



Evaluation of the Great Lakes Program

Final Report

Audit and Evaluation Branch

March 2017

Key Dates

Planning phase completed	March 2015
Report sent for management response	August 2016
Management response received	September 2016
Report tabled to the Departmental Evaluation Committee	December 20, 2016
Report approved by the Deputy Minister (DM)	March 10, 2017

List of Key Acronyms

ADM	Assistant Deputy Minister
AEB	Audit and Evaluation Branch
AOC	Area of Concern
BUI	Beneficial use impairment
COA	Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem
DG	Director General
ECCC	Environment and Climate Change Canada
Gs&Cs	Grants and contributions
GLAP	Great Lakes Action Plan
GLBEI	Great Lakes Basin Ecosystem Initiative
GLNI	Great Lakes Nutrient Initiative
GLSRP	Great Lakes Sediment Remediation Projects
GLSF	Great Lakes Sustainability Fund
GLWQA	Great Lakes Water Quality Agreement
LAMP	Lakewide Action and Management Plan
NGOs	Non-governmental organizations
O&M	Operations and maintenance
PAA	Program Alignment Architecture
PMF	Performance Measurement Framework
RAP	Remedial Action Plan
RPP	Report on Plans and Priorities
TBS	Treasury Board Secretariat
US	United States

Acknowledgements

The Evaluation Project Team would like to thank the individuals who contributed to this project, particularly members of the Evaluation Committee and all interviewees and survey respondents who provided insights and comments crucial to this evaluation.

The Evaluation Project Team was led by Michael Callahan, under the direction of William Blois, and included Lindsay Comeau, Lindsey Derrington, Kevin Marple, and Goss Gilroy, Inc.

Version Control

File: Great Lakes-Evaluation Report-Final-E.docx

Last Updated: March 10, 2017

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EXECUTIVE SUMMARY

Context

The Great Lakes program is comprised of three program components – the Great Lakes Nutrient Initiative (GLNI), the Great Lakes Action Plan (GLAP) and the Action Plan for Clean Water (Great Lakes Sediment Remediation Projects or GLSRP). These three programs support actions to address commitments stemming from the Canada–US Great Lakes Water Quality Agreement (GLWQA) and Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA).

Environment and Climate Change Canada (ECCC) works with the US, federal, provincial, state, and community partners as well as with the public to improve Great Lakes water quality. Among many other initiatives, these partners work to deliver Remedial Action Plans (RAPs) that guide restoration and protection efforts in key Areas of Concern (AOCs) — “hot spots” that have been designated as the most severely degraded areas within the Great Lakes.

The Great Lakes program uses funding from GLAP to restore beneficial use impairments (BUIs) in AOCs, and implements contaminated sediment remediation projects with funding from the Action Plan for Clean Water. Funding from GLNI is used to determine phosphorus targets and identify possible actions to reduce levels that contribute to harmful algae. The program also develops action plans and strategies to address evolving and historic issues of emerging concern in the Great Lakes (e.g., species and habitat protection, chemicals of concern, and climate change impacts).

The purpose of the evaluation was to assess the relevance and performance of the Great Lakes program (sub-program 1.3.4 in the department’s Program Alignment Architecture). The primary focus of the evaluation was on GLNI, while less effort was expended on the evaluation of GLAP because it had previously been evaluated in 2010. The assessment of the GLSRP was more limited because it was premature to evaluate the achievement of project outcomes. The evaluation primarily covered the five-year period from 2010–2011 to 2014–2015, with some updated information for 2015–2016.

Findings and Conclusions

Relevance

There is a demonstrated need to restore and maintain the Great Lakes ecosystem. The Great Lakes have enormous environmental, social and economic importance and value to Canada. Current and emerging environmental concerns for the Great Lakes require ongoing attention from the Government of Canada. There is evidence of coordinated efforts to avoid duplication among the various jurisdictions involved in restoring and maintaining the water quality of the Great Lakes.

The Great Lakes program is aligned with federal government and ECCC priorities, including the Federal Sustainable Development Strategy’s Goal 3 to maintain water quality and availability, and ECCC’s strategic outcome “Canada’s natural environment is conserved and restored for present and future generations.” The program is also consistent with federal government roles and responsibilities as specified in relevant legislation and international commitments.

Performance – Efficiency and Economy

Evidence indicates that the overall design of the Great Lakes program is appropriate for achieving its intended outcomes: the designs of the GLNI, GLAP and GLSRP are logical; program structures, processes and science are aligned with the updated GLWQA; a process exists for re-designating BUIs and delisting AOCs; and grants and contributions (Gs&Cs) are felt to be an effective mechanism for engaging and supporting a variety of partners to help achieve program results. Some concern was expressed regarding the need for a more clearly defined and timely process for delisting AOCs and reallocating resources, as well as the adequacy of science capacity to meet an expected increase in demand.

The management and governance mechanisms established in 2012 for the renewed GLWQA, including the Great Lakes Executive Committee and Annex Subcommittees, have set up binational processes to achieve a variety of objectives consistent with ECCC's program outcomes and have led to a more open and transparent governance process. The organization of GLWQA governance around the 10 Annexes in particular is viewed as effective. Most key informants acknowledge that communications and collaboration are challenges because of the number of program initiatives and stakeholder organizations involved. In addition, although roles and responsibilities are defined in the GLWQA, they are not yet clearly understood by all stakeholders. The GLWQA and new COA, and their corresponding governance structures, generally are viewed as complementary, and duplication of work is not thought to be a problem.

Most stakeholders consulted generally agree that Great Lakes initiatives are cost-effective. The project file review indicates that the Gs&Cs component has been successful at leveraging approximately three-quarters of project resources from sources other than ECCC, and the estimated combined administrative costs of the GLAP and GLNI programs are comparable to those for other ECCC Gs&Cs programs.

The program reports federally and provincially through the COA and binationally through the Canada–US GLWQA on progress toward meeting commitments in the agreements. While there are logic models for GLNI, GLAP and the Sediment Remediation projects, there is no formal overall logic model and performance measurement strategy for the Great Lakes program. Program managers and scientists reported that performance data generally are adequate but that significant improvements could be made. For example, it is difficult to integrate and aggregate data from the various Great Lakes program initiatives.

Performance – Effectiveness

GLNI: The work being conducted as part of GLNI is on track and good progress has been made toward the Initiative's five objectives and associated direct outcomes. (1) Progress has been made in science and monitoring to measure phosphorus loads, including the development of inventories, models and baseline information about nutrients. (2) Research documented through GLWQA Annex Subcommittee reports has led to a better understanding of nutrient loadings and other factors that affect water quality, ecosystem health and algae growth. (3) The Annex 4 Nutrients Subcommittee has summarized the research on nutrient loadings in Lake Erie from Canadian tributaries and recommended phosphorus reduction targets for Lake Erie. (4) ECCC has completed an evaluation of policy options for reducing phosphorus discharges to Lake Erie, and efforts to further assess and refine these options are expected to continue as part of the

development of Canada's Domestic Action Plan. (5) Progress has also been made by the Annex 2 Lakewide Management Subcommittee to develop a binational nearshore¹ assessment and management framework, with a draft framework completed in February 2016.

With respect to intermediate outcomes, understanding of the nearshore has improved through the process of developing a nearshore assessment and management framework, and efforts to manage the nearshore are planned to intensify once the framework has been approved in 2016. Regarding the minimization of the occurrence and impacts of algae, although some progress has been made over the past decades in reducing algae in Lake Erie, there is research evidence indicating that recent algae blooms are a result of excessive nutrient loadings and that there has been a levelling off or reversal of earlier reductions in nutrient loadings. It is premature to assess other GLNI intermediate outcomes (see Annex B) because work on phosphorus load reduction targets and a nearshore assessment and management framework is not yet finalized.

GLAP: Acceptable progress has been made on GLAP's immediate outcomes. Remedial actions in AOCs are being implemented through the development of Remedial Action Plans and implementation of funded projects focused on BUIs and AOCs with the involvement of local partners. Identification of environmental problems and progress in AOCs is being achieved through science and monitoring as well as the preparation of Remedial Action Plans, Annual Workplans and Progress Reports for AOCs. In addition, management and coordination of efforts to restore the Great Lakes ecosystem have improved with the governance structure and processes of the 2012 GLWQA.

Progress has also been made toward intermediate and longer-term outcomes. Projects in AOCs have had a number of benefits, including reducing pollution and restoring habitats. Activities of federal partners and stakeholders have helped to advance remedial actions in AOCs, for example, through their involvement on Remedial Action Plan committees. In the evaluation timeframe, 17 beneficial uses in AOCs were restored, and overall 54 beneficial uses out of a total of 146 across all 17 AOCs have been restored to "not impaired" status as of 2015. Although no AOCs were delisted during the five-year evaluation timeframe, in 2011 one AOC was designated as being in recovery. ECCC is meeting its international commitments under the GLWQA, for example, through its GLAP work in AOCs, its leadership in the implementation of the Agreement, preparation of 2014 Lakewide Management and Action Plan reports, and finalization of a Canada–US Biodiversity Conservation Strategy for Lake Superior.

GLSRP: As it is premature to assess the degree of outcome achievement for GLSRP, progress to date on the Randle Reef project in Hamilton Harbour was examined. While the project has experienced a number of delays, design and planning for this project is now completed, and preliminary work on the seven-year project began in the fall of 2015. Construction of the containment facility in the first phase began in May 2016, with final capping and completion of the project scheduled for 2022. The federal government is contributing \$46.3 million of the total project cost of \$138.9 million.

¹ Nearshore is defined as "the area of the Great Lakes and connecting rivers where waters are subject to direct influences from shorelands, watersheds and off-shore influences."

Recommendations

The following recommendations are based on the findings and conclusions of the evaluation, detailed in section 4 of the report. The recommendations are directed to the Assistant Deputy Minister of Strategy Policy Branch (SPB), as the senior departmental official responsible for the management of the Great Lakes program.

Recommendation 1: Improve performance measurement and reporting of program outcomes, including enhanced monitoring and development of a single performance measurement strategy for the overall Great Lakes program.

Recommendation 2: Contribute to improving communications on roles and responsibilities and coordination of GLWQA Annex Subcommittees.

Recommendation 3: Review the approach, strategy and timeliness for AOC delisting decisions.

The ADM SPB agrees with the recommendations and has developed a management response that appropriately addresses them. More details on the recommendations and the full management response can be found in section 6 of the report.

1. INTRODUCTION

This report presents the results of the Evaluation of the Great Lakes Program (Program Alignment Architecture (PAA) sub-program 1.3.4), which was conducted by Environment and Climate Change Canada's (ECCC) Audit and Evaluation Branch, in fiscal year(s) 2014–2015 and 2015–2016. The evaluation was identified in the 2014 Departmental Risk-Based Audit and Evaluation Plan and conducted in order to meet a commitment to evaluate the program. The evaluation also responds to the requirements of the *Financial Administration Act* and the Treasury Board of Canada Policy on Evaluation 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

Overview

The Great Lakes program comprises three components: the Great Lakes Nutrient Initiative (GLNI), the Great Lakes Action Plan (GLAP) and the Action Plan for Clean Water (Great Lakes Sediment Remediation implementation). These three components support actions to address commitments stemming from the Canada–US Great Lakes Water Quality Agreement (GLWQA) and the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA) (see Annex A for more details about these agreements). Reporting on the GLWQA includes the program's contribution to the State of the Lakes Ecosystem Conferences, hosted by ECCC and the United States (US) Environmental Protection Agency. Work within the Great Lakes program area encompasses policy development, issue management, work planning, reporting, coordination of science and monitoring, and the development, implementation and analysis of agreements, plans and initiatives (described in more detail below).

ECCC works with the US, federal, provincial, state, and community partners as well as with the public to improve Great Lakes water quality. This includes implementing Lakewide Action and Management Plans (LAMPs) that have been developed for each of the Great Lakes. Among many other initiatives, these partners work to deliver Remedial Action Plans (RAPs) that guide restoration and protection efforts in key Areas of Concern (AOCs) — “hot spots” that have been designated as the most severely degraded areas within the Great Lakes.²

Specifically, the Great Lakes program implements RAPs and LAMPs intended to improve environmental quality and achieve the vision of a healthy and prosperous Great Lakes ecosystem. It uses funding from GLAP to restore beneficial use impairments in AOCs, and implements contaminated sediment remediation projects with funding from the Action Plan for Clean Water. Funding from GLNI is used to determine phosphorus targets and identify possible actions to reduce levels that contribute to harmful algae. The program also develops action plans and strategies to address evolving and historic issues of emerging concern in the Great Lakes (e.g., species and habitat protection, chemicals of concern, and climate change impacts).

² Environment and Climate Change Canada (ECCC). Cleaning Up the Great Lakes. www.ec.gc.ca/doc/eau-water/grandslacs-greatlakes_e.htm.

Great Lakes Nutrient Initiative

The Great Lakes Nutrient Initiative (GLNI)³ is intended to advance the science to understand and address the complex problem of recurrent toxic and nuisance algae in the Great Lakes through a coordinated approach, and to help Canada deliver on key commitments under the 2012 GLWQA. The Initiative focuses on Lake Erie, the smallest and shallowest of the Great Lakes and the most susceptible to nearshore water quality issues. The science and policy approaches developed through the Initiative are expected to be transferable to the other Great Lakes and other bodies of water in Canada.

The Initiative targets five priority areas:

- establishing current nutrient loadings from selected Canadian tributaries;
- enhancing knowledge of the factors that impact tributary and nearshore water quality, ecosystem health, and algae growth;
- establishing binational lake ecosystem objectives, phosphorus objectives, and phosphorus load reduction targets;
- developing policy options and strategies to meet phosphorus reduction targets; and
- developing a binational nearshore assessment and management framework.

GLNI received a total of \$28.7 million in funding from 2011–2012 to 2015–2016. Funding was extended for 2016–2017, with \$3.1 million announced in Budget 2016.

