Agricultural Partnership is a new $3.5 billion, five-year agreement (April 1, 2023 to March 31, 2028), between the federal, provincial and territorial governments to strengthen the competitiveness, innovation, and resiliency of the agriculture, agri-food and agri-based products sector. The agreement includes $1 billion in federal programs and activities and $2.5 billion in cost-shared programs and activities funded by federal, provincial and territorial governments.

The objective of the Resilient Agricultural Landscape Program is to increase the environmental resilience of agricultural landscapes by accelerating the adoption of beneficial land use and management practices that increase carbon sequestration. These include practices that enhance provision of multiple EG&S, the environmental benefits that result from the physical, chemical and biological processes of a healthy ecosystem. Two sub-programs exist under the Resilient Agricultural Landscape Program:

- Watershed Resilience
    - eligible applicants are watershed districts
- Carbon Sequestration & Grassland Resilience
    - eligible applicants consist of producers, Agricultural Crown Lands forage lease holders, Association of Manitoba Community Pastures, Indigenous communities and producers

Sustainable Agriculture Manitoba

Sustainable Agriculture Manitoba provides funding to farmers and land managers to implement cost-shared beneficial management practices that increase the environmental and economic sustainability of agriculture operations in Manitoba. Priority areas include climate change adaptation and mitigation, air quality, water quality and quantity, soil health and biodiversity. Eligible applicants are beneficial management practice-specific but may include primary producers, commercial manure applicators, and custom pesticide operators. Sustainable Agriculture Manitoba funds a variety of beneficial management practices available within the following funding streams:

- Cropland Management, including:
    - Reduced Tillage Intensity
    - Low Disturbance Placement of Seed & Fertilizer
    - Reduced Pesticide Use
    - Perennial Cover for Sensitive Lands
- Manure & Livestock Management, including:
    - Improved Manure Application
    - Composting
- Water Management, including:
    - Irrigation Efficiency
    - Drainage Water Management
    - Water Use Efficiency
    - Water Supply

4R Nutrient Stewardship

The flagship technical and extension vehicle for sound nutrient management in agriculture, 4R Nutrient Stewardship is an industry-originated initiative supported, both locally and internationally, by governments, researchers, and non-governmental organizations. The 4Rs serve as a framework for studying and communicating the principles and practices of Right

Source of nutrient applied at the Right Rate, at the Right Time, and in the Right Place.

In Manitoba, 4R Nutrient Stewardship is exemplified by a partnership between the Manitoba government, farmers (represented by Keystone Agricultural Producers) and the fertilizer industry (represented by Fertilizer Canada). This partnership is fostered and formalized by a memorandum of understanding (MOU), signed and renewed most recently in October 2022. Funding is pledged annually by Fertilizer Canada for allocation, largely to extension activities, under the guidance of a local 4R MOU Implementation Committee. 4R Nutrient Stewardship is featured in Manitoba's Environmental Farm Plan and other extension campaigns and products.

4R Designation is a program that encourages in-person or on-line training that qualifies agricultural professionals to track individual clients' 4R-managed acres and rate the level of 4R practice annually. Over a hundred agricultural professionals operating in Manitoba have now completed the training and are qualified to participate. Fertilizer use surveys collect crop-specific information that can be categorized according to the 4Rs, indicating level of adoption by farms on the Canadian Prairies. Like 4R designation, these surveys may provide a way to characterize water quality risk mitigation by farmers.

Provincial Extension

Staff from Manitoba Agriculture and Manitoba Environment and Climate Change provide technical information on land management, agricultural practice and water quality implications in multiple ways (e.g., publications, presentations, and training events) to a wide range of audiences (e.g., farmers, agricultural professionals, municipal councils, water quality advocates, teachers, students) both within and outside of Manitoba.

Agronomic advice links production with environmental sustainability by describing water quality benefits that accompany superior fertilization technology and techniques, such as sub-surface placement that protects fertilizer from runoff and reduces the rate of application needed to achieve yield objectives. Growers and agriculture professionals attend events throughout the

year, such as the Crop Diagnostic School that has an approximate annual attendance of four hundred. Soil health workshops inform farmers and land managers of the principles and management practices that increase water storage and nutrient retention in soil, enhance nutrient uptake by crops and minimize the loss of nutrients to surface waters.

Manure management extension facilitates regulatory compliance by livestock operations, professional manure management planners and commercial manure applicators. Extension equips farmers and their agronomic advisers to achieve better nutrient use efficiency through superior liquid manure application methods, as well as, calculating land base requirements for new and expanded operations.

Water management extension helps farmers to reduce the risk of nutrient transport to surface waters because water movement is the means by which that transport occurs. An innovative component of this extension is the deployment of learning stations (indoor and outdoor) that simulate hydrological process including rainfall, snowmelt, infiltration, and runoff.

