Environment and Climate Change Canada
Environnement et Changement climatique Canada
Canada

Evaluation of the Lake Winnipeg Basin Initiative

Final Report

Audit and Evaluation Branch

June 2017

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List of Key Acronyms

AAFC	Agriculture and Agri-Foods Canada
ADM	Assistant Deputy Minister
AsRDG–W&N	Associate Regional Director General West and North
CA–MB MOU	Canada–Manitoba Memorandum of Understanding
CESD	Commission for Sustainable and Environmental Development
DFO	Department of Fisheries and Oceans
ENGO	Environmental Non-Governmental Organization
G&C	Grants and Contributions
INAC	Indigenous and Northern Affairs Canada
IRRB	International Red River Board
LWBIN	Lake Winnipeg Basin Information Network
LWBI	Lake Winnipeg Basin Initiative
LWBO	Lake Winnipeg Basin Office
LWBSF	Lake Winnipeg Basin Stewardship Fund
LWRC	Lake Winnipeg Research Consortium
MIMR	Manitoba Indigenous and Municipal Relations
MSD	Manitoba Sustainable Development
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
PMF	Performance Measurement Framework
PPWB	Prairie Provinces Water Board
PAC	Public Advisory Committee
RDG	Regional Director General
STB	Science and Technology Branch
WASP	Water Quality Analysis Simulation Program
WSTD	Water Science and Technology Directorate

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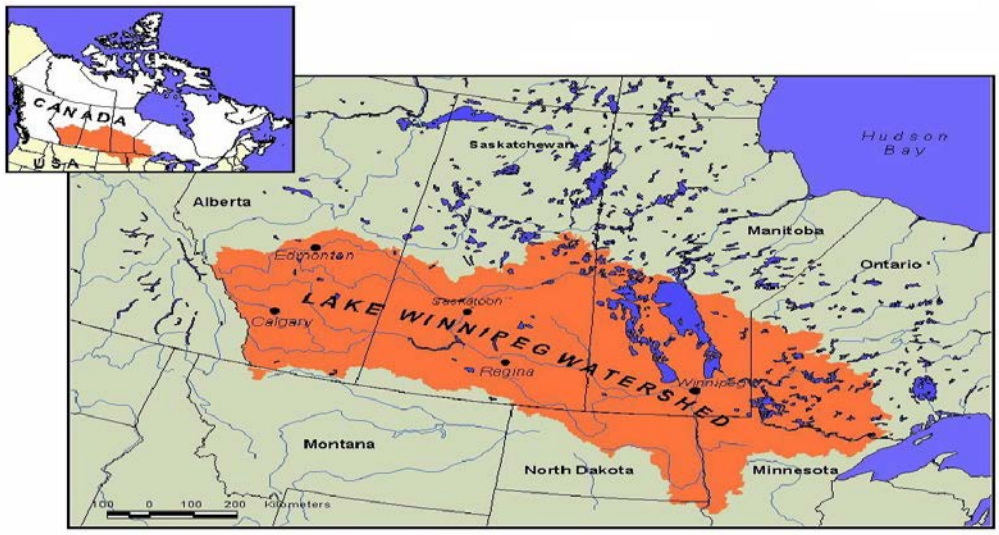
EXECUTIVE SUMMARY

Program Description

- Lake Winnipeg is the world's 10th largest freshwater lake. It is fed by a vast basin covering 960,000 square kilometers extending over four provinces and four states. Water quality has deteriorated in the lake over time, due to excessive amounts of nutrients from multiple sources. The Lake Winnipeg Basin Initiative (LWBI) aims to contribute to restoring the ecological health of Lake Winnipeg, reduce pollution from sources such as agriculture, industry and wastewater, and improve water quality for fisheries and recreation.
- The program was first launched in 2008 with $18 million in funding for a five year period. The program was renewed in 2012 for a second five year phase, with an additional $18 million in funding.
- Environment and Climate Change Canada's (ECCC's) program activities are organized within three key pillars:
    1. Science: Focuses on filling priority knowledge gaps and identifying ways to monitor and measure results and assess the effectiveness of efforts to clean up the lake.
    2. Stewardship – the Lake Winnipeg Basin Stewardship Fund (LWBSF): Provides funding to community groups and stakeholders for cost-shared projects that focus on reducing nutrient loads. Since 2012, 48 projects totalling approximately $4.4 million have been approved.
    3. Transboundary Partnerships: Includes collaborative work with other governments (provincial, state, federal) and organizations within the watershed, including working closely with the Province of Manitoba and with domestic and international water management boards.



Evaluation Conclusions

Relevance

- The basin is an important and complex watershed with significant water quality challenges related to excessive nutrients that have a negative impact on the ecosystem and economy.

There is a need to address these issues and better understand emerging issues impacting the lake's water quality and its response to interventions.

- Water quality is an area of shared federal, provincial and territorial responsibility. ECCC's involvement in Lake Winnipeg is consistent with the transboundary nature of the basin and its national importance as a large and significant freshwater body.

Performance

- ECCC science activities have contributed to the development and application of predictive modelling of nutrients in the Lake Winnipeg Basin to support work by the Province of Manitoba on understanding optimal nutrient reduction scenarios in key tributaries. Progress is being made toward an improved understanding of strategies for reducing nutrients in the basin, but more evidence is required to identify actions that will have the greatest impact and to improve the dissemination of research findings and water quality data.
- The LWBSF is well known among stakeholder groups in the Lake Winnipeg Basin and there is a strong demand for funding to conduct high quality projects. Measures are in place to prioritize funding to projects which, based on available knowledge, are likely to have the greatest impact. Estimates of total phosphorus reductions from LWBSF funded projects are substantially greater in the second phase of the program than in Phase I and are on track to meet program targets. It should be noted, though, that the level of nutrient reductions delivered by these projects is extremely small in relation to total estimated phosphorus loads, with total reductions delivered over five years estimated at less than 1% of the annual nutrient loads entering the lake.
- ECCC's leadership and participation in the LWBI has fostered high levels of collaboration and coordination among stakeholders participating in each of the program's three pillars. The LWBI leads or participates in multiple governance structures and the roles and responsibilities of various players are clear.
- Engagement of indigenous groups in governance structures in the basin is in the early stages, but more could be done to ensure their consistent and coordinated participation in these forums, as well as in the delivery of LWBSF projects.
- With respect to long-term results, insufficient data are available to assess the status of the ecological health of Lake Winnipeg, due largely to the fact that development of State of the Lake Indicators remains in the early stages and is delayed from target timelines established by Manitoba and ECCC. There is widespread agreement, however, that the ecological integrity of the lake and the basin has not improved significantly based on efforts to date and the impact of factors such as invasive species, weather events/seasonal flooding linked to climate change and recirculation of nutrients released from lake sediment.
- The LWBI is a well-managed program employing a number of practices that contribute to efficiency and funding applicants are generally satisfied with ECCC's delivery of the program.
- A performance measurement framework has been developed, is diligently populated and is used to monitor and inform decision-making about the program. However, in the context of current activities, the program's logic model does not reflect a realistic progression from near term to final outcomes that is likely to result in restoration of the lake's ecological health.

Evaluation Recommendations

The following recommendations are directed to the Assistant Deputy Minister, Strategic Policy Branch who accepts all of the recommendations and has developed appropriate management action plans in response.

Recommendations
1. Focus efforts on expanding the base of knowledge and improving dissemination to stakeholders regarding: i) the nutrient management practices likely to have the greatest impact; and ii) the impacts of emerging factors such as invasive species, climate change and nutrient cycling.
2. Review the program's design and expected outcomes to ensure they are consistent and demonstrate that the program's activities make a reasonable contribution to achieving final outcomes.
3. Strengthen efforts to engage Indigenous groups and communities in stewardship and partnership activities.
4. Build on and advance early efforts to develop State of the Lake Indicators with the Province of Manitoba.

About the Evaluation

- The evaluation was conducted by ECCC's Audit and Evaluation Branch between January and December 2016.
- The following data collection methodologies were used to address the evaluation issues and questions: a document review; thirty interviews with internal and external stakeholders; a review of the final reports from projects funded by the program that were completed as of March 31, 2016 (twenty-nine in total); an on-line survey of funding applicants, including both those who received funding and those who were not funded; and three case studies.

1. INTRODUCTION

This report presents the results of the Evaluation of the Lake Winnipeg Basin Initiative (Sub-program 1.3.7),[1] which was conducted by Environment and Climate Change Canada's (ECCC's) Audit and Evaluation Branch, in fiscal year 2016–2017. The evaluation was identified in the 2015 Departmental Risk-Based Audit and Evaluation Plan and conducted in order to inform future program funding decisions, as current funding ends in March 2017. The evaluation also responds to the requirements of the *Financial Administration Act* and the 2009 Treasury Board Policy on Evaluation[2] to evaluate all ongoing programs of grants and contributions and direct program spending at least once every five years.

2. BACKGROUND

2.1. Program Profile

Lake Winnipeg is the world's 10th largest freshwater lake. It is fed by a vast basin covering 960 thousand square kilometers extending over four provinces and four states. Water quality has deteriorated in the lake, due to excessive amounts of nutrients from multiple sources.

The Lake Winnipeg Basin Initiative (LWBI) aims to contribute to restoring the ecological health of Lake Winnipeg, reduce pollution from sources such as agriculture, industry and wastewater, and improve water quality for fisheries and recreation. Phase I of the program (2008-2012) consisted of $18 million in funding over a five year period. Phase II (2012-2017) was launched in August 2012 with another $18 million in funding through the Action Plan for Clean Water. Phase II builds on the scientific accomplishments of Phase I and moves towards taking more actions to address water quality issues.

2.2. Activities

The program's activities are organized within three key pillars, as described below:

I. Science

The LWBI science component is led by ECCC's Science and Technology Branch (STB) and is focused on understanding how nutrient contributions can be controlled in the watershed and how nutrients affect the ecology of the lake. This knowledge is used to encourage and inform best management practices in the agricultural industry and improve municipal waste and storm water management practices in the watershed. The science component also includes actions aimed at improving the monitoring of the health of the lake.

In Phase II, scientific research shifted from lake-based to land-based activities that assess the effects of human activity in the watershed and monitor any changes. A Science Plan for Phase II of the LWBI was developed by the Water Science and Technology Directorate (WSTD) in STB. The Science Plan provides an overview of monitoring and research activities for Phase II of the LWBI which aimed to fill priority knowledge gaps in science, identify ways to measure

[1] For the period from 2012-2013 to 2014-2015, this program was coded as sub-sub-program 1.3.4.4 in the Program Alignment Architecture. In 2015-2016 it changed to Sub-program 1.3.7. With the move to the Departmental Results Framework, as required by the 2016 Policy on Results, it will be included within the Ecosystem Partnerships program.
[2] The 2009 Policy on Evaluation was replaced by the Policy on Results, effective July 1, 2016.

results, and assess the effectiveness of efforts to clean up the lake. Annual work plans are developed to guide scientific investments and activities.