Great Lakes Action Plan

The Great Lakes Action Plan (GLAP) is a vehicle for the federal government, with ECCC as the lead department, to act to restore AOCs around the Great Lakes area and fulfil Canadian commitments under the GLWQA. GLAP has consisted of five phases to date,⁴ starting in 1989–1990. For Phase V (2010–2011 to 2014–2015), the Government of Canada announced \$8 million per year in ongoing funding for GLAP.

Activities supported by GLAP V include

- remedial actions – remedial actions within AOCs, consistent with the mandate of the Department, typically administered through contributions from the Great Lakes Sustainability Fund (GLSF);
- science – assessment and monitoring of beneficial use impairments (BUIs); and
- engagement/governance activities.

Action Plan for Clean Water (Great Lakes Sediment Remediation)

Under the Action Plan for Clean Water, in Budget 2007 the Government of Canada committed more than \$96.9 million over eight years (2008–2009 to 2015–2016)⁵ to act on water pollution issues in Canadian freshwater systems in the Great Lakes, Lake Simcoe and Lake Winnipeg basins. For the Great Lakes portion (\$48.9 million),⁶ a

³ ECCC. Great Lakes Nutrient Initiative. www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=4FF37866-1.

⁴ ECCC. Great Lakes Action Plan. www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=DF30B51A-1.

⁵ The present evaluation covered only a five-year period from 2010–2011 to 2014–2015.

⁶ Approximately \$11.6 million of this total was spent in the eight-year period on sediment remediation work in Hamilton Harbour (Randle Reef project), Peninsula Harbour (Jellicoe Cove project) and the Detroit River (clean-up project), development of monitored natural recovery strategies in the Niagara River and the Bay of Quinte, and internal costs. Virtually all of the remaining Great Lakes funds under the Action Plan for Clean Water have been re-allocated to the

primary goal is to improve water quality by removing or containing harmful pollutants in priority areas of the Great Lakes. ECCC has devoted funding from Canada's Action Plan for Clean Water to remediate contaminated sediment in Great Lakes AOCs.⁷

The GLAP (described above) funds the assessment, design and development of sediment remediation plans to lay the foundation for the sediment remediation itself. These Remedial Action Plans have been established for each of the AOCs to assess the nature and extent of beneficial use impairments (BUIs)⁸ and to develop strategies to restore beneficial uses, thus ultimately leading to the delisting of the AOC.

The Great Lakes Sediment Remediation Projects (GLSRP) are intended to provide funding for the implementation of contaminated sediment remediation plans in eight Canadian AOCs on the Great Lakes.⁹ Under the terms and conditions of the GLSRP, contribution funding for sediment remediation is cost-shared under the mechanism of the Great Lakes Sustainability Fund (GLSF). The terms and conditions of this fund require that federal funding cover no more than one-third of the total project cost. There was limited work on the implementation of GLSRP projects in the evaluation timeframe from 2010–2011 to 2014–2015. The sediment remediation project in Jellicoe Cove in the Peninsula Harbour AOC was implemented in 2012–2013. Another major project at Randle Reef in the Hamilton Harbour AOC was funded and the implementation stage began in 2015–2016.

2.2. Governance and Management

Overall accountability for the Great Lakes Program (PAA element 1.3.4) rests with ECCC's Regional Director General, Ontario. Other parts of ECCC also have significant roles in the management and delivery of this program: Water Science and Technology Directorate (in Science and Technology Branch) is accountable for many science components and groundwater-related issues in the Great Lakes; Chemicals Management Division (in Environmental Protection Branch) is responsible for chemicals of concern in the Great Lakes; and the National Hydrological Service (of the Meteorological Service of Canada) and the Atmospheric Science and Technology Directorate (of Science and Technology Branch) provide scientific support on Great Lakes climate change issues.

remaining work on the Randle Reef sediment remediation project in Hamilton Harbour and are currently budgeted for 2016–2017 to 2018–2019.

⁷ ECCC. Cleaning up the Great Lakes. www.ec.gc.ca/doc/eau-water/grandslacs-greatlakes_e.htm. Contaminated sediments are an ongoing source of persistent toxic substances to the waters and biota of the Great Lakes, impacting ecosystem quality at the local level and contributing to the overall degradation of the Great Lakes. The remediation of contaminated sediment is an essential prerequisite to a longer-term objective of the GLWQA to fully restore environmental quality in a number of AOCs in the Great Lakes. Because sources of contamination in the Great Lakes often occurred decades ago, the "polluter pays" principle cannot be applied, as polluters may no longer exist or do not assume responsibility for providing ongoing funds to support remediation efforts.

⁸ The GLWQA identifies 14 beneficial uses in the Great Lakes system (e.g., related to fish and wildlife health, recreational use, water quality). A beneficial use impairment (BUI) is a change in the chemical, physical, or biological integrity of the Great Lakes system sufficient to cause an impairment in any of the 14 uses.

⁹ The eight AOCs are Hamilton Harbour, the Niagara River, the Detroit River, the St. Mary's River, Thunder Bay, Peninsula Harbour, the St. Clair River and the Bay of Quinte. Federal funds are to be used to complete sediment remediation actions that may involve constructing containment structures around and over submerged contaminated sediments; capping sediments; removing, treating and disposing of sediment; and assisting natural recovery with long-term monitoring. Sediment remediation was completed in the Detroit River (Turkey Creek). Plans for projects in St. Mary's River, the St. Clair River and Thunder Bay (North Harbour) are still under development and, due to the higher than anticipated complexity and cost of sediment remediation work, it has not yet been determined whether these projects will proceed. Funds originally allocated to the remediation of these three AOCs have been re-allocated to the Randle Reef project in Hamilton Harbour. In addition, plans were developed for the Niagara River and the Bay of Quinte, but subsequently a decision was made to reallocate all of the remaining funds for these AOCs to the Randle Reef project.

ECCC also relies on other federal departments: Transport Canada leads on discharges from vessels into the Great Lakes, and Fisheries and Oceans Canada leads on addressing the threat and impact of aquatic invasive species in the Great Lakes. These federal government partners provide their own resources and are accountable for achieving the objectives of these activities.

Further details on governance and management mechanisms utilized by the Great Lakes program and associated agreements are provided in Annex A.

2.3. Resource Allocation

Details on the program's expenditures are presented in Table 1. According to available information, total expenditures over the evaluation timeframe were \$85.4 million, of which \$47.3 million were expenditures of the office of the Regional Director General (RDGO)–Ontario. Most of the remaining expenditures (approximately \$35.2 million) were associated with the work of S&T Branch in delivering the science to support the program.

Table 1. Great Lakes Program Expenditures for 2010–2011 to 2014–2015

Branch	2010–2011	2011–2012	2012–2013	2013–2014	2014–2015	Total
RDGO–Ontario						
FTEs	42.7	40	39.4	39	39.2	-
Salaries	\$3,303,326	\$3,261,449	\$3,375,343	\$3,368,525	\$3,379,369	\$16,688,012
O&M	\$1,105,221	\$1,293,141	\$4,832,457	\$2,647,275	\$1,897,490	\$11,775,584
Capital	\$28,234	-	-	-	-	\$28,234
Gs&Cs	\$3,760,998	\$3,602,633	\$3,800,810	\$3,825,810	\$3,805,124	\$18,795,375
S&T Branch						
FTEs	50	52	67	63	47	-
Salaries	3,568,318	3,786,786	4,978,702	4,777,007	3,636,529	20,747,342
O&M	\$1,178,658	\$1,950,318	\$2,862,844	\$3,308,828	\$2,912,830	\$12,213,478
Capital	-	-	\$644,337	\$791,983	\$638,644	\$2,074,964
Gs&Cs	-	-	\$20,000	\$60,000	\$60,000	\$140,000
Other Branches*						
Salaries	\$426,098	\$117,132	\$293,554	\$700,351	\$579,515	\$2,116,650
O&M	\$156,649	\$146,021	\$104,111	\$136,412	\$237,141	\$780,334
Capital	-	-	-	-	-	-
Gs&Cs	\$15,960	-	-	-	-	\$15,960
All Branches						
Salaries	\$7,297,742	\$7,165,367	\$8,647,599	\$8,845,883	\$7,595,413	\$39,552,004
O&M	\$2,440,528	\$3,389,480	\$7,799,412	\$6,092,515	\$5,047,461	\$24,769,396
Capital	\$28,234	-	\$644,337	\$791,983	\$638,644	\$2,103,198
Gs&Cs	\$3,776,958	\$3,602,633	\$3,820,810	\$3,885,810	\$3,865,124	\$18,951,335
Total Program Costs	\$13,543,462	\$14,157,480	\$20,912,158	\$19,616,191	\$17,146,642	\$85,375,933

Notes

1. Figures from ECCC's financial system as provided by Finance Branch, July 17, 2015. Figures for RDGO–Ontario confirmed by program management. For S&T Branch, program management estimated expenditures based on the standard average salary calculation used by the Branch's Financial Management Advisor for planning purposes

because coding of FTEs and salaries to the financial system was not aligned with S&T employees' actual time spent on the Great Lakes program.

2. *Other branches include Environmental Protection Branch (total costs of \$1,409,914), the Meteorological Service of Canada (\$263), Audit and Evaluation Branch (\$135,960), Corporate Services Branch (\$1,045), and default accounts (\$1,365,763).

2.4. Intended Outcomes

The diversity of objectives and intended outcomes of the various initiatives undertaken as part of the Great Lakes program have not been captured in a single unified logic model or set of outcomes. Separate logic models with intended outcomes have, however, been developed for the Great Lakes Nutrient Initiative, Great Lakes Action Plan, and Great Lakes Sediment Remediation Projects (see Annex B). This evaluation assessed progress toward the intended outcomes of GLNI and GLAP only (see section 4.3). As there was limited implementation of GLSRP projects in the evaluation timeframe and it was premature to evaluate the achievement of project outcomes, the evaluation focused on the relevance, design and delivery of this program component.

As GLNI and GLAP support the implementation of the Canada–US GLWQA and Canada Ontario Agreement, the assessment of these programs' intended outcomes by extension speaks to how well ECCC and its partners are responding to related key commitments in the two agreements.

3. EVALUATION DESIGN

3.1. Scope

The evaluation addresses the issues of relevance and performance (including effectiveness, efficiency and economy) of the Great Lakes sub-program, and in particular the program activities under GLNI. Less effort was expended on the evaluation of GLAP, as it had previously been evaluated. The assessment of the GLSRP was more limited and focused on progress to date because, as noted, it was too early to assess outcomes. The evaluation responds to the requirements of the *Financial Administration Act* and the Treasury Board of Canada Policy on Evaluation to evaluate all ongoing programs of grants and contributions and direct program spending at least once every five years.

The evaluation primarily covered the five-year period from 2010–2011 to 2014–2015, and it also included some updated information for 2015–2016. It considered and built on previous evaluations of the Great Lakes Action Plan IV (2010) and Freshwater Programs under the Action Plan for Clean Water (2011).

3.2. Evaluation Approach and Methodology

The research methods¹⁰ utilized to collect evidence for the evaluation are briefly described in this section, and further details are available in Annex C.

Document and Literature Review: Documentation and literature were reviewed to gather evidence to help address each of the evaluation questions. This included program documentation (e.g., State of the Great Lakes reports, COA Progress Reports), departmental and federal government documents (e.g., ECCC Departmental Performance Reports (DPRs), previous evaluations, Federal Budgets), and selected

¹⁰ A Data Collection Instruments Technical Appendix, which contains the instruments used for each methodology, is available under separate cover.

research literature.

Review of Financial and Performance Data: Financial and available performance data were reviewed to contribute to the assessment of evaluation questions related to the program's efficiency/economy (e.g., administrative costs associated with the disbursement of Gs&Cs) and effectiveness.

Grants and Contributions Project File Review: A review was conducted of the files of a random sample of 40 completed GLAP projects (of a total of 167 completed projects funded in the evaluation timeframe).

Key Informant Interviews: In order to obtain feedback related to all of the evaluation questions, in-depth interviews were conducted with a sample of 43 key informants, including representatives of different types of relevant stakeholders, both internal and external to ECCC.

Case Studies: Two case studies were conducted in order to examine two specific aspects of the Great Lakes program: (1) implementation of the 2012 Canada–US Great Lakes Water Quality Agreement, with a focus on the effectiveness of the governance structure and processes; and (2) the scientific process by which phosphorus targets are set for Lake Erie.

Online Survey of Stakeholders: An online survey was conducted to obtain quantifiable responses from a large group of stakeholders, beyond those consulted in the key informant interviews. Of 193 stakeholders invited to participate, responses were received from 108 stakeholders for a response rate of 56%. Survey respondents included representatives of various program-related committees, including the Great Lakes Executive Committee, the COA Management Committee, GLWQA Annex Subcommittees and Extended Subcommittees, and BUI Working Groups.

3.3. Challenges and Limitations

Challenges encountered in the conduct of this evaluation, as well as the associated limitations and strategies used to mitigate their impact, are outlined below.

- Performance measurement information was incomplete, as the sub-program does not currently have an overall performance measurement strategy with corresponding data collection in place for each of the outcome areas assessed in this evaluation. In addition, it was difficult to obtain outcome information from the final reports of funded projects in the file review, because the project reports focused primarily on activities and outputs. For these reasons, the information on the achievement of outcomes was incomplete. To the extent possible, gaps in the evidence of outcomes were filled by the available departmental Performance Measurement Framework data, other high-level performance information (e.g., in reports related to the GLWQA and IJC), and evidence obtained from other sources such as the document review and key informant interviews.
- Where there was insufficient evidence from documentation and performance data, the observations of stakeholders consulted in interviews and the survey were used. There is a possibility of bias stemming from the selection of stakeholders, given that

it was not feasible to interview each and every relevant stakeholder. This risk was mitigated by carefully selecting the sample of 43 interviewees to ensure that all relevant perspectives, both within and outside ECCC, were adequately covered by knowledgeable respondents from each interviewee group; asking interviewees to provide evidence or concrete examples to support the views they expressed; and corroborating the interview findings with reliable evidence from documentation and data where possible. Similarly, the online survey included a range of 108 relevant stakeholders from various perspectives, and the overall response rate of 56% was strong.