Extremes of Moisture Initiative

The Manitoba Crop Alliance coordinated research into the science and management of both excess and shortage of water on agricultural lands. This included funding proposal submissions and enabling optimal study designs, data collection, and results dissemination. Nutrient fate was a key element of some of the studies and was indirectly addressed by all the projects as water movement drives nutrient movement. In addition to Manitoba Agriculture and Manitoba Environment and Climate Change, participating agencies included the Universities of Brandon and Manitoba, Agriculture and Agri-Food Canada (AAFC), the Prairie Agricultural Machinery Institute (PAMI), the Manitoba Association of Watersheds (MAW) and Keystone Agricultural Producers.

Living Laboratories Initiative

The Living Laboratories Initiative of Agriculture and Agri-Food Canada was designed to increase agricultural innovation through collaboration between farmers, scientists, and other partners by promoting the development, testing and monitoring of new technologies for climate change adaption, soil and water conservation, and biodiversity preservation on agricultural landscapes. Announced in 2023, The Living Laboratories Initiative – Manitoba is managed through the MAW, and represents an investment of up to $9.2 million over five years under the Agricultural Climate Solutions – Living Labs program. The team prioritized agri-environmental challenges to be targeted for federally funded on-farm study in four representative watersheds. Among the types of practices being implemented and studied are zone management, use of slow-release phosphorus fertilizer, soil health measurement and improvement, water retention and sub-surface drainage water management.

Lake Winnipeg Research Consortium

The Lake Winnipeg Research Consortium (LWRC) is a registered charity, established in 1998, that facilitates scientific research and whole ecosystem monitoring on Lake Winnipeg. The LWRC owns/operates two research vessels – Motor Vessel (M/V) NAMAO and M/V FYLGJA. The M/V NAMAO is used to conduct three field surveys (spring, summer, and fall) in open water season.

Scientists and students from academia, various government, private and non-government organizations participate in these surveys, collecting a wide range of ecological data from an established network of sampling stations throughout the entire lake. Over 30 agencies comprise the membership of the LWRC, including the Manitoba government, one of the LWRC's founding members.

Manitoba is also a core funder and attends meetings of the LWRC's board of directors as an observer. Water quality and biological data collected by the Manitoba government as part of the M/V NAMAO field surveys provides the information to support reporting on Lake Winnipeg

including this report on progress towards nutrient targets.

Whole ecosystem data, collected from the LWRC-led field surveys on Lake Winnipeg, is integral to broadening our understanding of in-lake ecological processes, assessing changes over time, and supporting management decisions, including ways to reduce nutrient concentrations and improve water quality.

In addition, the LWRC hosts an annual science workshop convening the active science member agencies to increase awareness and understanding of long-term ecological changes due to multiple stressors, including excess nutrients (eutrophication), aquatic invasive species, climate change, and fishing pressures. It also offers a unique education program dedicated to providing students with hands-on experiential learning opportunities (the Lake Ecology Field Program on board the M/V NAMAO and Sail & Science: Lake Winnipeg Discovery Camp on shore in collaboration with the Gimli Yacht Club), as well as online resources, classroom visits, and two scholarships.

Supporting Nutrient Reduction Policies and Programs in Other Jurisdictions that Share a Transboundary River Basin with Manitoba

Given that approximately half of the nutrients (and 70 per cent of the water flow) entering Lake Winnipeg originate from outside of Manitoba, a critical component for improving water quality in the Lake Winnipeg watershed involves collaboration with external jurisdictions. Manitoba works through transboundary organizations to influence actions and activities in upstream jurisdictions that can affect water quality and nutrient loading to Lake Winnipeg.

Manitoba participates in, and, in some cases, provided funding to a number of transboundary water organizations, including the International Joint Commission, the Prairie Provinces Water Board, and the Red River Basin Commission (RRBC). Manitoba also has a number of Memorandums of Understanding related to water including the Saskatchewan-Manitoba Memorandum of Understanding Regarding Water Management.

Prairie Provinces Water Board

Saskatchewan, Alberta, Manitoba and Canada formed the Prairie Provinces Water Board (PPWB) in 1948 to recommend the best use of interprovincial water and recommend water allocations between the provinces. The Prairie Provinces Water Board's Committee on Water Quality has developed nutrient objectives for 12 transboundary river sites. Objectives have been developed for total nitrogen, total phosphorus and total dissolved phosphorus and are based on changes observed through the 40-year data set and the 90th percentile of the historical data set. Nutrient objectives were included as part of an update to Schedule E of the Master Agreement on Apportionment which includes updated and revised water quality objectives for metals, pesticides, physical parameters, and general chemistry. Updated objectives are available on the Prairie Provinces Water Board web site. The PPWB Committee on Water Quality reviews these water quality objectives every five years and is currently finalizing their review of the water quality objectives in the lead up to the 2026 water quality objectives update.