II. Stewardship – Lake Winnipeg Basin Stewardship Fund (LWBSF)

The LWBSF is implemented by ECCC's Associate Regional Director General West and North (AsRDG-W&N) through the Lake Winnipeg Basin Office (LWBO). It is used to fund cost-shared[3] projects that focus on reducing nutrient loads through actions taken by stakeholder and community groups. Since the start of Phase II, there have been three rounds of funding totaling approximately $4.4 million. A total of 48 projects have been approved, ranging from $4,000 to over $900,000, with an average project funding of $112,000.[4]

To be eligible under the LWBSF, projects must address at least one of the following priorities:

- reducing nutrient inputs from rural and urban sources;
- controlling point and non-point sources[5] of pollution;
- rehabilitating priority aquatic ecosystems that support nutrient reduction and sequestration; and
- enhancing research and monitoring capacity to support decision making.

Eligible funding recipients include: individuals; non-profit organizations and associations; industry and industry associations; Indigenous groups and organizations; provincial, municipal, territorial and local governments; regional conservation districts and authorities; research, academic and educational institutions; and watershed-based organizations.

Overall management of the proposal solicitation and review process is handled by the LWBO. Project proposals are solicited annually in late summer/early fall. Qualifying proposals then undergo a four-stage approval process: Letter of Intent Review; Technical Review of Project Proposals; Public Review by a Public Advisory Committee; and Final Approval of recommended projects.

During the five-year timeframe of LWBI Phase II, the LWBSF has also provided ongoing financial support for two additional projects, namely, support for: the operation of the Lake Winnipeg Research Consortium's (LWRC) MV Namao research vessel, which is used to conduct research and monitoring on the lake, and the University of Manitoba's Lake Winnipeg Basin Information Network, a single-window web-based information network aimed at promoting and enabling data sharing and analysis with partners to support research on the lake.

III. Transboundary Partnerships

The third pillar of the LWBI, which is also managed in the West and North Region, includes collaborative work with other governments (provincial, state, federal)[6] and organizations within

[3] The LWBSF is intended to contribute no more than one-third of total project costs; however, the program may provide up to a maximum of two-thirds of total project costs. Projects are encouraged to leverage funding from other sources and develop collaborative partnerships. In cases where other federal programs support an LWBSF project, the total federal contribution must not exceed two-thirds of the total cost of the project.

[4] ECCC. Lake Winnipeg Basin Stewardship Fund – Funded Projects. https://www.ec.gc.ca/eau-water/default.asp?lang=En&n=965BBC77-1

[5] "Point source" refers to a single, identifiable (or point) source of pollution, whereas "non-point source" refers to inputs and impacts that don't have one specific source and come instead from the cumulative effect of any number of factors or activities.

the Lake Winnipeg transboundary watershed. This includes working with the Province of Manitoba to continue implementation of the 2010 Canada–Manitoba Memorandum of Understanding Respecting Lake Winnipeg and the Lake Winnipeg Basin (CA–MB MOU). The CA–MB MOU provides a forum for communication to support a long-term collaborative and coordinated approach between the two governments in the areas of science and governance to support the sustainability and health of the Lake Winnipeg Basin. Transboundary partnership activities also emphasize collaborative work with other governments and jurisdictions to address sources of nutrients outside Manitoba. Domestic and international water management boards,[7] which provide integrated decision-making for the management of inter-jurisdictional waters, play a critical role in managing nutrients in the Lake Winnipeg Basin and therefore are key partners in this initiative.

2.3. Governance and Management

2.3.1 Governance

Overall accountability for the Lake Winnipeg Basin Initiative rests with the Assistant Deputy Minister, Strategic Policy Branch (SPB). However, responsibility for delivery of the program's three pillars is shared between the AsRDG-W&N (who reports through to the ADM SPB) and the ADM Science and Technology Branch (STB). More specifically responsibilities for the LWBSF and the transboundary partnerships pillars rests with the AsRDG-W&N, while the ADM STB is accountable for delivering the science pillar. Overall coordination of program activities is conducted by the LWBO in the West and North Region.

The overarching governance and coordination for the program is through the LWBI Executive Committee comprising participants at the Regional Director General and Director General levels and chaired by the AsRDG W&N. Participating organizations include STB's Water Science and Technology Directorate (WSTD), International Affairs Branch (Americas Directorate), and Strategic Policy Branch RDG Ontario and RDG W&N. This committee meets once or twice per year to oversee and provide advice on the program, and facilitate information sharing and engagement among the participating organizations within the department.

At the working level, internal Transboundary Connections calls engage ECCC stakeholders three times per year via teleconference. The calls are chaired by the Lake Winnipeg Basin Office and are used to share information about ECCC actions relative to the Lake Winnipeg watershed.

2.3.2 Supporting and Advisory Committees

In addition to the internal LWBI Executive Committee and the Transboundary Connections calls, there are a number of committees that play a supporting or advisory role in the delivery of the program's three pillars. Key supporting committees are described below:

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[6] International/Transboundary Partners include the United States (US) Environmental Protection Agency (EPA), the US Geological Survey (GS), the Minnesota Pollution Control Agency, and the North Dakota Department of Health.

[7] Transboundary Water Boards that operate within the LWB watershed include the International Red River Board, the International Rainy–Lake of the Woods Watershed Board, the International Souris River Board, and the Prairie Provinces Water Board. Note that the water management boards are outside the scope of the current evaluation, except as they pertain to the implementation of the transboundary partnerships. ECCC activities to support the water management boards are part of the Water Resource Management and Use Program (Sub-program 1.2.2), which was evaluated in 2014. Its results have been incorporated into this evaluation as appropriate.

LWBSF Technical Review Committees. Federal and provincial agencies are involved in Technical Review Committees which are convened to review LWBSF project applications to determine whether they meet one or more of the priorities of the program, are technically feasible, and can provide tangible results.

LWBSF Public Advisory Committee. A Public Advisory Committee made up of Ministerially-appointed Basin stakeholders also reviews project applications to ensure that local knowledge is considered when recommending projects and funding levels for approval.

Transboundary Partnerships Steering Committee. A Steering Committee was established in 2010 as part of the CA–MB MOU to oversee implementation of the agreement, including the Science Subsidiary Arrangement.[8] The Steering Committee is co-chaired by ECCC and Manitoba's Department of Sustainable Development (MSD) and includes federal and provincial agencies, including Fisheries and Oceans Canada (DFO), Indigenous and Northern Affairs Canada (INAC) and Agriculture and Agri-Food Canada (AAFC), as well as Manitoba Agriculture and Manitoba Indigenous and Municipal Relations (MIMR). The Steering Committee meets biannually. The CA–MB MOU has been extended to September 13, 2020.

Water Management Boards. ECCC also participates on a number of water management boards to facilitate coordination of efforts across the Lake Winnipeg Basin and to help address nutrient loading originating from outside of Manitoba's jurisdiction. ECCC chairs the Prairie Provinces Water Board (PPWB), and is the Canadian co-Chair and/or co-Secretariat of the following International Joint Commission boards[9]: the International Red River Board (IRRB); the International Rainy–Lake of the Woods Watershed Board; and the International Souris River Board.

2.3.3 Partners and Stakeholders

There are a large number and variety of collaborators and stakeholders involved in water quality issues in the Lake Winnipeg Basin across the program's three pillars. These include stakeholders representing other jurisdictions (municipal, provincial, state, federal), conservation districts and authorities, the scientific and research community, business and non-governmental organizations. ECCC is connected to this broader community through Manitoba's Lake Friendly Accord which was signed by ECCC in March 2014 and which established the multi-stakeholder Lake Friendly Stewards Alliance. The aim of this organization is to align stakeholder water quality improvement efforts in the Lake Winnipeg Basin and commit to actions to reduce nutrient loading and improve water quality in the Basin.

Applicants for funding from the LWBSF are also important stakeholders in the program.

[8] The Science Subsidiary Arrangement of the CA–MB MOU is aimed at coordinating federal and provincial science to identify, test and validate appropriate indicators of aquatic ecosystem health for the Lake and its Basin.

[9] The IJC is an international organization that was established in 1909 by the Boundary Waters Treaty to prevent and resolve disputes over boundary waters located along the Canada-US border. The ICJ serves as an independent and objective advisor to the two governments and has two main responsibilities: regulating shared water uses and investigating transboundary issues and recommending solutions. The IJC establishes boards comprised of experts from Canada and the US to assist it in carrying out activities.

2.4. Resources

With the renewal of the program for Phase II, a total of $18 million in funding was approved for the five-year period from 2012–2013 to 2016–2017. Planned allocation of the funding was as follows:

- Science: 48%;
- Stewardship: 41%; and
- Transboundary Partnerships: 11%.

Table 1 identifies the LWBI's actual expenditures over the four-year period under study (the first four years of Phase II) and forecasted expenditures for 2016–2017. Based on this information, total Phase II forecasted expenditures are very close to initially planned funding. The distribution of expenditures by pillar varies slightly from planned, with the Science pillar forecast to represent a higher proportion of total spending.

Table 1. ECCC Expenditures for the LWBI, 2012–2013 to 2016–2017 ($000s)[10]

Branch		2012–2013 Actual	2013–2014 Actual	2014–2015 Actual	2015–2016 Actual	2016–2017 Forecast	Forecasted Total 2012–2013 to 2016–2017
RDG	FTEs	3	6	6	6	6	NA
	Salary	$226.8	$471.1	$484.2	$498.0	$493.9	$2,174.0
	O&M	$52.8	$61.1	$76.1	$81.2	$81.9	$353.1
	G&C	$210.0	$1,604.3	$1,499.9	$1,369.9	$690.0	$5,374.1
	Total	**$489.5**	**$2,136.6**	**$2,060.2**	**$1,944.7**	**$1,265.8**	**$7,896.9**
STB	FTEs	0.3	0.8	17.2	18.8	19.7	NA
	Salary	$24.8	$61.0	$1,392.5	$1,479.9	$1,551.0	$4,509.2
	O&M	$564.1	$900.5	$896.9	$1,004.3	$830.4	$4,196.2
	G&C	-	$65.0	$55.0	$65.0	$121.0	$306.0
	Capital	$162.9	$148.6	$170.3	$878.5	$276.3	$1,636.6
	Total	**$751.7**	**$1,175.2**	**$2,514.7**	**$3,427.6**	**$2,778.7**	**$10,648.0**
All Branches	FTEs	3.3	6.8	23.2	24.8	25.7	NA
	Salary	$251.5	$532.2	$1,876.8	$1,977.8	$2,044.9	$6,683.2
	O&M	$616.9	$961.7	$973.0	$1,085.4	$912.3	$4,549.2
	G&C	$210.0	$1,669.3	$1,554.9	$1,434.9	$811.0	$5,680.1
	Capital	$162.9	$148.6	$170.3	$878.5	$276.3	$1,636.6
	Total	**$1,241.3**	**$3,311.8**	**$4,575.0**	**$5,376.6**	**$4,044.5**	**$18,549.1**

[10] STB numbers include expenditures for scientific activity directly related to Lake Winnipeg which were coded in ECCC's financial management system to the Water Quality and Aquatic Ecosystems Health Program (Sub-program 1.2.1) for the period from 2012–2013 to 2014–2015. As of 2015–2016 the expenditures for these activities are coded directly to LWBI (and are included in the table).