- It was difficult to measure the achievement of the longer-term outcomes of the Great Lakes program related to restoration and remediation in the lakes/AOCs and to assess the program's contribution to observed outcomes. The ecological issues in the Great Lakes are complex and evolving. Therefore, remediating or restoring many of these areas will occur over the long term and will be influenced by factors outside the control of the program. In the absence of up-to-date empirical or performance data, the evaluation evidence related to some longer-term outcomes of the program relied heavily on qualitative findings such as the observations of key informants and the views of survey respondents. No conclusions were drawn solely on the basis of one line of evidence, and all available evidence for each outcome was triangulated to arrive at a conclusion. In cases where there simply was insufficient evidence or it was premature to draw a conclusion, that is stated.

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 an analysis of 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 D.

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 restore and maintain the Great Lakes ecosystem. The Great Lakes have enormous environmental, social and economic importance and value to Canada. Current and emerging environmental concerns for the Great Lakes require ongoing attention from the Government of Canada. There is evidence of coordination of efforts to avoid duplication among the various jurisdictions involved in restoring and maintaining Great Lakes water quality.

- The Great Lakes ecosystem is important in terms of size and environmental, social and economic value. The Great Lakes are the largest system of fresh surface water on earth, with about 18% of the world's fresh surface water, an ecosystem that supports over 3,500 species of plants and animals, and fishing and shipping industries that inject more than \$7 billion annually into Canada's economy.¹¹
- There are a number of environmental issues that continue to be problematic for the Great Lakes, including
 - algal blooms and the toxins, habitat degradation, illness and mortality caused by their proliferation;^{12,13}
 - excess phosphorus¹⁴ from several rural and urban point and non-point sources, such as urban and agricultural runoff, improper manure storage, municipal wastewater effluent, septic systems, and industrial discharges;¹⁵
 - invasive species,¹⁶ with a total of 185 aquatic and at least 157 terrestrial non-native species that disrupt the ecosystem, degrade water quality by increasing turbidity,¹⁷ concentrating toxins, and altering nutrient and energy flows,¹⁸ and that cause significant economic damages;¹⁹
 - warming of the surface waters of the Great Lakes as a result of climate change,²⁰ and
 - numerous Areas of Concern (AOCs) that are still categorized as “impaired;” only 3 of 17 AOCs have been delisted and 2 identified as AOCs in recovery since the program began in 1987.²¹

¹¹ ECCC. Cleaning up the Great Lakes. www.ec.gc.ca/doc/eau-water/grandslacs-greatlakes_e.htm.

¹² International Joint Commission's Health Professionals Advisory Board. *Human Health Effects from Harmful Algal Blooms: A Synthesis*. November 22, 2013.

¹³ IJC. 2014. *A Balanced Diet for Lake Erie: Reducing Phosphorus Loadings and Harmful Algal Blooms. A Report of the Lake Erie Ecosystem Priority*.

¹⁴ Conference Board Water Quality Index. <http://www.conferenceboard.ca/hcp/details/environment/water-quality-index.aspx>.

¹⁵ EC. 2013. Great Lakes Nutrient Initiative. <http://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=4FF37866-1>.

¹⁶ US Environmental Protection Agency. The Great Lakes. <http://www.epa.gov/greatlakes/invasive/lakes/default.asp?lang=En&n=90661FCF-1>.

¹⁷ Turbidity refers to the effect of stirred-up or suspended sediment in water; a key indicator of water quality.

¹⁸ Energy flow, or caloric flow, refers to the flow of energy through a food chain, from energy producers to final consumers; ECCC. How Are the Great Lakes Doing? <http://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=9889A192-1>.

¹⁹ Marbek. 2007. Economic Value of Protecting the Great Lakes. Report produced for the Ontario Ministry of the Environment.

²⁰ O'Reilly, C.M., Sharma, S., Gray, D.K., Hampton, S.E. et al. 2015. Rapid and highly variable warming of lake, surface waters around the globe. *Geophysical Research Letters*, 42(24), 10,773-10,781.

²¹ ECCC. Restoring the Great Lakes Areas of Concern. www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=E08EA691-1.

- Survey respondents are almost unanimous in indicating that there is continued need for ECCC’s Great Lakes program to meet federal government commitments and to improve the water quality and ecosystem health of the lakes. Similarly, key informants cited emerging and ongoing issues with respect to water quality, pollutants, algae blooms, population growth, industrial development, climate change, and invasive species as evidence of an ongoing need for the research and monitoring supported by the program. They also emphasized the need for coordinated actions to address these concerns, including continued involvement of the federal government in meeting commitments in the Canada–US GLWQA.
- While some key informants identified areas of overlap between the mandates of initiatives in different jurisdictions, they reported that these areas of overlap are appropriate given that Canada, Ontario and the US share many Great Lakes issues in common and have similar responsibilities in their jurisdictions. Key initiatives in other jurisdictions include the US Great Lakes Restoration Initiative and the Province of [Ontario's Great Lakes Strategy](#). Interview respondents also emphasized that there are coordinated efforts by these jurisdictions to avoid duplication. The agreements with Ontario and the US provide the framework for cooperation and collaboration.

4.1.2. Alignment with Federal Government Priorities

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

The Great Lakes program is aligned with federal government and ECCC priorities. The initiative was included in the 2010 Budget and is consistent with the Government of Canada’s expected outcome of a clean and healthy environment, the Federal Sustainable Development Strategy’s Goal 3 to maintain water quality and availability, and ECCC’s strategic outcome “Canada’s natural environment is conserved and restored for present and future generations.”

- Findings from the document review and key informant interviews indicate that the Great Lakes program is aligned with federal government and ECCC priorities. For example, the program is consistent with the 2014 COA, through which the governments of Canada and Ontario have renewed their commitment to restore, protect and conserve the Great Lakes. In addition, in the renewed COA, the Parties affirmed their commitment to implement the 2012 Canada–US GLWQA. In addition, the program is directly associated with ECCC’s strategic outcome “Canada’s natural environment is conserved and restored for present and future generations.”²²
- Investments in this initiative were included in the 2010 Budget. In 2012 the Government of Canada committed \$16 million over four years to the Great Lakes Nutrient Initiative to address nearshore water quality and aquatic ecosystem health, and toxic and nuisance algae growth in the Great Lakes. Budget 2013 reiterated the Government of Canada’s commitment to sustain the Great Lakes, including committing to responding to recommendations of the International Joint Commission (IJC) to the Canadian and US governments regarding water levels and flows in the upper Great Lakes.
- The program is also consistent with the Government of Canada’s expected outcome of a clean and healthy environment²³ and Goal 3 of the Federal Sustainable

²² ECCC. 2014–2015 Report on Plans and Priorities. <http://www.ec.gc.ca/default.asp?lang=En&n=024B8406-1&offset=4&toc=show>.

²³ Treasury Board of Canada Secretariat. 2015. Descriptors for Government of Canada Outcome Areas.

Development Strategy (FSDS),²⁴ which includes targets to protect and restore the Great Lakes AOCs and aquatic ecosystem. For instance, the most recent Progress Report of the FSDS²⁵ presents evidence on phosphorus levels in the Great Lakes, including that levels remain above the objectives for the western and central basins of Lake Erie.

4.1.3. Alignment with Federal Roles and Responsibilities

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

The Great Lakes program is consistent with federal government roles and responsibilities as specified in relevant legislation and international commitments. A federal presence is necessary to ensure coordination among involved parties, which also is consistent with the relevant legislation. Stakeholders believe that delivery of the Great Lakes program is an appropriate role for the federal government to play in the restoration and maintenance of the Great Lakes basin ecosystem.

- The Great Lakes program is consistent with federal legislation related to the environment, including
 - the *Department of the Environment Act*, which specifies that the powers, duties and functions of the ECCC Minister include the preservation and enhancement of the quality of the natural environment, including water; and
 - the *Canadian Environmental Protection Act*, which specifies various roles for the Government of Canada related to environmental protection, including taking preventive and remedial measures to protect, enhance and restore the environment and endeavouring to act with regard to the intent of intergovernmental agreements and arrangements entered into for the purpose of achieving the highest level of environmental quality throughout Canada.
- According to the 2013 Federal Sustainable Development Strategy, the federal, provincial and territorial governments are all responsible for achieving environmental sustainability objectives.
- Almost all of the stakeholders consulted through the survey (94%) agree that the work being undertaken as part of the Great Lakes program is an appropriate role for the federal government to play in the restoration and maintenance of the Great Lakes basin ecosystem.
- Similarly, all of the ECCC personnel, partners and stakeholders consulted in interviews agree that the Great Lakes program is consistent with the federal government’s roles and responsibilities. In addition, some federal government interviewees noted that a federal presence and role are warranted given the international dimension of the Great Lakes, and to help coordinate the various parties involved.

²⁴ EC. Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada 2013 –2016. November 2013.

²⁵ EC. The 2012 Progress Report of the Federal Sustainable Development Strategy. February 2013.

4.2. Performance – Efficiency and Economy

4.2.1. Program Design

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

Overall, the design of the Great Lakes program is appropriate for achieving its intended outcomes: the designs of the GLNI, GLAP and GLSRP are logical; program structures, processes and science are aligned with the new GLWQA; a systematic process exists for re-designating BUIs and delisting AOCs; and Gs&Cs are felt to be an effective mechanism for engaging and supporting a variety of partners to help achieve program results. While the overall program design is sound, some concern was expressed regarding the need for a more clearly defined and timely approach and strategy for delisting AOCs and reallocating resources, as well as the adequacy of the program’s capacity to meet an expected increase in demand for science to support the GLWQA Annex Subcommittees.

- Based on a review of the program documentation and logic models (see Annex B), the design of GLNI, GLAP and GLSRP is logical, science-based and consistent with the objectives of the Great Lakes program.
- Most ECCC personnel, partners and stakeholders believe that the design of the Great Lakes program is appropriate for achieving its intended outcomes. They note that the major issues and priorities are identified in the updated 2012 Canada–US GLWQA and that ECCC program initiatives have been aligned to be consistent with the new structure and processes of the updated agreement.
- There is a systematic process in place for re-designating BUIs and delisting AOCs.²⁶ However, remediation work for the AOCs consumes a high proportion of program funding, and some ECCC managers suggest that there should be a more clearly defined strategy with targets and timelines, where feasible, for delisting AOCs as soon as possible and reallocating the resources to other priorities, including scientific research. A concern was expressed over the tension between historical BUIs, on which delisting is supposed to be based, and new and emerging problems. Some key informants indicated that community stakeholders resist the delisting of an AOC if new problems emerge, even if the original BUI problems have been adequately addressed. This community stakeholder resistance is thought to lead to some caution and delays in the delisting process, which can slow down the process of addressing lakewide issues not specific to AOCs.
- Grants and contributions are an effective mechanism for engaging and supporting a variety of partners to help achieve program results. Key informants indicated that the projects would not be possible without the financial support from ECCC, which can help to leverage funds and activities from other partners, and many would like to see a greater emphasis on funding for science-based projects, including projects conducted by universities. In addition, large majorities of stakeholders surveyed (over 80%) agree that ECCC should provide grants and contributions to various partners to support their initiatives to improve Great Lakes water quality and ecosystem health.
- The renewal of the GLWQA has led to a long-term process to improve the alignment of the science supported and conducted by ECCC with the objectives of the

²⁶ The Canada–Ontario Guide for Changing the Designation of Beneficial Use Impairments and Delisting Areas of Concern. V3. January 24, 2014. Timelines for delisting are not specified in this guide.

10 GLWQA Annexes, which were developed with input from scientists. ECCC managers generally reported that policy and science related to the Great Lakes are now better aligned in the Department, with good interactions between the two functions to identify what is advisable from a scientific perspective and what is feasible from a policy perspective. Some key informants expressed concern, however, about limitations on the program’s capacity to meet expected increases in demand for science to support GLWQA Annex Subcommittee processes, understand the complexity of interacting factors affecting the lakes, and identify new and emerging risks.

- Survey results indicate that a small majority of ECCC personnel, partners and stakeholders agree that the activities and outputs of GLAP (65%), GLNI (56%) and GLSRP (64%) are adequate and appropriate for improving Great Lakes water quality and ecosystem health.

4.2.2. Program Governance and Management

Evaluation Issue: Performance – Efficiency and Economy	Rating
5. To what extent is the management and governance of the Great Lakes program clear, appropriate, and efficient for achieving expected results?	Opportunity for Improvement

The management and governance mechanisms established in 2012 for the renewed GLWQA, including the Great Lakes Executive Committee (GLEC) and Annex Subcommittees, have set up binational processes to achieve a variety of objectives consistent with ECCC’s program outcomes and have led to a more open and transparent governance process. Despite these improvements, perceived challenges include communications and collaboration given the number of program initiatives and stakeholder organizations involved, and the fact that roles and responsibilities as defined in the GLWQA are not yet clearly understood by all stakeholders.

Governance Structure

- The evaluation found that program governance appears to have improved with the implementation of the 2012 GLWQA:
 - Under the renewed GLWQA, the Great Lakes Executive Committee and Annex Subcommittees are thought to have improved governance and set up binational processes to achieve a variety of objectives consistent with ECCC’s program outcomes.
 - The updated GLWQA Annexes and Subcommittees are widely considered to be better aligned with the needs and current realities of the Great Lakes than the pre-2012 structure, and key informants note that the work being done is better focused on achieving the expected results, in part due to the establishment of time-based commitments.²⁷
- In particular, interviewees perceive that the improved committee structure put in place with the renewal of the GLWQA has led to a more open and transparent governance process, whereby information is more readily available to stakeholders and to the public, and there is an extensive and inclusive engagement and consultation process involving a wide range of stakeholders.