International Red River Watershed Board

Manitoba participates on several boards for the International Joint Commission, which has a mandate to prevent and resolve disputes by helping the Governments of Canada and the US protect the transboundary environment through the Boundary Waters Treaty (1909).

In September 2019, through the work of the Water Quality Committee, the International Red River Watershed Board recommended nutrient load targets and concentration objectives for the Red River at the US/Canada border at Emerson. The International Joint Commission reviewed the recommendations, hosted two public meetings (Fargo January 2020 and Winnipeg February 2020), and provided an opportunity for submission of public comments. In May 2020, the International Joint Commission informed the International Red River Watershed Board that their recommendation was supported, and the recommendation was sent to the governments of Canada and the United States with a request to consider adding the objectives and targets to the list of water quality objectives that the commission reports on for the Red River at the boundary

between the U.S. and Canada. The two federal governments approved the nutrient load targets and concentration objectives for the Red River at the US/Canada border in 2022. The International Red River Watershed Board is now reporting on the new targets and objectives.

Red River Basin Commission

Manitoba is also a participant of the Red River Basin Commission (RRBC), which are undertaking work to improve water quality and reduce nutrients.

The RRBC is working to reduce nutrients across the international Red River watershed and has established a Natural Resource Framework Plan that spans provincial and international borders. The commission supports the International Red River Watershed Board's Water Quality Committee. The RRBC is also leading the Netley-Libau Marsh Restoration Pilot Project, to determine the feasibility of restoring marsh vegetation for the purpose of improving nutrient sequestration of the marsh. The project was initiated in 2018, with the first construction phase occurring in 2021 and hosting annual State of the Knowledge Workshops to share project progress and updates.

Manitoba also worked during the reporting period with Assiniboine River Basin Commission (ARBI), an organization that worked across the inter-jurisdictional shared watersheds of the Assiniboine, Souris and Qu'Appelle Rivers.

Transboundary organizations play an important role in promoting and developing coordinated water management including nutrient reduction. In 2018, The Water Protection Act was amended to recognize the important role of transboundary organizations.

International Rainy-Lake of the Woods Watershed Board and Lake of the Woods Freshwater Ecosystem Initiative

The International Rainy-Lake of the Woods Watershed Board was created in January 2013, from

an amalgamation of the International Rainy Lake Board of Control and the International Rainy River Water Pollution Board, with added water quality responsibilities for the broader Rainy-Lake of the Woods watershed. The Aquatic Ecosystem Health Committee is executing the Board's water quality and aquatic ecosystem health directives. The Objectives & Alert Levels Project - Phase 2 started in spring 2021 to set objectives for total phosphorus in Lake of the Woods and the Rainy River. The work was delayed due to the COVID-19 pandemic, but resumed with a kickoff meeting was in November 2023. The Lake of the Woods Ecosystem Initiative is one of eight Freshwater Ecosystem Initiatives identified in Canada's strengthened Freshwater Action Plan, supporting regionally specific actions to restore and protect water quality and ecosystem health in waterbodies of national significance

Memorandum of Understanding between Canada and Manitoba on Lake Winnipeg

In August 2021, a new *Canada-Manitoba Memorandum of Understanding Respecting Lake Winnipeg and the Lake Winnipeg Basin* (MOU) was signed by Environment and Climate Change Canada, on behalf of the Canada, and Manitoba Environment and Climate Change on behalf of the Manitoba government. The previous MOU was initially signed in September 2010, extended for five more years in 2015, and expired in September 2020. The purpose of the renewed MOU is to facilitate a cooperative and coordinated approach to better understand and protect water quality and the ecological health of Lake Winnipeg and its basin. The MOU is consistent with Manitoba's Water Protection Act, which recognizes the importance of inter-jurisdictional agreements protecting water, and the shared responsibility of all to protect water resources in the Lake Winnipeg Basin.

Implementation of the MOU is overseen by a steering committee co-chaired by senior federal and provincial representatives who report to their respective Ministers. The committee consists of members with a variety of expertise based upon occupation and unique knowledge, skills, and expertise from the following provincial and federal departments:

- Manitoba Environment and Climate Change, Manitoba Agriculture, Manitoba Natural Resources and Indigenous Futures

- Canada Water Agency, Environment and Climate Change Canada, Agriculture and Agri-Food Canada, Fisheries and Oceans Canada, Indigenous Services Canada, and Health Canada.