Source: Information provided by ECCC Corporate Services and Finance Branch in December 2016, and confirmed by program management.

2.5. Intended Outcomes

Program performance was assessed against the intended outcomes from the LWBI logic model (presented in Annex A) which was developed by the program and approved in November 2015. Note that, for reporting purposes, two outcomes related to collaboration and partnership under the Stewardship and Transboundary Partnerships pillars have been grouped together to minimize duplication, and two outcomes related to the setting of nutrient objectives by the province and transboundary organizations have also been grouped together. An additional outcome "Increased scientific knowledge and data to inform and support decision-making" was also assessed as this is a key aspect of the program which was not captured in the program's logic model.

3. EVALUATION DESIGN

3.1. Purpose and Scope

The evaluation was identified in the 2015 Departmental Risk-Based Audit and Evaluation Plan and conducted in order to inform future program funding decisions as current funding ends in March 2017. The evaluation also responds to the requirements of the *Financial Administration Act* and the 2009 Treasury Board Policy on Evaluation,[11] to evaluate all ongoing programs of grants and contributions and direct program spending at least once every five years.

The evaluation covers the period from 2012–2013 to 2015–2016, which includes four of the five years of Phase II of the LWBI.[12] The scope of the evaluation covers activities related to each of the program's three pillars: science (research, modelling and monitoring), stewardship and transboundary partnerships.

The evaluation was informed by a previous evaluation of the LWBI completed in 2011–2012 when the program was a component of the Freshwater Programs under the Action Plan for Clean Water,[13] as well as recent evaluations of other ECCC water management and freshwater programs. There were no recent audits by the Commissioner of the Environment and Sustainable Development (CESD) or internal ECCC audits directly pertinent to this evaluation.

3.2. Evaluation Approach and Methodology

The findings presented in this document are based on five data collection methodologies. Evidence drawn from these methods informed findings and conclusions:[14]

- **Document review**. A review of documents was conducted that included foundational documents, descriptive program information, departmental and Government of Canada publications related to policy and priorities, and other internal strategic, operational

[11] The 2009 Policy on Evaluation was replaced by the Policy on Results, effective July 1, 2016.
[12] Phase II consists of the period from 2012-13 to 2016-17. The final year of Phase II is not included in the evaluation as it was still in progress during the conduct of the evaluation.
[13] http://www.ec.gc.ca/ae-ve/default.asp?lang=En&n=4CE4B2F6-1
[14] A Data Collection Instruments Technical Appendix submitted under separate cover includes all the methodological instruments developed as part of the evaluation (e.g., key informant interview guides, survey questionnaire, case study protocol).

planning and past evaluations. Program performance measurement-related data were also reviewed.

- **G&C file review**. A review of 29 LWBSF project final reports was completed to examine project activities, outputs, outcomes and lessons learned. The project reports reviewed included all Phase II projects that were completed as of March 31, 2016.
- **Key informant interviews**. In total, 30 individuals were interviewed for the evaluation. The distribution of interviews by respondent category is shown below:
    - Internal ECCC program representatives and management (n=10);
    - External stakeholders (n=20).[15]
- **On-line survey of LWBSF funding applicants.** An online survey of all organizations that applied for LWBSF funding was conducted, including both funded and never-funded applicants. The survey gathered applicants' perspectives on awareness of the program, satisfaction with the eligibility criteria and application process, partnerships, adequacy and appropriateness of performance reporting, the impact of securing (or not securing) LWBSF funding, ongoing impacts of the project and sustainability. In total, 74 organizations were contacted by email to participate and 45 organizations completed the survey (61% response rate). Of the organizations that completed the survey, 28 were funding recipients and 17 were never-funded applicants. This data collection method addressed evaluation questions related to performance.
- **Case studies.** Three case studies were conducted to provide additional insight related to the relevance and performance of the LWBI:
    - funding of the LWRC for the operation of the MV Namao research vessel;
    - the LWBIN; and
    - a comparative analysis of the LWBI and three other ECCC freshwater funding programs.

  Case study methodologies included a document review and key informant interviews (n=1 or n=2 for the LWRC and LWBIN case studies). Case study interviews were conducted separately and in addition to the key informant interviews described previously.

3.3. Challenges and Limitations

Challenges experienced during the conduct of the evaluation, as well as the related limitations and strategies used to mitigate their impact, are outlined below.

- The water quality issues affecting Lake Winnipeg have developed over the past several decades and require long-term solutions. While science has enhanced the understanding of the state of the lake and contributing sources of nutrients, intended outcomes such as a reduction in the magnitude and extent of harmful algal blooms and restoration of the ecological integrity of Lake Winnipeg are complex and only expected to be measurable in the long term, beyond the evaluation timeframe. Where available,

[15] The distribution of external stakeholders included: Other federal departments, provincial government, water management boards (n=8); Other external stakeholders (e.g., academics, researchers, NGOs) (n=5); Members of advisory bodies (n=4); and Funding recipients (n=3).

proxy measures were used to assess intermediate outcomes and key external factors that impact on the achievement of longer-term outcomes were identified.

- Measures of some intended outcomes for the program such as nutrient reductions are not precise due to the method of calculation used and challenges in measuring nutrient reductions that occur as a result of individual actions. Additionally, intended outcomes related to the setting of nutrient objectives are the responsibility of other jurisdictions and, therefore, beyond the control of the program. These issues have been identified and explained in the findings where appropriate.
- The survey invitation was emailed to all 74 unique organizations that applied for LWBSF funding, including those who received funding and those never funded. Although a reasonable response rate of 61% was achieved, the small total number of completed surveys limits additional analysis beyond disaggregating the responses of funded and unfunded applicants.

4. FINDINGS

This section presents the findings of this evaluation by evaluation issue (relevance and performance) and by the related evaluation questions.

For each evaluation question, a rating is provided based on the evaluation findings. The rating statements and their significance are outlined below in Table 2. A summary of ratings for the evaluation questions is presented in Annex B.

Table 2. Definitions of Standard Rating Statements

Statement	Definition
Acceptable	The program has demonstrated that it has met the expectations with respect to the issue area.
Opportunity for Improvement	The program has demonstrated that it has made adequate progress to meet the expectations with respect to the issue area, but continued improvement can still be made.
Attention Required	The program has not demonstrated that it has made adequate progress to meet the expectations with respect to the issue area and attention is needed on a priority basis.
Not Applicable	There is no expectation that the program would have addressed the evaluation issue.
Unable to Assess	Insufficient evidence is available to support a rating.

4.1. Relevance

4.1.1. Continued Need for Program

Evaluation Issue: Relevance	Rating
1. Is there a continued need for the program?	Acceptable

There is a demonstrated need to address water quality issues in the Lake Winnipeg Basin and to better understand emerging issues that are impacting water quality and the lake's response to interventions.

- Lake Winnipeg is the world's 10th-largest freshwater lake and the world's third largest reservoir[16]. More than 7 million people live in the Lake Winnipeg basin which covers 1,000,000 km^2 between Canada and the United States.[17] The lake plays a critical role in tourism, recreation, commercial and sport fisheries, and hydroelectric generation in Manitoba.
- The basin is an important and complex watershed with significant water quality challenges related to excessive nutrients which have a negative impact on the ecosystem and economy. Available research and literature[18] clearly demonstrate the water quality challenges in the Lake Winnipeg Basin, including the following:
    - Eutrophication[19] is a key issue for this ecosystem. Excessive nutrients contribute to the growth of huge tracts of algae, which rob the lake of oxygen, clog fishing nets, foul beaches, and can produce harmful toxins.
    - There are multiple domestic and transboundary sources of nutrients, including agriculture sources and wastewater treatment plants, among others. The loss or degradation of wetlands, which are instrumental in filtering nutrients that flow off the land and into the lake, is exacerbating the issue.
    - Excessive nutrient levels have a negative impact on fish and fish health, as well as recreation and tourism. The Lake Winnipeg ecosystem supports an annual $50 million freshwater fishery and a $110 million recreation and tourism industry.[20]
- Interviewees agreed that there is a continued need to address persistent and ongoing water quality issues in the Lake Winnipeg Basin. The threats to the lake are evolving and not fully understood, requiring further knowledge and understanding of interactions and the impacts of interventions.
- In terms of stewardship funding, according to LWBSF funding applicants there are few alternative sources of funding. Most surveyed funding recipients (64%) did not believe their project would have been carried out if their organization had not received funding from the LWBSF.

[16] Environment and Climate Change Canada (2016) Canadian Environmental Sustainability Indicators: Nutrients in Lake Winnipeg. Consulted on March 6, 2017. Available at: www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=55379785-1.
[17] Province of Manitoba. (n.d.) *Lake Winnipeg Quick Facts*. Province of Manitoba. Water Stewardship Division. https://www.gov.mb.ca/waterstewardship/water_quality/lake_winnipeg/facts.html .
[18] Environment Canada and Manitoba Water Stewardship. 2011. State of Lake Winnipeg: 1999 to 2007 Highlights. https://www.ec.gc.ca/Publications/2348DE75-65E4-46D0-8277-9FAF6FB11DFC%5CStateOfLakeWinnipeg19992007Highlights.pdf; Manitoba Conservation and Water Stewardship Report (2015). Long-Term Nutrient Loading Targets for Lake Winnipeg Draft. Water Science and Management Branch; David W. Schindler, Robert E. Hecky, Gregory K. McCullough, The rapid eutrophication of Lake Winnipeg: Greening under global change, Journal of Great Lakes Research 38 (2012) 6–13; Leonard I. Wassenaara, Yerubandi R. Raob, Lake Winnipeg: The forgotten great lake, Journal of Great Lakes Research 38 (2012) 1–5.
[19] Eutrophication refers to the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen and leading to overgrowth of large, frequent and potentially toxic algal blooms.
[20] Environment and Climate Change Canada. Progress Report on the Lake Winnipeg Basin Initiative 2012–2013 and 2013–2014.

4.1.2. Alignment with Federal Government Priorities

Evaluation Issue: Relevance	Rating
2. Is the program aligned with federal government priorities?	Acceptable

LWBI objectives align well with federal government priorities to protect freshwater as a "precious resource" and with the strategic outcome of ECCC to conserve and restore Canada's natural environment.

Federal Priorities

- The objectives of the LWBI are aligned with federal government priorities related to water quality and sustainability as outlined in federal policy and budgetary commitments, as well as commitments made in the Federal Sustainable Development Strategy.[21]
- The 2015 Ministerial Mandate Letter sets out departmental priorities and includes a focus on protecting the country's freshwater sources as "a precious resource that deserves protection and careful stewardship." The Minister of ECCC is mandated to work in collaboration with the Minister of Fisheries, Oceans and the Canadian Coast Guard to renew the federal commitment to protect the Lake Winnipeg Basin.

ECCC Strategic Outcomes

- LWBI is aligned to the strategic outcome of ECCC to ensure that Canada's natural environment is conserved and restored for present and future generations. The LWBI falls under Program 1.3 Sustainable Ecosystems (Sub-Program 1.3.7) which "aims to sustain Canada's ecosystems over the long term by providing Canadians, their governments and the private sector with the environmental information and tools required to incorporate social, economic and environmental considerations into decision-making and action."