²⁷ For example, the work of the Annex 4 Nutrients Subcommittee and the Task Team to develop phosphorus loading targets for Lake Erie is directly related to the achievement of ECCC outcomes for the Great Lakes Nutrient Initiative.

- Survey results also demonstrate fairly strong support for most Great Lakes governance bodies, as more than half of respondents reported that the Remedial Action Plan Committees (72%), COA Executive Committee (58%), GLAP Workplan Review Team (54%) and COA Management Committee (53%) have been largely effective (i.e., responded with a 4 or 5 on a 5-point scale)²⁸ in managing the delivery of the Great Lakes program. The GLEC is the only committee rated as largely effective by fewer than half of the survey respondents (48%), although interview and case study evidence suggests that it is simply too early to tell whether GLEC will be effective.²⁹
- Key informant and case study results nonetheless identify a number of suggested areas of improvement. For example, key informants variously noted
 - some duplication and bureaucracy associated with the COA Executive and Management Committees, and there may be opportunities for streamlining;
 - the lack of a mechanism for coordination across the 10 GLWQA Annex Subcommittees;
 - that the large number of participants in GLEC may have an adverse impact on its effectiveness; and
 - that it may be difficult to maintain the interest and participation in the GLEC by some stakeholder groups (e.g., Indigenous groups, environmental NGOs) because active participation requires a significant level of commitment and resources.

Clarity of Roles and Responsibilities

- At the level of individual program components, for GLNI, responsibilities of RDGO–Ontario and S&T Branch for the delivery of activities and outputs are clearly specified in the program logic model (Annex B). Also, responsibilities of governance mechanisms associated with GLAP and the COA are specified (see Annex A).
- The overall roles and responsibilities of the Parties and the governance mechanisms are defined by the GLWQA. The GLWQA includes clear statements of the objectives associated with each of the 10 Annexes and the responsibilities of the Parties to achieve and report on progress toward achieving these objectives. For each of the Annexes, the GLWQA specifies that time-limited task teams will be created to focus efforts on priority issues and projects (e.g., the Objectives and Loading Task Team of the Annex 4 Nutrients Subcommittee).
- Survey results reveal mixed opinions on the degree to which roles and responsibilities of the different governments and organizations involved in Great Lakes program initiatives are clear and understood. Less than half of survey respondents (45%) agree that roles and responsibilities are clear and understood. The remaining 55% of respondents indicated that they either disagree (34%) or neither agree nor disagree (21%). Respondents who disagree suggested that there is a need to improve communications regarding roles and responsibilities.
- Key informants reported that different stakeholders are still working out the details of their roles and responsibilities as the work conducted under the governance structure of the new GLWQA progresses. Some external stakeholders suggested that a chart specifying the roles of all players involved in protecting the Great Lakes would be helpful.

²⁸ All or most of the remaining respondents indicated that each of these governance bodies has been somewhat effective (i.e., responded with a 2 or 3 on the 5-point scale).

²⁹ In the view of key informants, the effectiveness of GLEC will not be fully understood until issues of substance arise in the coming months and years and decisions on these issues need to be made by the Parties.

- Key informants also reported that they generally believe that the GLWQA and new COA, and their governance structures, are complementary and that there will be no duplication in the work undertaken for each agreement.

Communications, Engagement and Collaboration with Stakeholders

- Most key informants acknowledged that, overall, communications and collaboration are challenging in view of the number of program initiatives and the many stakeholder organizations involved. Despite this, government-to-government communications and collaboration are generally regarded as very good. Documentary evidence also shows that a previous evaluation recommendation³⁰ to improve coordination among federal government partners involved in GLAP has been addressed through the establishment of the GLAP Five-Year Workplan involving ECCC and its federal partner DFO.
- Views on the effectiveness of communication and engagement with other stakeholder groups and the public are mixed. The greater engagement and participation of various stakeholder groups in the GLEC and Annexes, as well as the enhanced openness and transparency of the process, are viewed very positively by almost all key informants. However, concerns were expressed about the sustainability of engagement by some stakeholders over the long term because of the resource requirements, in people and money, to keep up with a complex and demanding process. Survey results also suggest that respondents have concerns about communications and collaboration among partners and stakeholders, with just over half of respondents (53%) agreeing, and one in ten (12%) disagreeing, that this is effective.

4.2.3. Program Efficiency and Alternatives

Evaluation Issue: Performance – Efficiency and Economy	Rating
6. Is the program undertaking specific activities and delivering products at the lowest possible cost? How could the efficiency of the program’s activities be improved? Are there alternative, more economical ways of delivering program outputs?	Acceptable

A number of factors suggest that the Great Lakes program is efficient and cost-effective. The program has made efficiency improvements to the project application and reporting processes, and the Gs&Cs component has been successful at leveraging approximately three-quarters of project resources from sources other than ECCC. The combined administrative costs of the GLAP and GLNI programs are comparable to those for other ECCC Gs&Cs programs. In addition, most stakeholders consulted generally agree that Great Lakes initiatives are cost-effective.

- In the previous GLAP IV evaluation, it had been recommended that “the RDG Ontario should explore means of streamlining both the GLSF funding approvals process and the GLSF application process.”³¹ In an ECCC follow-up report (2011), it was indicated that the program made efficiency improvements in this regard by adopting the application and reporting processes being implemented as part of ECCC’s Action Plan for Gs&Cs Reform. Evidence from the interviews with Gs&Cs

³⁰ EC. 2010. Evaluation of the Great Lakes Action Plan IV.

³¹ EC. 2010. Evaluation of the Great Lakes Action Plan IV. <https://www.ec.gc.ca/doc/ae-ve/2010-2011/1265/page6-eng.htm>.

recipients confirmed that the application process has generally improved these last few years (e.g., better reporting templates and more timely response from ECCC).

- The Gs&Cs projects have been successful at leveraging other sources of funding and resources. Based on available information in the sample of Gs&Cs project files reviewed, ECCC contributed 26% of project resources, of which 2% was in kind, while 74% of resources were contributed by other sources, of which 53% was in kind.
- While relatively few key informants provided specific comments on the efficiency and economy of the Great Lakes program, most of them viewed the program as being efficient and economical overall, for example, because fiscal restraint has imposed discipline on program spending such that program funds and activities are well targeted and because savings are expected to be generated by project actions (e.g., projects to reduce the problem of aquatic invasive species).
- Over half of respondents to the stakeholder survey (57% to 60%) agree that the Great Lakes initiatives are the most cost-effective ways for the Government of Canada to restore and maintain water quality and ecosystem health in the Great Lakes basin. Of the respondents who do not agree, very few (3% to 6%) disagree that these initiatives are cost-effective while most neither agree nor disagree (33% to 40%).
- When asked if they think changes could be made to deliver Great Lakes activities and outputs at a lower cost, nearly two-thirds (65%) indicated that they did not know. Slightly more than one in four (27%) think changes could be made to reduce costs while slightly fewer than one in ten (8%) reported that no changes are needed. The key suggestions for delivering the program at a lower cost were to place more focus on funding and cost controls, and to improve coordination and collaboration among the involved parties.

Administrative Ratio

- An indicator of program efficiency is the administrative ratio, which is calculated as direct program costs (salaries and O&M)³² divided by the Gs&Cs funding disbursed. For the evaluation timeframe, a total of \$14.8 million in Gs&Cs was disbursed and the average administrative ratio for the program is approximately 0.15 (see Annex E). This is comparable to the estimated ratios observed in evaluations of other ECCC Gs&Cs programs, which range from 0.15 to 0.25.³³
 - The ratios for GLNI (starting at 0.55 and reducing to 0.29 over time) are higher than those for GLAP (starting at 0.18 and reducing to 0.13), which may suggest that the former is somewhat less efficient. However, it is important to note that there have been far fewer projects for GLNI than GLAP (2 to 4 versus 45 to 56 per year) and that GLAP is a long-standing program, allowing staff an opportunity to gain experience and improve efficiency in administering Gs&Cs, whereas GLNI is a newer program.

³² For the calculation of the administrative ratio, salary and O&M costs were based on program estimates of the portion of total RDGO–Ontario program costs used to administer Gs&Cs for GLAP and GLNI (see Annex E).

³³ EC. 2013. Evaluation of the EcoAction Community Funding Program; EC. 2011. Evaluation of Freshwater Programs under the Action Plan for Clean Water.

Performance Measurement

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

The program reports federally and provincially through the COA and binationally through the Canada–US GLWQA on progress in meeting commitments in the agreements. While there are logic models for GLNI, GLAP and the Sediment Remediation projects, there is no formal overall logic model and performance measurement strategy for the Great Lakes program. Program managers and scientists reported that data generally are adequate but that significant improvements could be made. They acknowledge that it is difficult to integrate and aggregate data from the various Great Lakes program initiatives.

- Program performance is documented through various reporting mechanisms, many of which fulfil COA and Canada–US GLWQA reporting requirements. These include reports such as
 - the State of the Great Lakes reports³⁴ (most recently released in 2011), which deal with the major factors related to water quality, aquatic-dependent life and landscapes and natural processes that have an impact on the state of the Great Lakes ecosystem. The results are presented at the State of the Lakes Ecosystem Conferences co-hosted by ECCO and the US Environmental Protection Agency (most recently held in October 2011);
 - reports related to the 2012 GLWQA issue-specific Annexes, such as Lakewide Action and Management Plan reports for each of the Great Lakes,³⁵
 - the IJC’s Biennial Report on Great Lakes Water Quality,³⁶ which presents 14 indicators of the chemical, physical and biological integrity of the Great Lakes and two indicators of the performance of government programs in meeting objectives in restoring sites of historic contamination identified as Areas of Concern;
 - Canadian Environmental Sustainability Indicators (CESI) relating to the state of the Great Lakes: restoring the Great Lakes AOCs (in terms of reducing BUIs and restoring beneficial uses) and phosphorus levels in the Great Lakes;
 - various micro-level reporting activities related to ongoing monitoring and modelling work on selected Canadian tributaries and nearshore areas of Lake Erie; data and reports to assess the status of AOCs and BUI indicators; and a performance measurement framework³⁷ to assess progress in restoring

³⁴ The State of the Great Lakes Report has been released every two years since 1994. <https://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=70FFEFDF-1>. Under the 2012 GLWQA, a State of the Great Lakes Report will be issued every three years. The State of the Great Lakes was recently presented at the Great Lakes Public Forum in October 2016 and the report will be issued in 2017.

³⁵ Individual annual reports for each of the Great Lakes are available on the archives of the Canada–United States Collaboration for Great Lakes Water quality website. The most recent reports were published in 2015. <https://binational.net/category/a2-2/lamps-paaps/>.

³⁶ The IJC’s 16th Biennial Report on Great Lakes Water Quality (April 2013) provides an assessment of progress made in restoring and maintaining the water quality of the lakes since 1987. The IJC, through its 16th Biennial Report, also recommended that the governments, going forward, use a core set of indicators related to the General Objectives of the 2012 GLWQA. Subsequent to the 16th Biennial Report, in 2014 the IJC formally transmitted its recommendations related to a smaller suite of core ecological indicators to Canada and the US (http://www.ijc.org/en/_news?news_id=441). Canada and the US then incorporated the IJC’s advice related to ecological indicators into the Parties’ State of Great Lakes Indicators which align to the nine General Objectives of the 2012 GLWQA.

³⁷ Program management explained that, since restoration of AOCs is a collaborative effort among many stakeholders, the main way the program measures progress in a practical sense is through each AOC’s Remedial Action Plan (RAP) and

- beneficial uses and delisting AOCs, which was developed in response to a recommendation from the 2010 evaluation of GLAP IV; and
- indicator studies to establish baseline biological and chemical conditions for the Randle Reef Sediment Remediation Project, which will be used subsequently to assess the effectiveness of the project through a comparison with post-remediation conditions.
 - Additional reporting is also expected to stem from commitments made in the 2012 GLWQA. This includes a Progress Report of the Parties (Canada–US), first issued in 2016, and an IJC triennial Assessment of Progress Report, to be issued in 2017, which will include an assessment of the Parties’ achievement of a series of general and specific objectives related to Great Lakes water quality.
 - In terms of performance measurement in direct support of the Great Lakes program, there is no formal overall logic model or complete performance measurement strategy³⁸ for PAA sub-program 1.3.4. Logic models have been individually developed for GLNI, GLAP and GLSRP; however, there is currently no systematic collection of indicator data related to many logic model outcomes. Nonetheless, some performance information related to two indicators (i.e., phosphorus levels in the Great Lakes and progress in restoring AOCs in terms of the number of AOCs delisted and number of beneficial uses listed as “impaired” or “requires further assessment”) was collected as part of the Department’s Performance Measurement Framework and reported in Departmental Performance Reports, though not consistently over the five years of the evaluation timeframe.³⁹
 - In addition to a lack of performance measurement in support of the various Great Lakes activities, ongoing gaps in performance measurement and reporting for the program were evident in relation to Gs&Cs project reporting. ECCC follow-up to a previous evaluation recommendation to “develop a more regular and robust reporting approach for GLAP projects conducted by federal partners”⁴⁰ indicated that the program had established guidelines for monitoring and reporting GLAP funds as well as a GLAP work planning template and associated annual report.⁴¹ However, program management indicated that there is no roll-up of the results information in Gs&Cs project final reports.
 - Interviewees, including program managers, scientists, and Gs&Cs recipients, generally indicated that performance data are adequate. ECCC managers in particular reported that monitoring data for nutrients, AOCs and sediment remediation projects have improved and should continue to improve. A number of suggestions were nonetheless offered for improving program performance measurement, including

the associated annual work plans. RAP work plans are reviewed annually and, because restoration work is inherently iterative, work plans are adjusted accordingly. Performance is measured against BUI delisting criteria more than anything else. When RAP actions for a particular BUI are close to being completed or it is perceived that conditions have changed, an assessment of the status of the BUI may be undertaken. Based on this, either further work may be identified or the assessment will become the basis for a recommendation to re-designate the BUI to “not impaired” status, which would be captured in the CESI indicator related to restoring the AOCs.