The strength of the Steering Committee is the broad participation of federal and provincial departments and agencies with water-related mandates. Membership supports the sharing of expertise and technical and administrative information necessary to coordinate federal and provincial efforts as both levels of government are concerned with the ecological health and sustainability of Lake Winnipeg and its basin. The membership has agreed to share information with each other, stakeholders and interested parties. Updates to this renewed MOU from the 2010 document are minor and include a commitment to work planning and recognition of the need to engage Indigenous Peoples where, based on mutual agreement and within respective legislated authorities, those opportunities occur and present themselves.

Through collective action, activities conducted under the MOU will continue to be based on sound science, good governance and concrete actions under a joint work plan with deliverables, performance indicators, and increased inclusion and participation of Indigenous peoples through ongoing Indigenous engagement work.

Canada Water Agency and Lake Winnipeg Basin Program

In Budget 2023, the Government committed $85.1 million over five years, with $21 million ongoing, for the creation of the Canada Water Agency, and an additional $650 million over 10 years for the implementation of a strengthened Freshwater Action Plan. In October 2024, the Canada Water Agency was launched as a standalone agency, with a mandate to work with provinces, territories, Indigenous Peoples and others to find the best ways to keep water saft, clean and well managed. The Agency will lead delivery of several components of Freshwater Action Plan, including eight regional Freshwater Ecosystem Initiatives. Canada is investing $64.5 million in the Lake Winnipeg Basin Ecosystem Initiative, over ten years starting in 2023-24, to support the protection and restoration of Lake Winnipeg and its basin. This includes supporting

stakeholder led action as well as advancing Environment and Climate Change Canada's federal science activities.

The renewed Lake Winnipeg Basin Program works in partnership with others and focuses on reducing nutrient loading to Lake Winnipeg and supporting enhanced engagement of Indigenous Peoples in addressing freshwater issues. From 2017 to 2024, Canada has invested over $11.6 million through the Lake Winnipeg Basin Program to support stakeholder-driven action in the Lake Winnipeg Basin. Some examples of nutrient reduction projects funded through the program include (expanded descriptions available at Program website):

- restoring wetlands and building retention ponds to intercept water flow across the landscape and capture nutrients
- exploring innovative approaches, such as floating treatment islands and duckweed, to remove phosphorus from municipal wastewater lagoons
- community-based water quality monitoring
- implementing beneficial management practices to prevent livestock from entering lakes and rivers
- stabilizing creek banks to reduce erosion

Federal investments will continue to support science and stakeholder-led actions and include efforts to explore more targeted approaches to reducing nutrient loading, including in the highest contributing areas.

OTHER ACTIVITIES ACROSS THE WATERSHED

In addition to work underway by the Manitoba Government and other jurisdictions that share a transboundary river basin with the province, many other agencies, stakeholders, and individuals are contributing to nutrient reduction efforts. From non-government agencies, such as the Lake Winnipeg Foundation and the International Institute of Sustainable Development (IISD), to municipalities, industries, individuals such as shoppers choosing phosphorus-free products, and

farmers adopting best management practices, there is much that can, and is, being done to reduce nutrients and improve water quality. While this report focuses on the work of the Manitoba government and other jurisdictions, we must acknowledge the contributions and commitments of others to nutrient reduction.

Academic institutions, non-government organizations, community action groups, industries, businesses, agricultural producers, landowners, and local watershed inhabitants are leading and/or participating in activities to reduce nutrient export to surface waters in Manitoba. For example, Manitoba's academic institutions and education system are providing educational programs to improve understanding of water quality issues and watershed management in Manitoba.

Non-governmental organizations are conducting environmental research and monitoring, encouraging collaboration, facilitating educational opportunities, hosting innovative competitions, and advancing our knowledge and understanding of the Lake Winnipeg ecosystem and beneficial management practices within the Lake Winnipeg watershed.

Grassroots community action groups are providing a voice within local watersheds to raise awareness of the concerns of nutrient pollution. Many industries, businesses, and landowners in Manitoba are showing a commitment towards environmental protection and are adopting beneficial management practices to reduce their impact on local water quality. All residents within the Lake Winnipeg watershed play a role in reducing their nutrient contribution to the lake.

CONCLUSION

As of 2023, nutrient concentrations in Lake Winnipeg remain elevated, due to significant contributions of nutrient loads from the four major tributaries (Red, Winnipeg, Saskatchewan, and Dauphin) discharging into the lake. The establishing and implementing of the proposed nutrient targets in Lake Winnipeg and its major tributaries provide a way to measure and track progress over time.

Significant progress has been made to implement actions to reduce nutrient contributions to surface waters. However, much remains to be done, and the Province of Manitoba will continue to work collectively to address the challenging issue of nutrient pollution and to improve surface water quality.