4.1.3. Alignment with Federal Roles and Responsibilities

Evaluation Issue: Relevance	Rating
3. Is the program consistent with federal roles and responsibilities?	Acceptable

Water quality is an area of shared federal, provincial and territorial responsibility. Federal involvement in Lake Winnipeg is consistent with the transboundary nature of the basin and the national importance of Lake Winnipeg as a large and significant freshwater body. ECCC's provision of science expertise fills an important role not addressed by other stakeholders. While the shared jurisdiction and involvement of multiple organizations in Lake Winnipeg introduces the potential for duplication, there are mechanisms in place that help mitigate this issue.

- The federal government has a legislated role in the management of transboundary waters that are of national interest. As Canada's 6th largest freshwater body, Lake Winnipeg is a freshwater resource of national importance. National leadership for water management is assigned to the Minister of the Environment in the *Department of the Environment Act*.

[21] Environment Canada. *Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada. 2013-2016*. November 2013.

While Lake Winnipeg itself resides fully within the Province of Manitoba, the Lake Winnipeg Basin covers four provinces and four states and over half of the nutrients that flow into Lake Winnipeg originate from outside Manitoba's borders. ECCC, with the support of the International Joint Commission, is responsible for delivering on the federal obligation under the International Boundary Waters Treaty[22] to support the management of the basin. The federal government is currently a signatory/participant in key inter-jurisdictional agreements pertaining to Lake Winnipeg including the CA–MB MOU and the Lake Friendly Accord.

- ECCC is also responsible for administering and enforcing the pollution prevention provisions under the *Fisheries Act*, which prohibit the deposit of deleterious substances into fish habitat.
- There are a variety of organizations that focus on issues in Lake Winnipeg, including universities (e.g., the University of Manitoba), other federal departments (e.g., AAFC, DFO), the provinces, multi-jurisdictional organizations (water management boards) and NGOs (e.g., the Red River Basin Commission, RBC Bluewater). Key informants acknowledge that the policy and program landscape is complex, but they do not view activities conducted by the LWBI as duplicating the work of other organizations. Coordination mechanisms such as the Lake Friendly Accord, the LWRC, inter-jurisdictional water management boards and the CA–MB MOU help support coordinated action and mitigate duplication.

4.2. Performance – Effectiveness

Evaluation Issue: Performance – Effectiveness	Rating
4. To what extent have intended outcomes been achieved as a result of the program?	
<u>Direct Outcomes</u>	
i. Effective actions by individuals and organizations	Acceptable
ii. Groups are aware of and apply for funding from the LWBSF	Opportunity for Improvement
iii. Increased stakeholder collaboration and coordination of federal actions	Acceptable
iv. State of the Lake Indicators are established and tracked	Opportunity for Improvement
v. Use of predictive capability to model nutrient scenarios	Acceptable
vi. Increased scientific knowledge and data for decision-making	Opportunity for Improvement
<u>Intermediate Outcomes</u>	
i. Reduced nutrients in Lake Winnipeg basin	Attention Required
ii. Manitoba/transboundary bodies establish nutrient objectives	Acceptable
<u>Final Outcome</u>	
Improvement of the ecological health of Lake Winnipeg	Unable to Assess

[22] The Boundary Waters Treaty is a treaty between Canada and the United States which provides general principles for preventing and resolving disputes for shared waters.

Direct Outcome 1: *Effective action by individuals, farmers, communities, and organizations to manage nutrients* ***– Acceptable***

The program has measures in place to prioritize funding to LWBSF projects which, based on available knowledge, are likely to have the greatest impact on managing nutrients. The majority of completed projects contributed to some level of sustainability over time through sharing of results and continued work with partners.

Selection and Funding of Effective Actions

- In an effort to maximize the effectiveness of projects funded by the LWBSF, the majority of LWBSF funds (70%) are directed to 'on the ground' actions.
- Further, LWBSF project proposals are assessed against clearly established priorities and criteria that are based on available science. Examples of efforts aimed at increasing the effectiveness of actions funded by the LWBSF include:
  - Targeting locations known to be a source of significant, direct nutrient loading to Lake Winnipeg. The majority of LWBSF project funds (70%) are directed to actions or research activities in the Red River/Assiniboine watersheds since the Red River is the highest contributing tributary in the Basin, accounting for one-half of nutrient inputs into Lake Winnipeg.
  - Focussing on addressing point sources and wetlands and shoreline restoration. Agricultural and major urban sources, together with spring flooding, are known to be key factors responsible for the increase in phosphorus loading in the lake.[23] Wetland creation, restoration and preservation play an important role in both intercepting runoff from the land before it reaches open water and in flood protection. The majority of projects (two-thirds) addressed issues related to water retention on the land/wetland restoration, while a minority were related to wastewater treatment and point sources. For the 29 projects completed between 2012-2013 and 2015-2016, LWBSF records identified:
    - 1,376 hectares of wetlands restored or protected;
    - 11,135 metres of shoreline restored or protected;
    - 102,340 trees/shrubs planted;
    - 9,404 hectares of land with surface water retained; and
    - 3,597 head of livestock restricted from accessing streams/shoreline.
- Both internal and external interviewees agreed that the technical review and PAC review of funding applications is an effective process for selecting projects, as it is science-driven, focuses on priority areas, and is fair and transparent.

Sustainability of Projects Beyond the Funding Period

- Another consideration in the assessment of project proposals is whether the project will provide ongoing benefits to the lake and watershed. Most LWBSF funding recipients indicated that their projects are having broader impacts beyond the stewardship action for which they were funded. For instance, funding recipients agreed or strongly agreed that

[23] David W. Schindler, Robert E. Hecky, Gregory K. McCullough, The rapid eutrophication of Lake Winnipeg: Greening under global change, Journal of Great Lakes Research 38 (2012) 6–13; Environment Canada (2015) Literature Review Of Nutrient Management-Related Best Practices Used in the Lake Winnipeg Basin 2015.

results from the project (to date) have been shared with other groups or organizations (93%) and partnerships developed during the project are continuing with another project or next-phase activities (86%).

- Most funding recipients whose projects were completed at the time of the survey (9 out of 14) indicated that some or all project activities continued after the funding from LWBSF ended. Examples of the sustainability of impacts identified in the file review included
  - ongoing awareness and education initiatives such as promotion of project activities in the media, events or scientific publications or integration of material in a school curriculum; and
  - continuation of project activities through integration into an existing initiative or replication of the project in another setting or with new partners.

Direct Outcome 2: *Lake Winnipeg groups are aware of and apply for funding from the LWBSF* – ***Opportunity for improvement.***

The program is well known in the Lake Winnipeg Basin and there is a strong demand for funding to conduct high-quality stewardship projects. However, Indigenous groups are not well represented as LWBSF funding recipients or partners in these projects.

- The LWBO conducts outreach to potential LWBSF applicants via mainstream media, social media, email and trade shows/conferences, although close to half of surveyed applicants (49%) reported first becoming aware of the LWBSF through word of mouth.
- All funds for Phase II of the program have been fully subscribed. Over three funding rounds under LWBSF Phase II, 178 Letters of Intent and 137 applications were received (excluding applications that were withdrawn or deemed ineligible) of which 49 were funded (success rate of 37% or $4.4 million allocated out of $20.8 million applied for).
- Almost all program applicants (89%) agreed that information about the LWBSF application process was easy to find. Applicant organizations are typically university/research organizations, ENGOs, and conservation districts/watershed associations.
- Although 15 First Nations reside around Lake Winnipeg, LWBI program representatives noted that the engagement of Indigenous groups in the LWBI is in the early stages and communities are not yet well represented among LWBSF funding recipients and partners.

Direct Outcome 3: *Increased partner and stakeholder collaboration at basin and sub-basin levels / Increased coherence and coordination of federal actions relative to Lake Winnipeg and its basins* ***– Acceptable.***

ECCC's leadership and participation in the LWBI has fostered increased levels of collaboration and coordination among stakeholders participating in each of the program's three pillars.

Science

- A recent management review of the CA–MB MOU[24] concluded that the priorities for science activities had been collaboratively determined and activities within federal and provincial departments were better coordinated as a result of the MOU. ECCC

[24] Steering Committee of the CA–MB MOU, Management Review to Support the Extension of the CA–MB MOU, 2014.

interviewees confirmed that LWBI annual science workplan objectives and priorities are informed by many factors including Manitoba's research activities, science in the US and universities, issues identified by local stakeholders, and the federal mandate.

- LWBI scientific collaboration benefits greatly from the work of the LWRC, a non-profit research organization with a mandate to coordinate research in the Lake Winnipeg Basin. ECCC scientists are active members of the LWRC, which also includes representatives from government, educational and other agencies and organizations. The LWRC facilitates sharing of results among scientists working in the basin through annual science meetings and posting of publications.

Stewardship

- The LWBSF selection criteria and requirement for matching funding (at least one-third of total project costs must come from alternate sources) encourage collaborations at the project level. An analysis of the project files and survey data confirm high levels of partner collaboration:
  - On average, projects in each funding round have involved four to six partners (consistent with the program's target of five partners, including ECCC).
  - Partners are drawn from all sectors, but have a focus on provincial and territorial governments, individuals and conservation districts/watershed associations, municipal governments, and academic institutions and ENGOs. Just 4% of projects included Indigenous groups or communities.
  - Most projects (61%) led to the development of partnerships that were new.
  - A large majority of funding recipients (74%) agreed or strongly agreed that the project contributed to greater collaboration among stakeholders in the Lake Winnipeg Basin.
- To increase partner and stakeholder collaboration, the program has held two LWBSF symposiums during the evaluation timeframe that bring together project recipients to discuss and share their work.[25]

Transboundary Partnerships

- As described in section 2.2, the focus of the program's work under this pillar is on supporting collaboration and ensuring a coherent, coordinated approach among the various jurisdictions involved in the Lake Winnipeg Basin. Examples of the program's contributions in this area include the following:
  - Engagement of the province and federal departments (AAFC, INAC, DFO) in twice yearly CA–MB MOU Steering Committee meetings. The review of documents and interviews with program representatives and external stakeholders confirmed that meetings are held regularly, are productive and have a high level of engagement;
  - LWBI representation and advocacy within international water governance bodies such as the Red River Water Board and Souris River Water Board; and
  - ECCC was one of the first signatories of the Lake Friendly Accord, an initiative of Manitoba's Department of Sustainable Development and the South Basin Mayors and Reeves. The Lake Friendly Accord document is a declaration of support by

[25] Presentations on 30 of the 48 projects supported by LWBSF occurred during the two symposiums.

signatories to take action to reduce nutrient loading and improve water quality in the Lake Winnipeg basin. ECCC staff participated in the Lake Friendly Steering Committee overseeing the implementation of the Accord, as well as working groups related to Governance and Science and Research.