³⁸ EC. June 2015. Performance Measurement for Decision-Making. Reviewing EC’s Performance Measurement Framework. Internal document.

³⁹ In the DPRs, information on phosphorus levels was reported only in 2011–2012, 2012–2013 and 2013–2014, while data on the number of beneficial uses listed as impaired or requiring further assessment were reported only in 2013–2014 and 2014–2015.

⁴⁰ EC. 2010 Evaluation of the Great Lakes Action Plan IV. <http://www.ec.gc.ca/ae-ve/default.asp?lang=En&n=A720ED4D-1&offset=1&toc=hide>.

⁴¹ EC. 2010 Evaluation of the Great Lakes Action Plan IV. <http://www.ec.gc.ca/ae-ve/default.asp?lang=En&n=A720ED4D-1&offset=1&toc=hide>.

- developing a mechanism to monitor the longer-term impacts of Gs&Cs projects (though some recipients have already incorporated project monitoring activities, e.g., pre/post water samples, satellite images and pictures);
- devising some means of aggregating data from the various Great Lakes program initiatives to show the performance of the overall program;
- establishing links between interventions and outcomes (e.g., reducing nutrient levels and water quality outcomes);
- differentiating the impacts of new interventions and legacy effects;
- isolating the impacts of land-based activities on nutrient levels (e.g., agriculture, winter run-off);
- assessing the quality of data (e.g., phosphorus levels) contributed by various stakeholders such as funded project proponents, and integrating all relevant data;
- improved data archiving; and
- various other suggestions for improving performance data, including improved coordination among federal partners, better documentation, and adopting adaptive management⁴² for ongoing monitoring and assessment.

4.3. Performance – Effectiveness

Evaluation Issue: Performance – Effectiveness	Rating
<p>8. To what extent have intended outcomes been achieved as a result of the program?</p> <ul style="list-style-type: none"> ● GLNI ● GLAP ● GLSRP 	<p>Acceptable Acceptable Unable to Assess</p>

Evidence of outcomes achieved⁴³ was obtained through all lines of evidence and results are presented in this section by the intended outcomes specified in the logic models for GLNI and GLAP.

The survey of stakeholders provided ratings of the extent of achievement for all immediate, intermediate and longer-term outcomes. Results are presented for the percentage of survey respondents who perceived that a particular outcome has been achieved to a large extent (i.e., responded with a 4 or 5 on a 5-point scale) or to some extent (i.e., responded with a 2 or 3 on the scale). It should be noted that because many committees and subcommittees were still actively working on key deliverables for GLNI, including targets to be set, it was too early to assess the effectiveness of some aspects of this program. According to the interview evidence, this may explain modest survey ratings of outcomes achievement, as much of the work is still in progress.

⁴² Adaptive management is defined by the US Department of the Interior, Office of Policy Analysis, as “a systematic approach for improving resource management by learning from management outcomes.” Three key points are made to explain adaptive management: “Adaptive management acknowledges uncertainty about how natural resource systems function and how they respond to management actions; Adaptive management is designed to improve understanding of how a resource system works, so as to achieve management objectives; and, Adaptive management makes use of management interventions and follow-up monitoring to promote understanding and improve subsequent decision making.” <https://www.doi.gov/ppa/Adaptive-Management>.

⁴³ As it is premature to assess the ultimate outcomes of GLNI and GLAP (restoration and protection of Great Lakes water quality and ecosystem health, and restoration and maintenance of the chemical, physical and biological integrity of the Great Lakes basin ecosystem), these outcomes are excluded from this section. Achievement of these outcomes is a very long-term process, and the assessment of shorter-term outcomes is the only sensible means by which the degree of progress toward the ultimate outcomes can be estimated.

4.3.1 Great Lakes Nutrient Initiative

Objectives/Immediate Outcomes

Due to the fact that there are a large number of immediate/direct outcomes (12) in the GLNI logic model, the findings in this section are presented for the five GLNI objectives with which the immediate outcomes are associated. As detailed below, the findings indicate that the work being conducted as part of GLNI generally is on track and progress has been made on each of the five objectives.

Immediate Outcome 1: *Measurement of phosphorus loads from urban and agricultural sources to identify and assess phosphorus discharges, inform decision making, and track and report progress toward achievement of phosphorus reduction targets – Acceptable.*

Acceptable progress has been made toward achieving outcomes in the areas of science and monitoring for the measurement of phosphorus loads, including the development of inventories, models and baseline information about nutrients, and phosphorus reduction targets have been developed.

- Changes and resource alignments within ECCC's Water Science and Technology Directorate resulted in certain delays at the end of Year 1 (2012–2013) of the Great Lakes Nutrient Initiative. Consequently, this led to adjustments to some of the monitoring work and setbacks in the analysis of data.⁴⁴ However, the 2013–2014 DPR indicates there has been progress toward outcomes in the areas of science and monitoring, including the development of inventories, models and baseline information about nutrients. Documentation⁴⁵ also indicates that various sampling devices were installed to provide data on phosphorus loading⁴⁶ and information for forecasting models.
- Based on the work of the Annex 4 Nutrients Subcommittee, phosphorus reduction targets for the western and central basins of Lake Erie were announced by ECCC and the US EPA in February 2016, as planned.
- According to the IJC, both Canada and the United States have made important contributions to improving our understanding of the sources of excess nutrients and developing successful methods for managing them.⁴⁷
- A majority of stakeholders completing the survey indicated that GLNI has achieved to a large extent the sub-outcomes of having critical data for input to forecasting models to derive the phosphorus load reduction targets for Lake Erie (59%), and having an updated and improved understanding of Canadian phosphorus loadings to Lake Erie (56%). All remaining respondents indicated that these sub-outcomes have been achieved to some extent.

Immediate Outcome 2: *Improved understanding of the influence of aquatic invasive species and other factors contributing to algae production, and of the impacts of toxic and nuisance algae on water quality and ecosystem health – Acceptable.*

⁴⁴ EC. 2014. *GLNI 2012–2013 Annual Report*.

⁴⁵ EC. 2014. *GLNI 2012–2013 Annual Report*.

⁴⁶ Current data available include nutrient loads for five Canadian tributaries to Lake Erie and the Detroit River for the 2012–2015 period, as well as nearshore and offshore nutrient concentration assessments and reports. EC. 2015. Water Science and Technology Directorate Presentation for Great Lakes Science Day.

⁴⁷ IJC. 2014. *A Balanced Diet for Lake Erie: Reducing Phosphorus Loadings and Harmful Algal Blooms. A Report of the Lake Erie Ecosystem Priority*.

Research documented through GLWQA Annex Subcommittee reports has led to a better understanding of nutrient loadings as well as invasive species and other factors that affect water quality, ecosystem health and algae growth.

- Progress has been made by the Annex 4 Nutrients Subcommittee to improve understanding of invasive species and other factors affecting water quality. The 2012 amendment to the GLWQA contains several new Annexes responding to current and emerging challenges, including aquatic invasive species (AIS). ECCC contributed to the binational Biodiversity Conservation Strategies (BCS), which included an assessment of the threat of AIS, and assembled key regional partners to create a coordinated action plan for the common reed and other priority terrestrial invasive species. Many commentators on the COA were supportive of the current commitments under this agreement, particularly those related to early detection and rapid response initiatives, improved understanding and tools to respond to AIS, and engagement of the Great Lakes community to prevent, detect, respond to and manage AIS.⁴⁸
- The Government of Canada has been working collaboratively with Ontario to address AIS, and COA commitments reflect efforts to work together and with others to protect the waters of the Great Lakes from AIS. These collaborative efforts include planning and delivering early detection, response actions when and where such responses are possible, and science to improve understanding and develop new tools.⁴⁹ As a key partner, Fisheries and Oceans Canada also delivers science that contributes to the understanding of the state of the ecosystem and progress toward a range of GLWQA 2012 objectives, with specific focus on AIS and habitat and species in the Great Lakes.⁵⁰ Project file information indicates that some local projects involve the monitoring of invasive species, such as zebra mussels and shoreline plants.
- Close to half of stakeholders in the survey (44%) indicated that GLNI has achieved to a large extent the sub-outcome of an improved understanding of the connection between phosphorus concentrations and algae production, and 37% provided the same positive rating for the sub-outcome of an improved shared understanding of factors contributing to toxic algal production. All remaining respondents indicated that these outcomes have been achieved to some extent. These findings are not surprising given that efforts closely related to this outcome are ongoing as part of the Annex 4 Nutrients Subcommittee work.
- Based on the work of the Objectives and Loading Task Team of the Annex 4 Nutrients Subcommittee,⁵¹ key informants generally believe that understanding of the factors contributing to algae production and its impacts has improved. They also recognize that the science is complex, the situation is dynamic, and ongoing research is required.

Immediate Outcome 3: *Establish binationally agreed upon, science-based phosphorus load reduction targets* – **Acceptable.**

⁴⁸ EC. 2014. COA: The Government of Canada Reports on Comments.

⁴⁹ EC. 2014. COA: The Government of Canada Reports on Comments.

⁵⁰ Parliament of Canada. *Government of Canada's Responses to the 2014 Committee Report Recommendations* (Standing Committee on Environment and Sustainable Development).

⁵¹ *Establishment of Phosphorus Targets for Lake Erie under the GLWQA*. Annex 4 Nutrients Subcommittee Objectives and Loading Task Team. Presentation to EC, February 2015.

The Annex 4 Nutrients Subcommittee has summarized the research on nutrient loadings in Lake Erie from Canadian tributaries and recommended phosphorus loading targets for Lake Erie.

- As outlined in the COA, there is a commitment to develop science-based phosphorus concentration and load reduction targets for Lake Erie by 2016. According to a 2014 report,⁵² agreement on a binational approach to monitoring and reporting on phosphorus concentrations and loads will be sought at that time.
- The Objectives and Loading Task Team has been established by the Annex 4 Nutrients Subcommittee of GLEC. The Task Team is conducting an in-depth analysis using existing science and modelling tools, and measurements of phosphorus in different zones of Lake Erie to develop models and establish phosphorus targets for the lake. Recommendations for targets were published^{53,54} and, as noted earlier, binational targets were announced in February 2016.
- The Annex 4 Nutrients Subcommittee is on track to complete the work to develop a binational Phosphorus Reduction Strategy for Lake Erie.⁵⁵
- ECCC personnel, partners and stakeholders indicated that the work being conducted as part of GLNI generally is on track. While they believe that there still are knowledge gaps, they observed that research has led to a better understanding of phosphorus loadings, and progress has been made in developing phosphorus load reduction targets for Lake Erie.
- Approximately half of survey respondents indicated that the GLNI has achieved the following to a large extent: updated and scientifically defensible phosphorus targets for management purposes, to meet key milestones in the Canada–US GLWQA (50%); and ecosystem objectives and phosphorus targets to guide domestic and binational phosphorus management decisions (47%). Approximately half also indicated some extent of achievement for each outcome. Modest ratings of the degree of achievement of these outcomes are not unexpected considering that work in support of these outcomes was ongoing at the time of the survey, and that the survey asked whether the outcomes had already been achieved.

Immediate Outcome 4: *Develop and assess policy options for reducing phosphorus discharges from agricultural and urban point and non-point sources – Acceptable.*

ECCC has completed an evaluation of policy options for reducing phosphorus discharges to Lake Erie, and efforts to further assess and refine these options are expected to continue as part of the development of Canada’s Domestic Action Plan.

- ECCC is leading an evaluation of policy options and best practices for reducing phosphorus discharges from both point and non-point sources to support decision making by all levels of government and the private sector for the control of toxic and nuisance algae levels in the Great Lakes.⁵⁶

⁵² EC. 2014. COA: The Government of Canada Reports on Comments.

⁵³ Recommended Phosphorus Loading Targets For Lake Erie. Annex 4 Objectives and Targets Task Team Final Report to the Nutrients Annex Subcommittee. May 11, 2015.

⁵⁴ Recommended Binational Phosphorus Targets to Combat Lake Erie Algal Blooms. June 30, 2015.

⁵⁵ *Establishment of Phosphorus Targets for Lake Erie under the GLWQA.* Annex 4 Nutrients Subcommittee Objectives and Loading Task Team. Presentation to EC, February 2015.

⁵⁶ Parliament of Canada. *Government of Canada’s Responses to the 2014 Committee Report Recommendations* (Standing Committee on Environment and Sustainable Development).

- Most respondents indicated that the development of policy options for achieving phosphorus reduction has been achieved to some extent (57%) or a large extent (29%).
- Key informants noted that adaptive management, an approach that seeks to improve resource management by assessing and learning from the outcomes of management interventions, is a central theme of the Phosphorus Reduction Strategy, to reinforce the concept that the lakes are complex dynamic environments that are not fully understood and that are expected to change as we change our impacts on them. There is a consensus that the Phosphorus Reduction Strategy will serve as a road map for a domestic action plan and watershed phosphorus reduction implementation plans.
- Work on the development and assessment of policy options to reduce phosphorus discharges from Canadian sources to Lake Erie is mostly completed,⁵⁷ and efforts to further assess and refine these policy options are expected to continue as part of the development of Canada's Domestic Action Plan, to be finalized in 2018.

Immediate Outcome 5: *Develop a binational nearshore assessment and management framework – Acceptable.*

Acceptable progress has been made by the Annex 2 Lakewide Management Subcommittee to develop a binational nearshore assessment and management framework. A draft framework was completed in February 2016.

- The Annex 2 Lakewide Management Subcommittee has established a Task Team to develop an integrated framework to identify priorities and guide management of nearshore areas of the Great Lakes. Implementation of the nearshore framework is expected to advance lakewide management.
- The work to complete the nearshore framework is well underway; a binational progress report was completed and accepted in December 2014.⁵⁸ Subsequently, a draft framework was completed in February 2016, and a revised draft was posted for public review in May 2016.
- Key informants reported that the preliminary work to develop a nearshore assessment and management framework has been more complex than expected. For example, the focus of the Ontario provincial government is on priority areas (e.g., beaches), while the federal government is looking at the lakes more systemically. Both the provincial and federal governments agree on a focus on non-point sources of pollution.
- Four in five (80%) survey respondents reported that the sub-outcome related to “coordinated binational management of nearshore areas to benefit Great Lakes water quality and aquatic ecosystems” has been achieved to some extent, which is consistent with the fact that the nearshore framework is still under development. Fewer than one in ten (7%) feel that this outcome has been achieved to a large extent.

⁵⁷ Greenland International Consulting Ltd., Wilkinson Insight Inc. and Faculty from the University of Guelph. March 11, 2016. Evaluation of Policy Options to Achieve Nutrient Reductions from Canadian Sources to Lake Erie. Draft Final Report.

⁵⁸ Annex 2 Lakewide Management Nearshore Task Team Report. December 2014.

Intermediate Outcomes

- Almost all stakeholders who completed the survey believe that at least some progress has been made toward achieving all GLNI intermediate outcomes, and few or no respondents think that progress has been made toward these outcomes to a large extent. Additional evidence for each intermediate outcome is presented below.

Intermediate Outcome 1: Implement pollution prevention and control measures to reduce phosphorus loadings – Acceptable.

Acceptable progress has been made in developing phosphorus reduction targets, and measures are currently being developed in 2016 to achieve these targets.

- As noted, a Domestic Action Plan to reduce phosphorus loadings in Lake Erie to achieve binational targets is currently being developed in 2016, and is expected to be completed in 2018.
- Evidence from the key informant interviews indicates that the program's Gs&Cs component has contributed to this outcome by helping communities to reduce sewage spills in the lakes. For example, in the file review, one project focused on diagnosing the state of a sewage system.

Intermediate Outcome 2: Minimize the occurrence and impacts of toxic and nuisance algae – Opportunity for Improvement.

Although some progress has been made over the past decades in reducing algae in Lake Erie, there is research evidence indicating that recent algae blooms are a result of excessive nutrient loadings and that there has been a levelling off or reversal of earlier reductions in nutrient loadings.

- Continual improvements to lakewide management of Lake Erie are being made,⁵⁹ but the results to date are mixed in terms of the impact these measures are having on algae. A study conducted by IJC (2013) using seven chemical indicators illustrates that there have been mostly favourable or stable results since 1987, reflecting the success of policy changes implemented in both Canada and the US after the original 1972 Agreement.⁶⁰ The same study, however, also concludes that recent (2013) algal blooms seen in the Great Lakes are a result of excessive nutrient loadings.⁶¹ There are also signs of levelling off or even, in some cases, a reversal of reductions in nutrient loadings in the past decade and earlier. According to a 2014 IJC study, total phosphorus loads have not declined appreciably in many watercourses draining agricultural areas, and the highly bioavailable dissolved fraction of total loads (dissolved reactive phosphorus) has been steadily increasing.⁶²
- A major focus of the efforts of ECCC and its partners is to reduce the amounts of excess phosphorus entering the Great Lakes, Lake Erie in particular, which contributes to algae growth.

⁵⁹ Lake Erie Lakewide Action and Management Plan, Annual Report, 2014.

⁶⁰ IJC. 2013. *Assessment of Progress Made Towards Restoring and Maintaining Great Lakes Water Quality Since 1987.*

⁶¹ IJC. 2013. *Assessment of Progress Made Towards Restoring and Maintaining Great Lakes Water Quality Since 1987.*

⁶² IJC. 2014. *A Balanced Diet for Lake Erie: Reducing Phosphorus Loadings and Harmful Algal Blooms. A Report of the Lake Erie Ecosystem Priority.*

Intermediate Outcome 3: *Canada and US establish and meet phosphorus load reduction targets for all Great Lakes – Unable to Assess.*

It is premature to assess the degree to which phosphorus reduction targets are being met because targets for Lake Erie have only recently been developed.

- As noted, binational phosphorus reduction targets for the western and central basins of Lake Erie were announced by ECCO and the US EPA in February 2016. It is too early to assess the degree to which targets will be met.
- GLNI's focus is on Lake Erie, but the science and policy approaches developed are eventually expected to be transferable to other Great Lakes.

Intermediate Outcome 4 *Improved understanding and management of the Great Lakes nearshore – Acceptable.*

Understanding of the nearshore has improved through the process of developing a nearshore assessment and management framework, and efforts to manage the nearshore will intensify once the framework has been approved in 2016.

- Key informants familiar with the work of the Annex 2 Lakewide Management Subcommittee reported that much has been learned and documented (e.g., in progress reports⁶³), through both science and stakeholder engagement, in the process of developing the nearshore assessment and management framework.
- Efforts to manage the Great Lakes nearshore will intensify following completion and approval of the nearshore assessment and management framework in 2016. As noted, a draft framework was completed in February 2016 and a revised draft posted for public review in May 2016.

Intermediate Outcome 5 *Reduction in cumulative impacts of human activities in nearshore areas – Unable to Assess.*

It is premature to assess this outcome because the nearshore assessment and management framework has not yet been finalized.

- More systematic measurement of the cumulative impacts of human activities on the Great Lakes nearshore⁶⁴ will be possible following completion and approval of the nearshore assessment and management framework in 2016.

4.3.2 Great Lakes Action Plan

Immediate Outcomes

Immediate Outcome 1: *More effective/better integrated remedial actions in Areas of Concern – Acceptable.*

⁶³ Annex 2 Lakewide Management Nearshore Task Team Report. December 2014.

⁶⁴ Although AOCs may fall within a nearshore zone, GLNI's focus on the nearshore is distinct from GLAP's focus on restoring BUIs in AOCs. The nearshore assessment and management framework under GLNI is intended to address a broad range of cumulative impacts including non-point source runoff, shoreline hardening, climate change impacts, habitat loss, invasive species, dredging and contaminated sediment issues, bacterial contamination, contaminated groundwater, and other factors where they are identified as a source of stress to the nearshore environment. GLWQA, 2012.

Remedial actions in AOCs are being implemented through the development of Remedial Action Plans and implementation of funded projects focused on BUIs and AOCs with the involvement of local partners.

- Remedial Action Plans are developed for each AOC and, based on the file review, all Gs&Cs were targeted toward AOCs and BUIs and have involved various local partners, including municipalities, First Nations communities and other local organizations. Projects include
 - restoration initiatives, such as restoration of buffer zones, wetlands, forests and riverbank or stream habitats;
 - lake habitat projects involving the planting of trees and plants, and protected or enhanced wetland habitat for species at risk and other species;
 - monitoring projects including geomorphology assessment projects, water sampling and analysis projects, and deployment of monitoring mechanisms; and
 - education and awareness projects targeting landowners of available resources and general public awareness campaigns.
- Few project files include impact measurements, such as the impacts on water quality of these various funded activities.
- All survey respondents indicated that the work undertaken through GLAP has achieved this outcome to some (46%) or a large extent (54%).

Immediate Outcome 2: *Improved identification of environmental problems and progress in Areas of Concern – Acceptable.*

Identification of environmental problems and progress in AOCs is being achieved through the conduct of science and monitoring of ecosystem health as well as the preparation of Remedial Action Plans, Annual Workplans and Progress Reports for AOCs.

- The document review shows that Remedial Action Plans, Annual Workplans and Progress Reports are prepared to identify problems and track progress in AOCs.
- O&M funds are utilized for science and monitoring, which is integral to the identification and implementation of remedial actions in AOCs.⁶⁵
- Almost all survey respondents reported that the work undertaken through the GLAP has achieved this outcome to some (48%) or a large extent (48%).

Immediate Outcome 3: *Improved management and coordination of efforts to restore and maintain the Great Lakes Basin ecosystem – Acceptable.*

Management and coordination of efforts to restore the Great Lakes ecosystem have improved with the governance structure and processes of the 2012 GLWQA.

- There is a strong consensus among key informants that the Annex subcommittee structure and processes (described in Annex A) were strengthened for the 2012 GLWQA, compared to the previous agreement, and have greatly improved the management and coordination of efforts to achieve Great Lakes program outcomes, including restoring and maintaining the Great Lakes Basin ecosystem.
- Efforts within ECCC are reasonably well coordinated. Interview findings indicate that there were already long-standing distinct units within the department working on

⁶⁵ GLAP V Five-Year Workplan, 2014.

most of the applicable 2012 GLWQA Annexes (excluding the two Annexes led by other departments).

- All survey respondents indicated that the work undertaken through GLAP has achieved this outcome either to some extent (54%) or a large extent (46%).

Intermediate Outcomes

Intermediate Outcomes 1 and 2: *Pollution from identified sources is minimized or eliminated and habitats are restored in Areas of Concern – Acceptable.*

Since 1987, the environmental quality in Canada’s 17 AOCs has improved, with three AOCs delisted and two more designated as being in the recovery stage (one of which was so designated in 2011, within the evaluation timeframe). Projects in AOCs have had a number of benefits, including reducing pollution and restoring habitats.

- The environmental quality in Canada’s 17 Great Lakes Areas of Concern has improved since the restoration program began in 1987. Although no AOCs were delisted in the evaluation timeframe, to date three out of 17 AOCs have been delisted (i.e., all restoration activities have been implemented and delisting criteria met): Collingwood Harbour and Severn Sound, both in Lake Huron (in 1994 and 2003 respectively), and Wheatley Harbour in Lake Erie (in 2010). Two more AOCs have been designated as being in the recovery stage: Spanish Harbour in Lake Huron (in 1999) and Jackfish Bay in Lake Superior (in 2011).⁶⁶
- ECCC reports that by 2019, required remedial actions are expected to be completed in five more Canadian Areas of Concern: [Nipigon Bay](#), [Niagara River](#), [the Bay of Quinte](#), [St. Lawrence River \(Cornwall\)](#) and [Peninsula Harbour](#).⁶⁷
- According to the ECCC Great Lakes Areas of Concern web page, projects in AOCs have enhanced water quality, restored fish and wildlife populations and habitats, improved management of municipal waste waters, and investigated and developed options to manage contaminated sediments in the AOCs.⁶⁸
- To date, over 900 restoration projects have been completed by ECCC and community partners in the AOCs.⁶⁹
 - According to file review evidence, about one Gs&Cs project out of five in the sample included habitat restoration work, such as planting and restoration of buffer zones, wetlands, forests and riverbank or stream habitats. The program’s own internal analysis of *all* projects funded by the GLSF over the past five years indicates that roughly two in five projects (38%) were related to habitat restoration.
 - Key informants indicated that the work conducted under GLAP has led to concrete results, for example, through Gs&Cs-funded projects that have reduced various types of pollution and improved habitats in AOCs. During the evaluation timeframe, BUI 14 on loss of fish and wildlife habitat has been re-designated as “not impaired” in the Nipigon AOC and is up for re-designation in the Bay of Quinte and St. Lawrence AOCs.

⁶⁶ ECCC. Restoring the Great Lakes Areas of Concern. www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=E08EA691-1.

⁶⁷ ECCC. Great Lakes Areas of Concern. www.ec.gc.ca/raps-pas/.

⁶⁸ ECCC. Great Lakes Areas of Concern. www.ec.gc.ca/raps-pas/.

⁶⁹ ECCC. Great Lakes Areas of Concern. www.ec.gc.ca/raps-pas/.

- Just under half of stakeholders in the survey perceived that the work undertaken through GLAP has to a large extent achieved the outcomes of minimizing or eliminating pollution from identified sources (42%) and restoring habitats (48%). All or most of the remaining respondents (58% and 48% respectively) indicated some extent of achievement. There are no CESI indicators to provide empirical data on pollution levels or habitat restoration in the Great Lakes, however.

Intermediate Outcome 3: *Activities of federal partners and stakeholders advance remedial actions, monitoring, outreach and engagement in each Area of Concern – Acceptable.*

Activities of federal partners and stakeholders help to advance remedial actions in AOCs, for example, through their engagement on Remedial Action Plan (RAP) committees.

- GLAP governance mechanisms related to work on AOCs engage federal partners and stakeholders. The GLAP Workplan Review Team conducts an annual review of five-year work plans submitted by federal departments, in consultation with the GLEC. In addition, Remedial Action Plan (RAP) committees, each with a federal project lead, maintain working-level links to community and provincial stakeholders to ensure that environmental needs at the AOC level are addressed.
- The file review indicated that funded projects targeted at AOCs have engaged various local partners, including municipalities, First Nations communities and other local organizations.
- Close to two-thirds of stakeholders completing the survey (62%) reported that this outcome has been achieved to a large extent, with the remaining 38% indicating to some extent.

Long-term Outcomes

Long-term Outcome 1: *Beneficial uses are determined to be unimpaired and Areas of Concern are delisted – Acceptable.*

In the evaluation timeframe, 17 beneficial uses were restored. Overall, since 1987, 54 beneficial uses out of a total of 146 across all 17 AOCs have been restored to “not impaired” status as of 2015. No AOCs were delisted during the five-year evaluation timeframe; however, in 2011 one AOC was designated as being in the recovery stage.

- FSDS target 3.3 (from November 2013) is to take federal actions to restore beneficial uses for delisting five Canadian AOCs and to reduce the number of impaired beneficial uses in the remaining AOCs by 25% by 2018.
- In the evaluation timeframe (from 2010 to 2015), 17 beneficial uses in AOCs were restored. Overall, since 1987, 54 out of 146 previously identified⁷⁰ beneficial uses across all 17 AOCs have been restored to “not impaired” status as of 2015.⁷¹ The number of impaired uses has increased in only one AOC (Detroit River).⁷²

⁷⁰ Beneficial uses were identified during initial assessments, which took place between 1988 and 2003.

⁷¹ Governments of the United States and Canada. 2016. Progress Report of the Parties.

⁷² ECCC. Restoring the Great Lakes Areas of Concern. www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=E08EA691-1.