- The transboundary partnerships were universally seen by internal and external interviewees to be useful and important, leading to beneficial information sharing and opportunities for collaboration and coordination of efforts. For instance, interviewees confirmed the value of the CA–MB MOU and the MOU Steering Committee which were both viewed very positively and described as a "strong piece of work", and "effective." This is consistent with the 2014 management review of the MOU, in which most Steering Committee members agreed that the MOU has been effective and improvements in information sharing were noted.
- The benefits of positive relationships developed through the transboundary partnerships pillar extended beyond the scope of LWBI planned activities. For instance, collaborations during the study period allowed the LWBI to draw on the experience and expertise of stakeholders to develop a strategy to address the emergence of zebra mussels in Lake Winnipeg.
- Ensuring representation of the LWBI in transboundary water governance bodies was viewed as important by key informants, in order to raise the profile of the issues specific to Lake Winnipeg within these organizations that have a broader mandate.

Direct Outcome 4: *State of the Lake indicators are established and progress against them is tracked –* ***Opportunity for Improvement.***

Development of State of the Lake Indicators aimed at providing greater insight into the status and trends of Lake Winnipeg's water quality and aquatic ecosystem health remains in the early stages and is delayed from target timelines identified in the CA–MB MOU Science Subsidiary Arrangement.

- In 2011, the State of the Lake report was released by ECCC and Manitoba.[26] With growing concerns about water quality in the lake, the report was the first attempt to summarize scientific knowledge about the aquatic ecosystem of Lake Winnipeg as it pertains to eutrophication. The report reflects changes in the physical, chemical and biological characteristics of Lake Winnipeg and also discusses current issues such as algae blooms and toxins, aquatic species at risk, and risks posed by climate change.[27] An update of the State of the Lake Indicators was a commitment of the CA–MB MOU Science Subsidiary Arrangement that set out a plan to "coordinate federal and provincial science to identify, test and validate appropriate indicators of aquatic ecosystem health for Lake Winnipeg and its Basin." Appropriate indicators were to be adopted to monitor the environmental, social and economic factors of interest to the general public and stakeholders and allow the efficacy of current nutrient objectives to be evaluated. A report was to be submitted in 2016 on the status and trends in water quality and aquatic ecosystem health in the Lake Winnipeg Basin.

[26] Environment Canada and Manitoba Water Stewardship. 2011. State of Lake Winnipeg: 1999–2007 Highlights.
[27] Environment Canada and Manitoba Water Stewardship. 2011. State of Lake Winnipeg: 1999–2007 Highlights.

- Development of the State of the Lake Indicators is delayed due to a lack of capacity at the provincial level for this work during the period under study. However, some recent progress is notable, including creation of an Indicator Steering Committee with staff from ECCC and Manitoba's Department of Sustainable Development; development of draft indicators and a process for further developing and publishing indicators for Lake Winnipeg and its watershed; and a draft table of contents and reporting plan (technical and summary reporting, eventually available online).
- According to key informants, monitoring data to assess progress on nutrient loading are in the early stages and there is likely a need for more data to support this requirement.

Direct Outcome 5: *Use of predictive capability to model nutrient scenarios* – ***Acceptable.***

ECCC predictive modelling of nutrients in the Lake Winnipeg Basin has been enhanced and is used to support work by Manitoba to understand optimal nutrient reduction scenarios in key tributaries.

- The Water Quality Analysis Simulation Program (WASP) model has been used by scientists for several decades to set nutrient target loads for various water bodies. Since 2010, ECCC has applied the WASP model to develop a eutrophication model for Lake Winnipeg that is calibrated for conditions in the basin, including major nutrient and algal dynamics. An iteration of the Lake Winnipeg eutrophication model was delivered to the Manitoba Department of Sustainable Development in fall 2013. The model was extended by ECCC and Manitoba scientists to incorporate three additional years of water quality data up to 2010 to strengthen the simulations by capturing more variability and water residence cycles of the lake. ECCC and Manitoba scientists used the model to simulate nutrient reduction scenarios and to develop draft nutrient loading targets for Lake Winnipeg's main tributaries.[28] The optimal nutrient reduction scenario established an annual total phosphorus load target for Lake Winnipeg (4,850 tonnes (4,850K kilograms) of total phosphorus per year) with targeted loads for each of the main four tributaries (4,250 tonnes) and smaller tributaries (600 tonnes). This would require a decrease of approximately 37% from current loadings based on the most recent estimates of average annual phosphorus loads available.[29] Parallel targets were also established for nitrogen.[30]
- According to documentary sources and the views of ECCC and Government of Manitoba key informants, the WASP eutrophication model for Lake Winnipeg is the best available predictive model to accurately model eutrophication in a complex aquatic ecosystem such as Lake Winnipeg. External users agreed that the work is of high quality and essential to the development of nutrient loading targets by the province. However, there are known limitations of the model.[31] Specifically, there is a lack of certainty about the relative contribution of various factors to nutrient loading (and, therefore, challenges in determining the most effective strategies for managing nutrients), and continued work is

[28] Manitoba Sustainable Development (formerly Manitoba Conservation and Water Stewardship), Water Science and Management Branch, Long-Term Nutrient Loading Targets for Lake Winnipeg, DRAFT, May 2015.
[29] The State of the Lake Winnipeg: 1999–2007 estimates average annual phosphorus loads at approximately 7,655 tonnes.
[30] The targets for nitrogen was an annual load of 62,140 tonnes per year (52,010 tonnes from main tributaries; 10,130 tonnes from others locations).
[31] MSD. Long-Term Nutrient Loading Targets for Lake Winnipeg.

required to refine the model in order to account for evolving conditions, including invasive species and climate change–related impacts on seasonal flooding.

Direct Outcome 6: *Increased scientific knowledge and data to inform and support decision making*[32] ***– Opportunity for improvement***

Good progress is being made on scientific commitments identified for Phase II and ECCC scientists have published numerous articles in peer-reviewed journals about issues facing Lake Winnipeg, however, there is a continued need to better understand the effectiveness of nutrient management practices in the basin to identify actions that will have greater impacts. While scientific collaboration and some sharing of data and scientific knowledge occur, more could be done to improve the dissemination of research findings and water quality data.

- Documents reviewed indicate that there has been good progress toward the scientific commitments identified under the LWBI Phase II. The Science Plan for Phase II had the objective of "focusing on watershed research and monitoring to help further target actions to improve the lake and to measure the performance of actions taken to improve water quality." Key science projects have included in-lake research activities to support development of predictive eutrophication models for Lake Winnipeg to inform ecologically relevant nutrient objectives, and monitoring research to understand the lake and watershed conditions and factors influencing nutrient loading.
- While progress is being made toward an improved understanding of the strategies for reducing nutrients in the basin, many internal and external key informants noted that additional evidence is needed to better understand the effectiveness of nutrient management practices in the basin and help identify actions that will have more significant impacts.
- Scientific findings are disseminated through science workshops hosted by the LWRC, in presentations to scientific audiences, and through professional networks. Water quality monitoring data collected by ECCC are shared with the International Red River Board, other water management boards, Manitoba, and internal ECCC researchers. ECCC scientists also publish their findings in peer-reviewed journals. In total, according to program performance measures, twenty-nine articles related to issues facing Lake Winnipeg were published by ECCC scientists in scientific journals during the four years under study.
- The case study on the LWBIN identified a need to improve the dissemination of data and scientific research about Lake Winnipeg. LWBIN, the web-based data and information portal designed by ECCC, is intended to facilitate sharing of water quality data and other research related to the basin. The LWBIN was transferred from ECCC to the University of Manitoba during the study period, with the provision of funding to continue to enhance the functionality of and access to the portal. While no data are available on the use of the portal, the case study of the LWBIN and the views of interviewees on the effectiveness of the portal as a dissemination channel were mixed. The LWBIN is not yet fully operational and there are some logistical challenges (e.g., restrictions on access to some data

[32] Note that this outcome was not part of the LWBI's formal logic model however it was added during the evaluation as it was identified as an important component of the program.

sources) which limit the extent to which researchers are able to populate their findings and data in the portal. ECCC water quality monitoring data are available through the LWBIN, however, the most current data available in the portal are from 2011 (but more recent data can be accessed by direct request to the department).

- ECCC program representatives agreed that the LWBI could be more proactive about disseminating scientific findings to other stakeholders in the basin, particularly to stakeholder groups who develop regulations related to nutrient release or who are responsible for the implementation of recommended management practices.

<u>Intermediate Outcome 1</u>: *Reduced nutrient loading in the Lake Winnipeg Basin* **– Attention Required.**

Information is not available to assess the degree to which the actions of various stakeholders are impacting nutrient loadings in the basin. While estimates of reductions from LWBSF projects are on track to meet their targets and are substantially greater than in Phase I, the level of nutrient reductions they deliver is extremely small in relation to total phosphorus estimated to be entering the lake, with total loading reductions from all Phase II projects over five years estimated at less than 1% of annual nutrient loads.

- Recent information on the level of nutrient loadings in the Lake Winnipeg Basin is not available, and as a result it is not possible to understand the degree to which efforts by other stakeholders in the basin may be having an impact on annual nutrient loadings. The most current information available on loadings comes from the State of Lake Winnipeg Report: 1999–2007, which was published in 2011, and indicated that the total phosphorus load for Lake Winnipeg was, on average, 7,655,000 kilograms annually (with variability each year depending on precipitation and associated river flows).
- The LWBSF funded projects include a focus on delivering nutrient reductions, and phosphorus reduction estimates for the projects are calculated using a desk top method provided by ECCC.[33] While the nutrient reductions achieved through the LWBSF are important and a step in the right direction, they are extremely small in relation to the annual phosphorus loading of the lake. The estimate of total LWBSF reductions achieved over five years will represent less than 1% of one year of loadings.
- During the first four years of Phase II of the LWBSF (2012–2013 to 2015–2016), funded projects are estimated to have reduced or diverted a total of 37,200 kilograms of phosphorus. This amount is on track to meet or exceed the LWBSF target of 10,800 kilograms/year (or 54,000 kilograms in total) when the remaining projects are completed in 2016–2017. The amount of phosphorus reductions delivered by Phase II projects is substantially greater than those for Phase I, which were estimated to be 6,500 kilograms in total over four years (average of 1,600 kilograms per year).
- Note that the estimates of nutrient reductions to date have come from just 10 out of the 29 projects that were funded and completed during the period under study, with over one-half of the reductions being contributed by one project (decommissioning of a municipal sewage lagoon site).

[33] The calculation does not include potential reductions from LWBSF education and outreach projects that are intended to increase awareness and encourage behaviour/practice changes among organizations and citizens to reduce phosphorus concentrations in Lake Winnipeg.

Intermediate Outcome 2: *The Province of Manitoba/transboundary management bodies establish nutrient objectives* **– *Acceptable.***

While not directly the responsibility of ECCC, draft nutrient objectives for Lake Winnipeg have been established by the Province of Manitoba, and work on the development of nutrient objectives is being carried out by two transboundary water management bodies that impact the basin.

Province of Manitoba

- As Lake Winnipeg lies within provincial boundaries, the Province of Manitoba is the jurisdiction responsible for establishing the lake's nutrient objectives. Transboundary water management bodies are responsible for establishing nutrient objectives for shared waters such as the Red River.
- Provincial nutrient objectives for Lake Winnipeg are based on scientific research, including the historical research conducted by Bunting et al. (2011)[34] which examined historical water quality conditions in Lake Winnipeg since the early 1800s. The research documented increases in phosphorus concentrations in the south basin of the lake to approximately 0.05 micrograms/litre (*µ*g/L) between 1900 and 1990 and further acceleration of eutrophication between 1990 and 2006 with phosphorus concentrations reaching 0.10 *µ*g/L. The authors recommended a 50% reduction in phosphorus influx to pre-1990 levels to avoid future toxic impacts. Based on this research, Manitoba's (unpublished) phosphorus reduction goal is to reduce phosphorus concentrations in the lake to pre-1990 levels of approximately 0.05 *µ*g/L.[35]

Transboundary Water Management Bodies

- Two of the four transboundary water management bodies in the Lake Winnipeg Basin have made progress on nutrient objectives related to tributaries within the basin:
  - The Prairie Provinces Water Board (PPWB) ratified Interprovincial Water Quality Objectives[36] in 2015 that included thresholds for nutrients – including water quality parameters for phosphorus and nitrogen – for 12 transboundary rivers in Alberta, Saskatchewan and Manitoba.
  - The IRRB has established water quality objectives for five variables,[37] although none of these relate to nutrient levels. Objectives related to nutrient levels are currently under development and are expected to be finalized in 2017 or 2018.

[34] Bunting, L., P.R. Leavitt, B. Wissel, K.R. Laird, B.F. Cumming, A. St. Amand, and D.R. Engstrom. 2011. Sudden ecosystem state change in Lake Winnipeg, Canada, caused by eutrophication arising from crop livestock production during the 20th century. Report produced for the Province of Manitoba. 72 pp.
http://www.gov.mb.ca/conservation/waterstewardship/water_quality/lake_winnipeg/pdf/rep ort_lake_wpg_paleolimnology_2011.pdf.
[35] Total nitrogen concentration targets for the south and north basins were set at 0.75 mg/L and 0.70 mg/L respectively.(Source: Status Report on the Activities of the International Red River Board. Prepared for the International Joint Commission. Spring Semi-Annual Meeting. April 28, 2015, Washington, D.C.)
[36] Water quality variables related to nutrients include total phosphorus, total dissolved phosphorus, nitrate as N (nitrogen), and ammonia Un-ionized,(IRRB Status Report).
[37] These variables include dissolved oxygen, total dissolved solids, chloride, sulphate, and E.coli. The IRRB is responsible for monitoring and reporting on compliance with the established objectives for these variables. (IRRB Status Report).

Final Outcome: *Improvement to the ecological health of Lake Winnipeg, namely: Reduction in the magnitude and extent of harmful algal blooms; Reduced beach advisories and improved water quality for recreation; Restoration of the ecological integrity of Lake Winnipeg; A sustainable fishery* ***– Unable to assess.***

There are insufficient data to fully assess improvements to the ecological health of Lake Winnipeg, There is widespread agreement, however, that the ecological integrity of the lake and the basin has not improved significantly during the period under study based on efforts to date and the impact of a number of factors such as invasive species, weather events linked to climate change and the recirculation of nutrients released from lake sediment.

- Currently available indicators and supporting data to measure long-term improvements in the ecological health of Lake Winnipeg are limited due in part to delays in establishing State of the Lake Indicators. While the annual number of algal advisories issued for Lake Winnipeg beaches decreased over the four years under study (from 10 advisories in 2012-13 to 1 in 2015-16), data on other indicators such as the prevalence of toxic blooms and an indicator on ecological integrity of the lake are not available.
- The evaluation evidence suggests that the LWBI is unlikely to have resulted in detectable improvements to the ecological health of Lake Winnipeg. Scientific research indicates significant and negative impacts on water quality due to factors such as the presence of invasive species, weather events/seasonal flooding linked to climate change and recirculation of nutrients (nutrients that are released from the sediment within the lake).
- At this point in time the program is having only a very minimal impact in terms of the actual nutrient reductions realized through on-the-ground activities and investment in science and transboundary partnerships is only likely to translate into improvements in water quality in the longer term.

Unintended Outcomes: *Have there been any unintended (positive or negative) outcomes?* ***– Acceptable.***

Unintended/unexpected outcomes of the LWBI are few, but mostly positive.

- The review of project annual reports revealed an example of an unexpected positive non-environmental outcome. Namely, one funding recipient noted that project activities improved profitability for the livestock sector, which increased investment in infrastructure to improve pasture management and sustainability more broadly.
- The case studies identified positive unexpected outcomes, particularly regarding capacity building:
    - Support for the operation of the MV Namao for offshore work helped create the capacity and experience within the LWRC to also add the operation of a nearshore vessel as part of the research and monitoring plan on the lake.
    - The information sharing and collaborative network of the LWBIN has helped to add a community monitoring element, including citizen science groups and GIS mapping.

4.3. Performance – Efficiency and Economy

4.3.1. Program Design

Evaluation Issue: Performance – Efficiency and Economy	Rating
5. Is the program design appropriate for achieving its intended outcomes?	Opportunity for Improvement

The science, stewardship and transboundary partnerships pillars remain relevant, and the interrelationships among the organizations delivering the program components are effective for establishing a foundation to address issues in the lake. While the current LWBI program design is generally consistent with program objectives, there appears to be a disconnect between the program design and the program's expected outcomes as portrayed in the logic model, as the program's current activities fall short in terms of delivering any significant actions that address the logic model's intermediate outcome of "reduced nutrients in the Lake Winnipeg Basin."

- The design of the LWBI is logical, science-based and consistent with the objectives of the program as identified in its foundational documents which emphasize:
  - establishing a long-term, collaborative and coordinated approach to support the sustainability of the lake; and
  - improved science-based understanding of the dynamics of Lake Winnipeg and its Basin for more informed decision-making.
- Internal stakeholders agreed that the science, stewardship and transboundary partnership pillars continue to be appropriate areas of focus for the LWBI. The three pillars each play an important role in establishing the foundation needed to address the longstanding water quality issues in the lake. Further, there appear to be beneficial interrelationships among the pillars. The development of a science plan to identify and address gaps in data is leading to relevant scientific evidence to inform funding of stewardship projects; stewardship projects also play a role in contributing to scientific knowledge and an increased awareness among stakeholders of the issues impacting the basin; and transboundary partnerships encourage the collaboration necessary to coordinate both science and stewardship activities.
- While the current LWBI program design is generally consistent with program objectives, there appears to be a disconnect between the program's design and its expected outcomes as portrayed in the logic model. The program's design is not fully reflected in the logic model and it falls short in terms of delivering any significant actions that address the logic model's intermediate outcome of "reduced nutrients in the Lake Winnipeg Basin." This in turn limits visible progress toward the longer term outcomes of improved ecological health for the lake. The final outcome represents an important aspirational objective, but requires the collective efforts of other stakeholders and jurisdictions or introduction of more direct measures and program alternatives to be achieved.

- Most internal key informants were comfortable with the allocation of resources among the three program pillars.[38] However, some interviewees cautioned against any further reductions to the science pillar (as occurred between Phase I and Phase II),[39] particularly given that many important questions remain concerning the effectiveness of management practices and the impact of emerging issues such as zebra mussels. Currently, the level of funding to science within the LWBI is proportionately higher than other ECCC freshwater programs.[40] Others in the external stakeholder community, however, were of the opinion that LWBSF funding for stewardship is under-resourced.

4.3.2. Program Governance and Management

Evaluation Issue: Performance – Efficiency and Economy	Rating
6. To what extent is the governance structure clear and appropriate?	Opportunity for improvement

The LWBI leads or participates in multiple governance structures and roles and responsibilities of the various players are clear. Engagement of Indigenous groups in governance is in the early stages, but more could be done to ensure their consistent and coordinated participation.

- As described in section 2.3, the LWBI governance structure involves multiple internal federal (the LWBI Executive Committee, Transboundary Connections Calls) and multi-jurisdictional committees (CA–MB MOU Steering Committee). Additionally, the LWBSF engages scientific experts and other stakeholders in Technical and Public Advisory Committees to evaluate applications for funding.
- Internal and external interviewees indicated that the structures are effective for coordinating the various stakeholders working on the issues surrounding the Lake Winnipeg Basin. The roles and responsibilities, including for the management of G&C and science resources, are generally understood by all relevant parties. Stakeholder diagrams produced by the LWBO help provide clarity of relationships.
- Many interviewees stated that information sharing is the greatest benefit of collaboration among stakeholders. This includes access to the expertise of other departments such as best management practices on agricultural land from AAFC and knowledge of invasive species from DFO (given the emergence of zebra mussels in the basin).
- Although the Lake Winnipeg Basin is expansive and involves many different stakeholder groups, for the most part, the structures appear to involve most relevant stakeholders, and include cross-membership among the committees. As previously noted, one exception is the participation of Indigenous groups, whose input is not currently integrated in a

[38] The distribution of the current allocation over the five years of Phase II is: Science (including the $8.6 million allocation and $2.3 million in LWBSF funds to research), 61%; Stewardship, 28%; and Transboundary Partnerships, 11%.
[39] Science represented 68% of the $17.7 million in funding under Phase I of the LWBI.
[40] For instance, the allocation to STB for the Great Lakes Program is 41%, although it is generally recognized that the state of science in the Great Lakes is more mature compared to Lake Winnipeg and in actual dollars it is more than three times greater (approximately $35.2 million for the five-year period from 2010–2011 to 2014–2015) (from ECCC's Evaluation of the Great Lakes Program, Draft Report. December 2016, p. 8).

coordinated manner. The recently established Lake Winnipeg Indigenous Collective[41] was identified as a positive step forward in Indigenous stakeholder engagement.

- Collaboration with internal ECCC partners (such as other freshwater lake programs) and other relevant federal departments (DFO, AAFC, INAC) is working well according to most internal key informants, although some would like to see more formal involvement and coordination from these other federal departments.

4.3.3. Program Delivery

Evaluation Issue: Performance – Efficiency and Economy	Rating
7. Is the program implemented in an efficient and economical manner?	Acceptable

The evaluation found that the LWBI is a well-managed program and includes a number of practices that contribute to efficient activities. LWBSF funding applicants were generally satisfied with the delivery of the program.

- Here are some examples of ways the program enhances the efficiency of delivery:
  - use of collaborative mechanisms such as the LWRC and the annual LWBSF symposium to avoid duplication, create synergies and ensure that future investments are purposeful;
  - leveraging learning within ECCC across freshwater lake scientific programs; and
  - leveraging support from other organizations for LWBSF-funded projects, including volunteer efforts (for LWBSF projects, partner contributions are leveraged at a 3:1 ratio to program funds, and the Technical Review and Public Advisory Committees leverage federal expertise and volunteer time).
- LWBSF applicants were generally satisfied with the delivery of the program; three-quarters of applicants or more agreed that the LWBSF Project Officer provided satisfactory support during the project (93%), the application form was easy to complete (82%), and eligibility criteria were easy to understand (76%). The supporting reference tools are also regarded as satisfactory, although fewer agreed that the program's funding decisions were received in a timely manner (60%).
- As might be expected, unfunded applicants had lower levels of satisfaction with the program. Additionally, most unfunded applicants (71%) did not agree that they were provided with sufficient information on the reason(s) their LWBSF funding application was unsuccessful.
- The efficiency of the program was also assessed through an analysis of financial information for the LWBSF. Considering salary and O&M costs to deliver the LWBSF G&C program, the proportion of administrative overhead for the program during the period under study was approximately 14%.[42] This is lower than in Phase I of the program (22%

[41] The Lake Winnipeg Indigenous Collective was formed in 2014. It is a collective of First Nation communities located near Lake Winnipeg who are concerned about the health of the lake. The mission of the Lake Winnipeg Indigenous Collective is to "seek healthy and equitable solutions for our waters and our people from the diverse communities who have a relationship with Manitoba's sacred great lake."