- No AOCs were delisted during the five-year evaluation timeframe. However, as noted, one AOC was designated as being in the recovery stage in 2011 (Jackfish Bay in Lake Superior),⁷³ and ECCC has reported that remedial actions are expected to be completed in five more AOCs by 2019.
- Over one-third of stakeholders completing the survey (39%) indicated that this outcome has been achieved to a large extent, and 61% indicated to some extent.

Long-term Outcome 2: *Canada's international commitments related to Great Lakes Areas of Concern are met – Acceptable.*

ECCC is meeting its commitments under the GLWQA, for example, through its GLAP work in AOCs, leadership in the implementation of the Agreement, preparation of 2014 Lakewide Management and Action Plan reports, and finalization of a Canada–US Biodiversity Conservation Strategy for Lake Superior.

- ECCC has continued its collaboration with the US and met commitments related to the GLWQA. For example, in addition to GLAP work in AOCs, the Department has continued to lead implementation of the GLWQA, prepared 2014 Lakewide Management and Action Plan reports, finalized a Canada–US Biodiversity Conservation Strategy for Lake Superior, and co-led the identification of the first set of proposed Canada–US chemicals of mutual concern.⁷⁴
- Key informants noted that the roles of the Parties are clearer under the 2012 GLWQA and that the indicators for BUIs are more specific.
- With respect to the 2007–2012 COA, ECCC met 176 of 189 commitments and continued efforts on the remaining commitments.⁷⁵ Similar findings on the 2014 COA are not yet available.
- Just over half of stakeholders completing the survey (52%) indicated that Canada's international commitments related to Great Lakes AOCs are being met to a large extent, with 44% indicating to some extent.

4.3.3 Great Lakes Sediment Remediation Projects: Progress to Date

As it is premature to assess the degree of outcome achievement for GLSRP, progress to date on the major project⁷⁶ at Randle Reef was examined. Design and planning for this project is now complete, with preliminary work on the seven-year project beginning in the fall of 2015. Construction of the containment facility in the first phase began in the spring of 2016, with final capping and completion of the project scheduled for 2022. The federal government is contributing \$46.3 million of the total project cost of \$138.9 million.

⁷³ ECCC. Restoring the Great Lakes Areas of Concern. www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=E08EA691-1.

⁷⁴ Environment Canada Departmental Performance Report 2014–2015.

⁷⁵ Environment Canada Departmental Performance Report 2012–2013.

⁷⁶ In addition to the Randle Reef project, a smaller project was implemented in the Peninsula Harbour AOC in 2012–2013. This \$7 million project placed 15 to 20 centimetres of clean sand on top of the most contaminated sediment in Jellicoe Cove – a process known as thin-layer capping. Thin-layer capping is intended to create a clean fish habitat, stop the spread of contaminated sediment, and reduce risk to fish, fish-eating birds, mammals and people. The issues remaining in the Peninsula Harbour AOC require no further action by ECCC; however, the environment needs time to recover naturally. A monitoring plan for this sediment remediation project is in place to assess the recovery of ecosystem health. The results will be used to determine whether the AOC will be designated as delisted or as an AOC in Recovery by 2019. (ECCC. Peninsula Harbour Area of Concern. <https://www.ec.gc.ca/raps-pas/default.asp?lang=En&n=BC4BB3E0-1>.) Under the Action Plan for Clean Water, ECCC budgeted \$2,704,502 for this project, and the department's expenditures in 2012–2013 and 2013–2014 were a total of \$2,386,697. (Figures provided by ECCC Finance Branch, August 31, 2016.)

Randle Reef is an area of highly contaminated sediment located on the south shore of Hamilton Harbour in the western end of Lake Ontario, and is considered to be the largest and one of the more complex and highly contaminated sediment sites in the Great Lakes. Sediment remediation is required to reduce the environmental impacts of contaminants, including the polycyclic aromatic hydrocarbons (PAHs) and heavy metals located at this site. A shared responsibility model has been adopted with the Government of Canada, the Government of Ontario and the local community, participating equally in the design and implementation of a solution. This legacy site is a priority for remediation in the Hamilton Harbour Remedial Action Plan and under the COA.⁷⁷

The objective of the Randle Reef Sediment Remediation Project is to contribute to the improvement of environmental conditions in Hamilton Harbour and to assist in the delisting of the harbour as an Area of Concern. The development of the project has been ongoing since 1992, when the Remedial Action Plan was first submitted to the IJC.⁷⁸ Since then, the initiation of the project's core activities has experienced a series of unanticipated delays related to technical studies, funding disputes, a change in the project lead (from the Hamilton Port Authority to ECCC), legal concerns, and finalizing the project design and estimated cost.^{79,80} These delays resulted in moderated goals and rescheduled timelines to address the project objectives in a feasible manner. The seven-year remediation project is now planned for completion in 2022. The project will be conducted in three phases: (1) construction of a 7.5-hectare engineered containment facility (ECF) over the most highly contaminated sediment containment box (two years); (2) dredging and placement of additional contaminated sediment within the steel-walled ECF (two years); and (3) constructing a cap and isolation of remaining sediment on the containment structure (three years). A total of 675,000 cubic metres of sediment is being managed through the project.

A total of \$138.9 million has been allocated to the project. This includes \$46.3 million from each of the federal and Ontario governments, \$14 million from the City of Hamilton, \$14 million from US Steel Canada, \$14 million from the Hamilton Port Authority, \$2.3 million from the City of Burlington and \$2 million from Halton Region.

The design and planning phase for the Randle Reef Remediation Project has been completed. ECCC issued a request for proposals for the first phase to build the steel containment walls in February 2014. The planned work was delayed by a year when the initial bids came in over budget, and the request for proposals was reissued in the spring of 2015. An ECCC official reported that preliminary work to reconstruct a harbour wall along the shoreline began in the fall of 2015. The shoreline wall is required to allow dredging of sediments in the second phase. The first phase of the ECF construction started in the spring of 2016.

⁷⁷ EC, 2015–2016 RPP Supplementary Tables, Status Report on Transformational and Major Crown Projects; <https://www.ec.gc.ca/default.asp?lang=En&n=C80941AA-1&offset=4&toc=show>.

⁷⁸ Milestones. n.d. Retrieved June 13, 2016, from <http://www.randlereef.ca/>.

⁷⁹ Milestones. n.d. Retrieved June 13, 2016, from <http://www.randlereef.ca/>.

⁸⁰ McNeil, M. July 21, 2015. Randle Reef Construction Starting in Spring. *The Hamilton Spectator*. Retrieved September 09, 2016, from <http://www.thespec.com/news-story/5744697-randle-reef-construction-starting-in-spring/>.

5. CONCLUSIONS

Relevance

There is a demonstrated need to restore and maintain the Great Lakes ecosystem. The Great Lakes have enormous environmental, social and economic importance and value to Canada. Current and emerging environmental concerns for the Great Lakes require ongoing attention from the Government of Canada.

The Great Lakes program is aligned with federal government and ECCC priorities, including the Federal Sustainable Development Strategy's Goal 3 to maintain water quality and availability, and ECCC's strategic outcome "Canada's natural environment is conserved and restored for present and future generations." The program is also consistent with federal government roles and responsibilities as specified in relevant legislation and international commitments.

Performance – Efficiency and Economy

Evidence indicates that the overall design of the Great Lakes program is appropriate for achieving its intended outcomes: the designs of the GLNI, GLAP and GLSRP are logical; program structures, processes and science are aligned with the updated GLWQA; a process exists for re-designating BUIs and delisting AOCs; and grants and contributions (Gs&Cs) are an effective mechanism for supporting partners to help achieve program results. Some concern was expressed regarding the need for a more clearly defined and timely process for delisting AOCs and reallocating resources, as well as the adequacy of science capacity to meet an expected increase in demand.

The management and governance mechanisms established in 2012 for the renewed GLWQA, including the Great Lakes Executive Committee and 10 Annex Subcommittees, have improved governance, set up binational processes to achieve a variety of objectives consistent with ECCC's program outcomes, and led to a more open and transparent governance process. In the view of some key informants, however, it is premature to draw final conclusions about the effectiveness of the GLWQA governance structure, particularly the Great Lakes Executive Committee, which will not be fully understood until substantial issues and decisions are addressed by the Canadian and US governments in the months and years ahead. Communications and collaboration are noted as challenges because of the number of program initiatives and stakeholder organizations involved. In addition, although roles and responsibilities are defined in the GLWQA, they are not yet clearly understood by all stakeholders.

Most stakeholders consulted generally agree that Great Lakes initiatives are cost-effective. The project file review indicates that the Gs&Cs component has leveraged approximately three-quarters of project resources from sources other than ECCC, and the estimated combined administrative costs of the GLAP and GLNI programs are comparable to those observed for other ECCC Gs&Cs programs.

The program reports federally and provincially through the COA and binationally through the Canada–US GLWQA on progress in meeting commitments in the agreements. While there are logic models for GLNI, GLAP and the Sediment Remediation projects, there is no formal overall logic model and performance measurement strategy for the Great Lakes sub-program. Program managers and scientists reported that performance data generally are adequate but that significant improvements could be made (e.g., it is difficult to integrate and aggregate data from the various Great Lakes program initiatives).

Performance – Effectiveness

GLNI: The work being conducted as part of GLNI is on track and good progress has been made toward the Initiative's five objectives and associated direct outcomes. Progress has been made in science and monitoring to measure phosphorus loads, including the development of inventories, models and baseline information about nutrients. Research documented through GLWQA Annex Subcommittee reports has led to a better understanding of nutrient loadings and other factors that affect water quality, ecosystem health and algae growth. The Annex 4 Nutrients Subcommittee has summarized the research on nutrient loadings in Lake Erie from Canadian tributaries and recommended phosphorus reduction targets for Lake Erie. ECCC has completed an evaluation of policy options for reducing phosphorus discharges to Lake Erie, and efforts to further assess and refine these options are expected to continue as part of the development of Canada's Domestic Action Plan. Progress has also been made by the Annex 2 Lakewide Management Subcommittee; a draft binational nearshore assessment and management framework was completed in February 2016.

With respect to intermediate outcomes, understanding of the nearshore has improved through the process of developing a nearshore assessment and management framework, and efforts to manage the nearshore are planned to intensify once the framework has been approved in 2016. Regarding the intended outcome of minimizing the occurrence and impacts of algae, although some progress has been made over the past decades in reducing algae in Lake Erie, there is research evidence indicating that recent algae blooms are a result of excessive nutrient loadings and that there has been a levelling off or reversal of earlier reductions in nutrient loadings. It is premature to assess other GLNI intermediate outcomes because work on phosphorus load reduction targets and a nearshore assessment and management framework is not yet finalized.

GLAP: Acceptable progress has been made on GLAP's immediate outcomes. Remedial actions in AOCs are being implemented through the development of Remedial Action Plans and implementation of funded projects focused on BUIs and AOCs with the involvement of local partners. Identification of environmental problems and progress in AOCs is being achieved through science and monitoring as well as the preparation of Remedial Action Plans, Annual Workplans and Progress Reports for AOCs. In addition, management and coordination of efforts to restore the Great Lakes ecosystem have improved with the governance structure and processes of the 2012 GLWQA.

Progress has also been made toward intermediate and longer-term outcomes. For example, in the evaluation timeframe, 17 beneficial uses were restored. Overall, since 1987, 54 beneficial uses out of a total of 146 across all 17 AOCs have been restored to "not impaired" status, three AOCs have been delisted and two more designated as being in the recovery stage. Although no AOCs were delisted during the five-year evaluation timeframe, in 2011 one AOC was designated as being in recovery. ECCC is meeting its international commitments under the GLWQA.

GLSRP: As it is premature to assess the degree of outcome achievement for GLSRP, progress to date on the Randle Reef project was examined. While the project has experienced numerous delays, design and planning for this project is now completed and preliminary work on the seven-year project began in the fall of 2015. Construction of the containment facility in the first phase began in the spring of 2016, with final capping and completion of the project scheduled for 2022. The federal government is contributing \$46.3 million of the total project cost of \$138.9 million.

6. RECOMMENDATIONS AND MANAGEMENT RESPONSES

The following recommendations are addressed to the Assistant Deputy Minister of Strategic Policy Branch (SPB), as the senior departmental official responsible for the management of the Great Lakes Program.

Recommendation 1: Improve performance measurement and reporting of program outcomes, including enhanced monitoring and development of a single performance measurement strategy for the overall Great Lakes program.

High-level performance reporting on lakewide water quality and ecosystem health is available, with indicators to address the Department’s Performance Measurement Framework, the State of the Great Lakes ecosystem reporting, and the Progress Report of the Parties. Improvements can, however, be made to the performance monitoring given the lack of performance data for several program outcomes assessed in the current evaluation. There is also a need for better linkages between data on water quality and on land-based activities affecting water quality.

A single performance measurement strategy for the overall Great Lakes program, including a logic model, indicators, targets, data sources, and data collection strategies for each major output and outcome, would reduce duplication, improve coordination of effort for performance measurement, and clarify the linkage of indicators to program objectives and outcomes among the three Great Lakes program components.

The ADM of SPB agrees with the recommendation.

Management Action		
The program will develop a single performance measurement strategy for the Great Lakes program, including a logic model. Of note, the International Joint Commission, an independent binational body mandated to advise the Government of Canada and the Government of the United States, has advised against managing the Great Lakes as a single system – this advice will need to be considered in the design of the performance management strategy.		
Timeline	Deliverable(s)	Responsible Party
November 2017	Completed performance measurement strategy for the Great Lakes program, including development of logic model and performance measures.	Regional Director General, Ontario

Recommendation 2: Contribute to improving communications on roles and responsibilities and coordination of GLWQA Annex Subcommittees.

Many GLWQA Annex Subcommittee members are unaware of the activities and roles of the other subcommittees, even though Annex Co-Leads report on their work at GLEC meetings and many of the issues and problems covered by the Annex Subcommittees are interrelated. Better communications on roles and responsibilities, as well as coordination of activities across the Annex Subcommittees, would promote synergies among subcommittees. It is recommended that ECCC play a leadership role to improve communications.