[42] The administrative overhead of the program was calculated as (salary + O&M) / G&C funds. Salary and O&M costs were based on program estimates of the portion of LWBI salary and O&M used to administer the LWBSF program.

overhead) and lower than other ECCC G&C programs such as EcoAction (22%–25% overhead).

4.3.4. Performance Measurement

Evaluation Issue: Performance – Efficiency and Economy	Rating
8. Are performance data being collected and reported? If so, is this information being used to inform senior management / decision makers?	Opportunity for Improvement

A Performance Measurement Framework was recently developed, is diligently populated, and is used to monitor and inform decision making about the program. Additionally, performance data is being captured to measure the impacts of projects funded under the LWBSF. Weaknesses were identified in the program's logic model in terms of presenting an accurate depiction of the program and a realistic progression to achieving final outcomes.

- Although missing indicators and data to track progress on final outcomes, the program has developed and implemented a Performance Measurement Framework (PMF) that includes performance measures to monitor outputs and report on many intended outcomes. Targets are established and historical values are being tracked for the majority of indicators.
- ECCC interviewees reported that performance data have been used to inform senior managers of outcomes, support Departmental Performance Reports, and aid in the selection of LWBSF projects.
- Performance data is captured electronically on the environmental outcomes of funded LWBSF projects and is readily accessible for analysis. Through the survey, the majority of funding recipients (86%) indicated that the reporting template allowed for meaningful reporting on the results of their project. However, the calculation of project environmental outcomes has some challenges.
- The LWBIN case study found that performance measures are being reported as per the requirements of the Contribution Agreement. After the network is fully established, it will be important to ensure meaningful performance measures are in place for this LWBSF project to understand the effectiveness of this dissemination channel.
- As described in section 4.3.1, although a key intermediate outcome of the evaluation is reduced nutrient loadings, the program as currently designed does not include activities which deliver significant levels of nutrient reductions. While the program's PMF identifies a target value for this indicator that is in line with the program's actions, the current level of nutrient reductions are not in their own right likely to make significant contributions to the program's final outcomes related to improved ecological health of the lake. Furthermore, the two other identified intermediate outcomes (which both relate to establishing nutrient objectives) are also not likely in their own right to lead to the program's final outcomes. The logic model appears to be missing an outcome related to greater uptake and actions on the part of other important stakeholders in the basin.

5. CONCLUSIONS

Relevance

There is a demonstrated need to improve the ecological health of Lake Winnipeg. The program is aligned with federal government priorities, and while management of freshwater resources is a shared federal and provincial/territorial responsibility, ongoing involvement of the federal government in Lake Winnipeg is warranted given the transboundary nature of the Lake Winnipeg Basin, the national importance of Lake Winnipeg, and the unique capacity of the federal government to contribute in areas such as science and the provision of funding to support local action.

Performance – Effectiveness

With respect to the program's **science** pillar, science work plans are developed annually based on the original commitments of the LWBI and coordination with other stakeholders. Program efforts to apply and extend the WASP to model nutrient scenarios in Lake Winnipeg have supported setting of nutrient loading targets in the basin. This modelling work is ongoing, due to the complexity of the ecosystem and the need to better understand the impacts of evolving issues such as invasive species, climate change and the recirculation of nutrients. While progress is being made toward an improved understanding of the strategies for reducing nutrients in the basin, there is a strong desire to increase understanding of the kinds of nutrient management actions that will be most effective in the context of the local climate and geographical features of the basin.

The science pillar benefits from the work of the LWRC, which facilitates sharing of research among scientists working in the Lake Winnipeg Basin. The LWBIN, which is funded by the program to ensure that research and monitoring data are available for the use of other stakeholders in the Basin, is not yet completely functional. Broader dissemination of research and data was noted as an area for improvement.

With respect to the **stewardship** pillar, the immediate outcomes of engaging stakeholders in the LWBSF have largely been met as the program is well known among stakeholders in the Lake Winnipeg Basin, and requests for funds to support high-quality projects exceed the amount of available funds. Projects funded by the LWBSF involve multiple partner organizations, which also provide additional in-kind or cash contributions to the project, however, Indigenous communities around Lake Winnipeg are under-represented in the program, both as project applicants and partners.

Projects funded by the LWBSF are undertaking varied research and stewardship activities, many of which address priority concerns in the Red River watershed, which contributes a large portion of the nutrients flowing into Lake Winnipeg. The amount of nutrients reduced by projects will meet or exceed the targets set by the program and are much greater than the amounts addressed in Phase I, however, these reductions remain extremely small in relation to the overall amount of phosphorus estimated to be released or entering Lake Winnipeg annually. Transfer of knowledge and education regarding the most effective practices was viewed as a priority in order to continue to increase awareness and action on the part of organizations and individuals.

The **Transboundary Partnerships** pillar includes work with the Province of Manitoba under an effective MOU, as well as through its leadership and participation with the transboundary water management boards. While the program is also impacted by the constraints of other organizations, during Phase II of the LWBI nutrient objectives for Lake Winnipeg were set by Manitoba, and the PPWB and the Red River Watershed Management Board (RRWMB) are making progress in establishing nutrient objectives. Less progress has been made with the

Province of Manitoba on a commitment in the MOU Science Subsidiary Arrangement to develop, monitor and publish State of the Lake Indicators.

In terms of the program's long-term outcome of improving the ecological integrity of Lake Winnipeg, evidence is lacking due largely to the fact that the State of the Lake indicators are not developed and implemented. However, the literature and the views of key stakeholders suggest that there has been limited or no improvement in water quality in Lake Winnipeg. As mentioned, the funds dedicated to on-the-ground stewardship actions, while increased in Phase II, in themselves lead to nutrient reductions that are small in relation to the total phosphorus entering the lake. Further, external factors such as invasive species, seasonal weather events linked to climate change, and nutrient cycling are impacting nutrient loadings and the response of the lake to interventions.

Performance – Efficiency and Economy

The LWBI is a well-managed program employing a number of practices that contribute to efficiency and funding applicants are generally satisfied with ECCC's delivery of the program.

While there are many entities involved in the Lake Winnipeg Basin, governance mechanisms effectively support coordination and coherence of efforts, and all pillars are actively involved in collaborations with the numerous organizations and water management bodies active in the Lake Winnipeg Basin. Engagement of Indigenous groups and communities in the Lake Winnipeg Basin is in the early stages, but will be facilitated by the recently established Lake Winnipeg Indigenous Collective.

The evaluation evidence indicates that the LWBI is being implemented as planned, and its design, with the three pillars of science, stewardship and transboundary partnerships, remains a relevant and logical approach for organizing the program. An apparent discrepancy was identified between the program's design and its intended outcomes as identified in the program's logic model. The program's design is not fully reflected in the logic model and, in the context of the program's current activities, the logic model does not reflect a realistic pathway from intermediate to final outcomes that is likely to result in restoration of the lake's ecological health.

6. RECOMMENDATIONS AND MANAGEMENT RESPONSES

The following recommendations are addressed to the ADM, Strategic Policy Branch, as the senior departmental official responsible for the management of the LWBI.

<u>Recommendation 1:</u> Focus efforts on expanding the base of knowledge and improving dissemination to stakeholders regarding: i) the nutrient management practices likely to have the greatest impact; and ii) the impacts of emerging factors such as invasive species, climate change and nutrient cycling.

The evaluation evidence indicates that while the LWBI is contributing to nutrient reductions, program efforts alone will not lead to meaningful nutrient loading reductions in Lake Winnipeg. Science and engagement efforts remain important to support broad take-up of proven interventions. The evaluation points to a lack of sufficient evidence to understand the effectiveness of management practices in the Lake Winnipeg Basin and optimize nutrient reductions. Therefore, it is recommended that investments in science and stewardship focus more intensively on increasing the knowledge base on the effectiveness of promising nutrient management practices and that knowledge transfer through outreach and education be

prioritized to enable other organizations in the basin (e.g., conservation districts, municipalities, land owners) to incorporate these proven practices. Additionally, a need was identified to better understand the impacts of emerging and evolving factors such as invasive species, climate change and nutrient cycling on the Lake Winnipeg Basin's complex ecosystem. The priorities and work plans of the LWBI pillars should be informed by these factors and responsive to changing conditions.

The ADM of SPB agrees with the recommendation.

Management Action		
The proposed approach to respond is for additional science to conduct research on the sources, transport and fate of nutrients in several high-impact sub-watersheds in the Lake Winnipeg Basin in order to improve understanding of what management practices are best for reducing nutrient loading in watercourses in northern prairie landscapes. Where possible, collaborative research with other stakeholders and levels of government will be conducted. In addition, scientific research, modelling and monitoring will be conducted to better understand the impacts of invasive species, climate change and other emerging issues on the ecological health of Lake Winnipeg and its watershed. ECCC will also provide targeted G&C funding to academic researchers for studies on emerging water quality contaminants in the Lake Winnipeg basin to complement ECCC research efforts. The proposed approach for stewardship is to provide targeted G&C funding to academic researchers for studies on the effectiveness of nutrient reducing Best Management Practices in northern prairie landscapes. Those studies will complement, and not duplicate, ECCC research efforts and will be encouraged to have an education/outreach component about proven nutrient reducing practices. A plan will be developed to promote knowledge transfer on proven nutrient reduction practices through use of webinars, online publishing of the State of Lake Winnipeg reports and Indicator series, and regular Lake Winnipeg Basin Symposiums. Information and knowledge transfer will continue through ongoing participation in established governance forums. Government of Canada funding has been announced for the Lake Winnipeg program (2017-2022) through Budget 2017. An important component of the proposed program is the development of an Lake Winnipeg Adaptive Management Framework for Lake Winnipeg, in collaboration with the Province of Manitoba and other stakeholders, which will assess the effectiveness of management decisions intended to mitigate the effects of nutrient loading and multiple ecological stressors such as invasive species and climate change.		
Timeline	**Deliverable(s)**	**Responsible Party**
May 2017	Initiate development of Lake Winnipeg Adaptive Management Framework.	DG, Water Science & Technology AsRDG West & North
June 2017	Implementation of the ECCC science plan to guide ECCC research, modelling and monitoring studies under the Lake Winnipeg program from 2017-18 to 2021-22.	DG, Water Science and Technology

Recommendation 2: Review the program's design and expected outcomes to ensure that they are consistent and demonstrate that the program's activities make a reasonable contribution to achieving final outcomes.

While the current LWBI design is generally consistent with program objectives, an apparent discrepancy was identified between the program's design and its intended outcomes as presented in the program's logic model. The current program design does not deliver significant actions related to the key intermediate outcome of reduced nutrient loadings. Furthermore, the two other identified intermediate outcomes (which relate to establishing nutrient objectives) are also not likely in their own right to lead to the program's final outcomes. Both the program's design and its stated expected outcomes should be reviewed and reconciled.

The ADM of SPB agrees with the recommendation.

Management Action		
While the program in this Phase did meet and exceed its identified targets with respect to demonstrating measureable nutrient reductions through individual on the ground projects, it is acknowledged that this was articulated as a numerical value at a project scale. When this was compared to basin-levels of nutrients, the overall impact of nutrient reduction attributed to the program appears minimal. In order to address this moving forward, the program design and logic model will be updated to fully reflect the desired results of the program in contributing to nutrient reduction efforts in the Lake Winnipeg Basin through project activities as well as through collaboration with stakeholders and partners. At the program level, the Lake Winnipeg Basin Office will update the Lake Winnipeg program performance management framework and use this information to inform the Lake Winnipeg component of the Ecosystem Partnerships Program Logic Model and the Program Performance Information Profile (PIP) for the Freshwater Action Plan (2017-2022). At the departmental level, the Associate Regional Director General Office, West and North, will continue to work with Corporate Management Directorate in the development of the Ecosystem Partnerships Program Logic Model and the Program Performance Information Profile (PIP) for the Freshwater Action Plan (2017-2022) which includes the Lake Winnipeg program. The Evaluation Recommendation for Phase II of the Lake Winnipeg Basin Initiative will guide the development of the Logic Model and PIP. Program outcomes will reflect the scope and magnitude of the Lake Winnipeg program authority and its funding envelope. With respect to Budget 2017, we will be including updated outcomes and indicators.		
Timeline	**Deliverable(s)**	**Responsible Party**
August 2017	Lake Winnipeg Program performance measurement framework completed and reflects the scope and magnitude of the Lake Winnipeg program authority and its funding envelope.	AsRDGO, West and North
Fall 2017	Ecosystem Partnerships Program Logic Model completed and program outcomes reflect the scope and magnitude of the Lake Winnipeg program authority and its funding envelope.	AsRDG, West and North DG, CMD

Recommendation 3: Strengthen efforts to engage Indigenous groups and communities in stewardship and partnership activities.

Although efforts have been made recently to increase the participation of Indigenous communities, the level of engagement remains limited. Indigenous communities around Lake Winnipeg are not well-represented as funding recipients or partners in the LWBSF projects and have a limited presence in basin coordination mechanisms. As they are important stakeholders in the Lake Winnipeg Basin, it is recommended that the program build on preliminary work to engage these communities.

The ADM of SPB agrees with the recommendation.

Management Action		
ECCC will collaborate with other federal and provincial departments through the CA-MB Lake Winnipeg MOU Steering Committee to ensure that departmental Indigenous engagement efforts are inclusive and coordinated federally and provincially within Manitoba on the water quality issues facing Lake Winnipeg. Government of Canada announced additional funding for the Lake Winnipeg program in Budget 2017 which will provide targeted G&C funding to increase the representation of Indigenous communities as funding recipients or partners in LWBSF projects and support Indigenous engagement in freshwater issues for First Nations communities surrounding Lake Winnipeg. ECCC will also support broader Indigenous engagement in freshwater issues for Indigenous organizations throughout the Lake Winnipeg Basin.		
Timeline	**Deliverable(s)**	**Responsible Party**
June 2017	Indigenous engagement strategy developed	AsRDG, West & North
Sept. 2017	Lake Winnipeg G&C funding program criteria developed and implemented to support Indigenous engagement on freshwater issues.	AsRDG, West & North

Recommendation 4: Build on and advance early efforts to develop State of the Lake Indicators with the Province of Manitoba.

The CA–MB MOU Science Subsidiary Arrangement included a commitment to develop State of the Lake Indicators and submit a report by 2016 on the status and trends in water quality and aquatic ecosystem health in the Lake Winnipeg Basin. Appropriate indicators were to be adopted to monitor the environmental, social and economic factors of interest and allow nutrient objectives to be assessed. While some development of indicators has been initiated and a governance mechanism was recently established, the work is delayed and the commitment has not yet been met. It is recommended that efforts be re-focused to ensure that this work advances, including aligning monitoring efforts to enable an assessment of changes in the indicators over time.

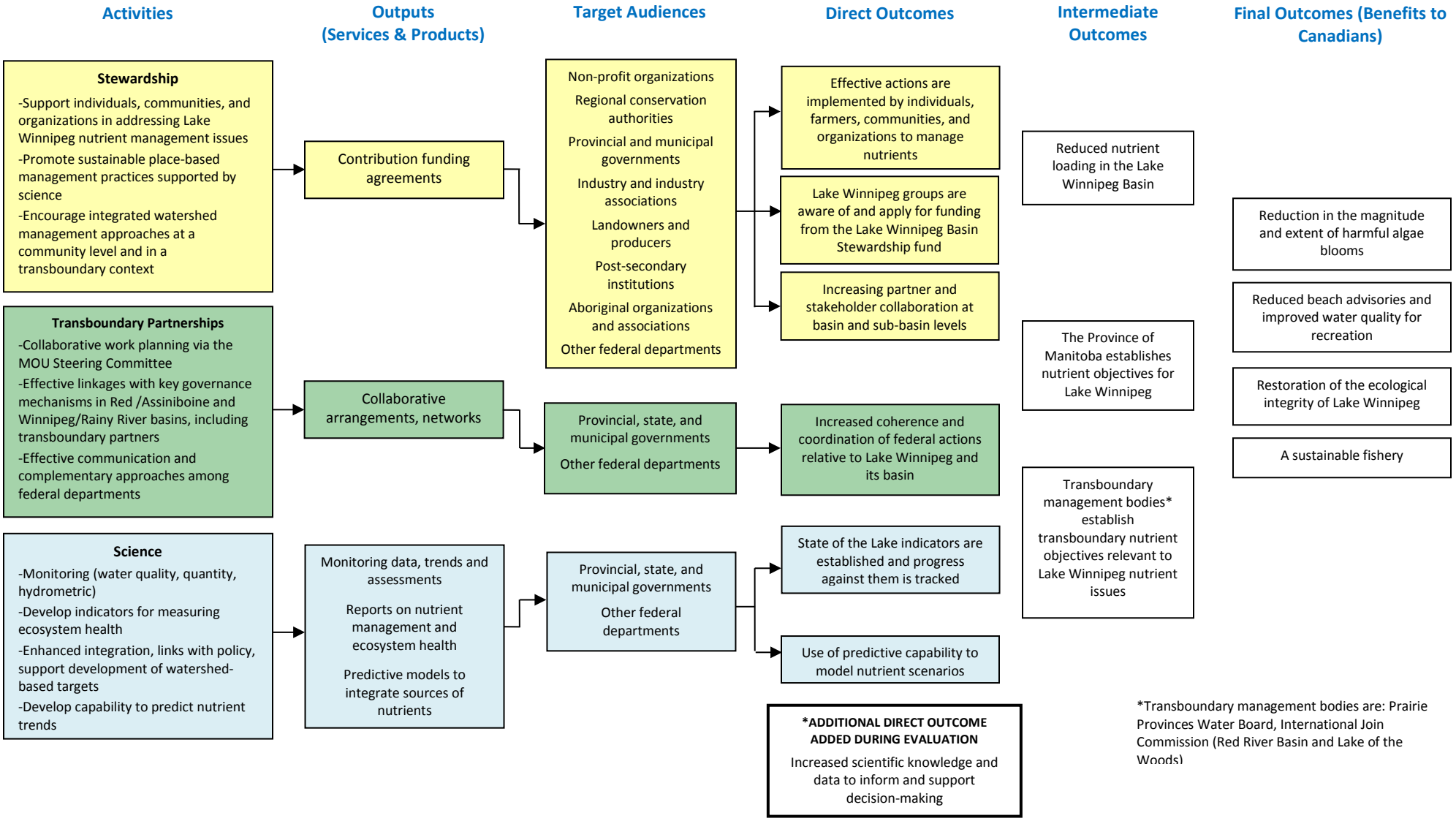
The ADM of SPB agrees with the recommendation.

Management Action
Through the governance mechanism approved by the CA–MB MOU Steering Committee for reporting on the health of Lake Winnipeg and its basin, ECCC will collaborate with provincial colleagues and other stakeholders in the development and on-line publishing of a State of the Lake indicators series. The goal is to develop 2 to 3 indicator factsheets each year and update published indicator factsheets regularly, based on data availability.

ECCC will collaborate with provincial colleagues and other stakeholders in publishing a second Lake Winnipeg State of the Lake Report in 2018. That report will summarize the scientific knowledge of the lake, focusing on the period from 1999 to 2017. Like the first Lake Winnipeg State of the Lake Report which covered the time period from 1999 to 2007, the report will be available both as information highlight as well as an extended technical document.		
Timeline	**Deliverable(s)**	**Responsible Party**
March 2018	Initial 3 to 5 State of Lake Winnipeg Indicator factsheets published on-line in 2017-18, with 2 to 3 factsheets developed each subsequent year.	AsRDG, West & North DG, Water Science & Technology
March 2018	Lake Winnipeg State of the Lake Report published on-line	AsRDG, West & North DG, Water Science & Technology

ANNEX A – Lake Winnipeg Basin Initiative Logic Model

Logic Model for the Lake Winnipeg Basin Initiative *2 November 2015*



ANNEX B – Summary of Findings[43]

Relevance

Evaluation Question	Acceptable	Opportunity for Improvement	Attention Required	Unable to Assess	Not Applicable
1. Continued need for the program	●				
2. Aligned to federal government priorities	●				
3. Program consistent with federal roles and responsibilities	●				

Performance

Evaluation Question	Acceptable	Opportunity for Improvement	Attention Required	Unable to Assess	Not Applicable
4. Achievement of intended outcomes					
Immediate Outcome 1: Effective actions to manage nutrients	●				
Immediate Outcome 2: Lake Winnipeg groups are aware of and apply for funding		●			
Immediate Outcome 3: Increased partner and stakeholder collaboration/ coherence and coordination of federal actions	●				
Immediate Outcome 4: State of the Lake Indicators are established and tracked		●			
Immediate Outcome 5: Use of predictive capability to model nutrient scenarios	●				
Immediate Outcome 6: Increased scientific knowledge and data to support decision making		●			
Intermediate Outcome 1: Reduced nutrients in the Lake Winnipeg Basin			●		
Intermediate Outcome 2: The Province of Manitoba / transboundary management bodies establish nutrient objectives	●				
Final Outcome: Improvement to the ecological health of Lake Winnipeg				●	
5. Unintended outcomes					●
6. Program design appropriate for achieving expected program results		●			
7. Governance clear, appropriate and efficient		●			
8. Program is implemented in an efficient and economical manner	●				
9. Performance data collected and reported		●			

[43] The ratings and their significance are outlined in Table 2 on page 11.