The ADM of SPB agrees with the recommendation.

Management Action		
The Regional Director General–Ontario will write to Annex Co-Leads and subcommittee members to remind them about their roles and responsibilities, including the need to ensure cross-Annex information sharing and coordination is occurring. The Regional Director General–Ontario will also take the opportunity at each GLEC meeting to reinforce this messaging.		
Timeline	Deliverable(s)	Responsible Party
December 2016	Annex Co-Leads and Subcommittee members are reminded in writing about their roles and responsibilities, including the need to ensure that cross-Annex information sharing and coordination is occurring.	Regional Director General–Ontario
Ongoing	During each GLEC meeting, subcommittee members are reminded about their roles and responsibilities, including the need to share information and coordinate across Annexes.	Regional Director General–Ontario

Recommendation 3: Review the approach, strategy and timeliness for AOC delisting decisions.

Over the five-year evaluation timeframe, no AOCs were delisted, though one area was designated as being in the recovery stage in 2011. While there are established criteria for assessing AOCs for delisting, delays have been encountered in reaching consensus in delisting decisions. This in turn may delay the redeployment of program resources to other needs (e.g., addressing lakewide issues not specific to AOCs, scientific research). In particular, concern was expressed over community resistance to delist AOCs if new problems emerge, even once the original BUI problems have been adequately addressed. As it was beyond the scope of this evaluation to examine this issue in-depth, it is recommended that the program review the AOC delisting approach and process to clarify the emphasis placed on historical versus new BUI problems, determine whether unnecessary delays are being experienced and, if so, consider strategies for expediting the process where feasible.

The ADM of SPB agrees with the recommendation.

Management Action		
<p>To operationalize the GLWQA delisting procedures and requirements, the Canada – Ontario Agreement Areas of Concern Annex Co-Leads established “<i>The Canada–Ontario Guide to Changing the Designation of Beneficial Use Impairments and Delisting Areas of Concern.</i>” The Guide was developed in 1995 and revised and updated in 2010 and 2014.</p> <p>This process will include the following steps:</p> <ul style="list-style-type: none"> • Completing a review of existing delisting criteria and revising criteria where necessary to make these criteria realistic, measurable, and achievable. • Reviewing current and proposed science to align it to support the assessment of whether delisting criteria have been met. • Reviewing consultation and engagement approaches, including engagement of Indigenous peoples, to ensure appropriate opportunities for input to delisting decisions. 		
Timeline	Deliverable(s)	Responsible Party
March 31, 2017	Review current and proposed science to align it where necessary to support the assessment of conditions in AOCs against the delisting criteria. To be coordinated in advance of FY 2017–2018 and annually thereafter.	Regional Director General–Ontario
September 30, 2017	Complete review of existing delisting criteria and revise delisting criteria as necessary so that criteria are realistic, measurable and achievable. Review of delisting criteria will occur on an AOC-by-AOC basis and will engage Indigenous peoples and stakeholders.	Regional Director General–Ontario
September 30, 2017	Review AOC consultation and engagement approaches, including engagement of Indigenous peoples, to ensure appropriate opportunities for input to delisting decisions.	Regional Director General–Ontario

ANNEX A – Background on Great Lakes Program

The Great Lakes program comprises three components – the Great Lakes Nutrient Initiative (GLNI), the Great Lakes Action Plan (GLAP) and the Action Plan for Clean Water (Great Lakes Sediment Remediation Projects or GLSRP). These three programs support actions to address commitments stemming from the Canada–US Great Lakes Water Quality Agreement (GLWQA) and the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA). These two agreements and associated governance mechanisms are described in this Annex.

Canada–United States Great Lakes Water Quality Agreement

The Canada–US Great Lakes Water Quality Agreement, since it was first signed in 1972, has guided and coordinated the efforts of Canada and the US for over four decades in restoring and maintaining the water quality and aquatic ecosystem health of the Great Lakes.

The 2012 Canada–United States Great Lakes Water Quality Agreement (2012 GLWQA), which entered into force in February 2013, commits the governments of Canada and the US to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes. Specifically, the agreement commits the Parties to work toward attaining a series of general and specific objectives in each of 10 priority issue areas, which are described in Annexes to the Agreement: Areas of Concern; Lakewide Management; Chemicals of Mutual Concern; Nutrients; Discharges from Vessels; Aquatic Invasive Species; Habitat and Species; Groundwater; Climate Change Impacts; and Science.

Pursuant to the GLWQA, the International Joint Commission (IJC)⁸¹ provides advice and recommendations to the Parties related to the quality of the waters of the Great Lakes, assesses the Parties' progress in the implementation of the 2012 GLWQA, and provides public outreach and education on Great Lakes water quality.

Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem

Both the federal government and the Ontario government contribute to fulfilling Canada's responsibility for managing and protecting the Great Lakes. Both levels of government share authority to protect the environment, and are involved in aspects such as water, agriculture, species and fisheries.

Coordination of federal and provincial efforts with respect to the Great Lakes is accomplished through the Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA). The COA outlines how the governments of Canada and Ontario will cooperate and coordinate their efforts to restore, protect and conserve the Great Lakes and sets out roles and responsibilities among eight federal and three provincial ministries. It is a means by which federal partners interact with the provincial ministries to help meet Canada's obligations under the GLWQA.⁸²

⁸¹ The IJC was established in 1909 by the Boundary Waters Treaty to prevent and settle disputes over boundary waters located along the Canada–US border. The role of the IJC is described in detail in Article VII of the GLWQA.

⁸² Canada–Ontario Agreement on Great Lakes Water Quality and Ecosystem Health. [www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=B903EE0D-1;ECCC.Cleaning up the Great Lakes. www.ec.gc.ca/doc/eau-water/grandslacs-greatlakes_e.htm](http://www.ec.gc.ca/grandslacs-greatlakes/default.asp?lang=En&n=B903EE0D-1;ECCC.Cleaning%20up%20the%20Great%20Lakes.www.ec.gc.ca/doc/eau-water/grandslacs-greatlakes_e.htm).

A new, renamed five-year Canada–Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (COA), 2014 became effective on December 18, 2014.⁸³ The 2014 COA includes a series of articles that outline the purpose, governance and other administrative aspects of the Agreement, as well as over 270 commitments to be undertaken either jointly or separately by Canada and Ontario over a five-year period, organized into 14 Annexes: Nutrients; Harmful Pollutants; Discharges from Vessels; Areas of Concern; Lakewide Management; Aquatic Invasive Species; Habitat and Species; Groundwater Quality; Climate Change Impacts; Science; Promoting Innovation; Engaging Communities; Engaging First Nations; and, Engaging Métis.

Governance Mechanisms

Governance and management under the GLWQA

In implementing the 2012 GLWQA, which is directly supported by all Great Lakes program activities, Canada and the US work in cooperation and consultation with several partners and stakeholders. Strengthened governance mechanisms were established under the 2012 GLWQA to ensure the right representation and participation in order to achieve the commitments outlined in the Agreement. Engagement of partners and stakeholders occurs through a variety of means, including the following:

- The Great Lakes Executive Committee (GLEC) serves as a forum to advise and assist the Parties in coordinating, implementing, reviewing and reporting on programs, practices and measures undertaken under the Agreement. The GLEC, co-chaired by ECCO and the US Environmental Protection Agency (EPA), includes senior-level representatives of federal governments, state and provincial governments, Tribal governments, First Nations, Métis, municipal governments, watershed management agencies, and other local public agencies.
- A formal structure of subcommittees, each with Co-Leads, has also been put in place to engage GLEC member organizations in working binationally to develop and implement actions to achieve commitments for each of the 10 issue annexes identified in the 2012 GLWQA. These committees further engage others, beyond the GLEC membership, in order to undertake specific tasks and activities in support of achieving the commitments in each annex.⁸⁴
- A Great Lakes Public Forum is convened by the Parties with the IJC, every three years, to discuss and seek public comments on the state of the lakes and bi-national priorities for science and action to inform future priorities and actions. This Forum also allows the IJC to discuss and receive public input on the Progress Report of the Parties, which was first issued in 2016.
- A Great Lakes Summit is convened in conjunction with the Great Lakes Public Forum to promote coordination among the Parties, the IJC, the Great Lakes Commission, and the Great Lakes Fishery Commission.
- Opportunities for public engagement on specific commitments related to those from the issue annexes are also undertaken.

Governance and management under the Canada–Ontario Agreement

⁸³ *Canada–Ontario Agreement on Great Lakes Water Quality and Ecosystem Health*, 2014 ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=E9A42FF1-1; Environment Canada and Ontario Ministry of the Environment and Climate Change. News Release: Governments of Canada and Ontario sign new Great Lakes Agreement. December 19, 2014.

⁸⁴ More information can be found at the Canada–United States Collaboration for Great Lakes Water Quality website, www.binational.net.

- COA Management Committee (the COA Executive Committee in the 2014 Agreement): responsible for the oversight and overall administration of the COA. It oversees all federal–provincial work carried out under the Agreement, including activities related to AOCs, and provides direction and decision making for AOC work.
- COA Annex Implementation Committee (the COA Management Committee in the 2014 Agreement): coordinates development and implementation work planning across multiple Agreement annexes.
- COA Annex Co-Leads: federal and provincial Co-Leads to oversee the implementation of specific Agreement annexes.

Committees under the Great Lakes Action Plan (AOC-specific)

- GLAP Workplan Review Team: conducts an annual review of five-year work plans submitted by federal departments, in consultation with the GLEC.
- Remedial Action Plan (RAP) committees: maintain working-level links to community and provincial stakeholders and ensure that environmental needs at the AOC level are addressed. Each RAP committee has a federal project lead who reports RAP activities directly to the COA Annex Implementation Committee.⁸⁵

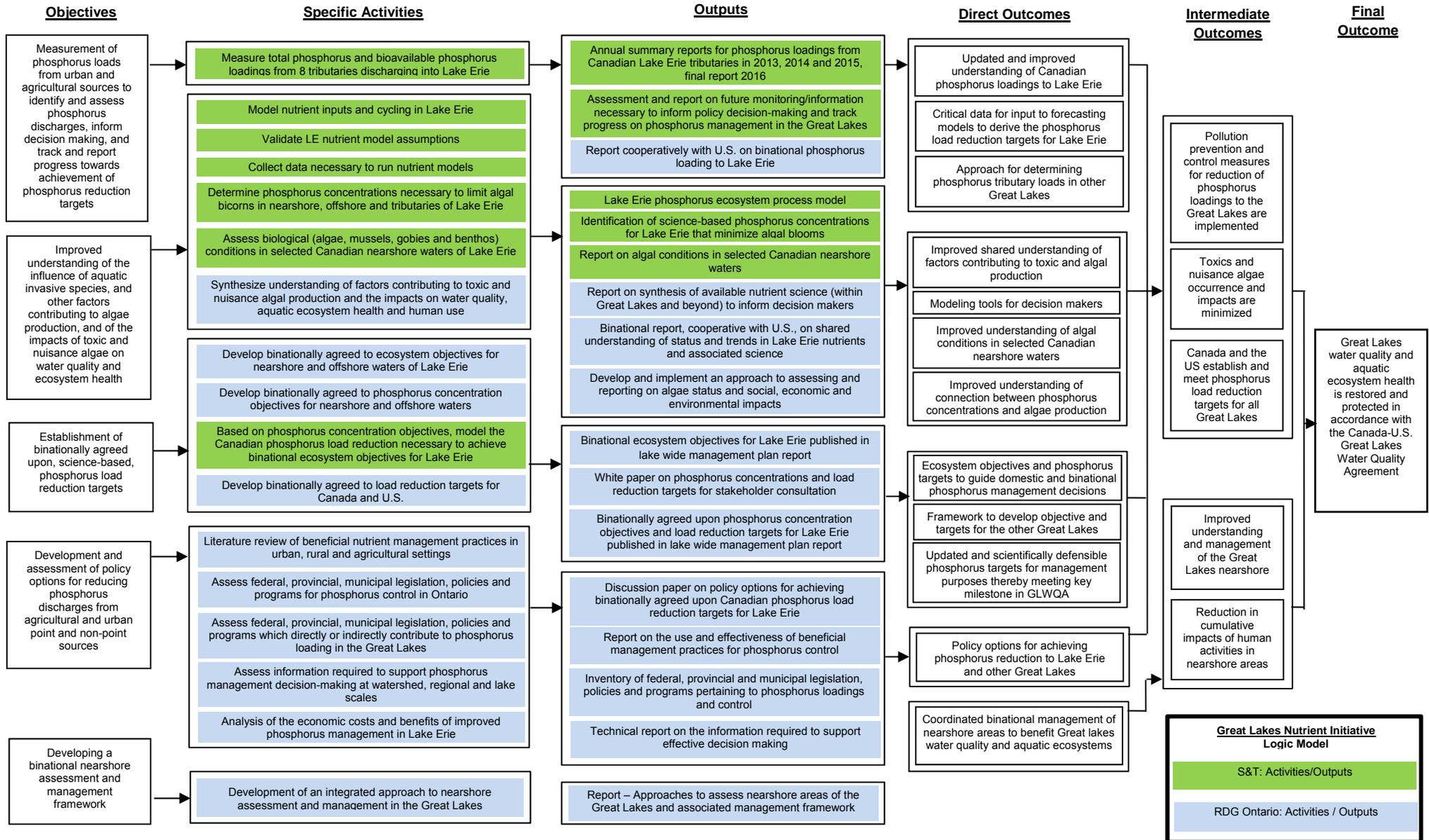
For the development and implementation of Lakewide Action and Management Plans (LAMPs) for each shared Great Lake, a Lake Partnership, led by the US EPA and ECCC, facilitates information sharing, sets priorities, and assists in coordinating binational environmental protection and restoration activities among the federal, state and Ontario government agencies.

⁸⁵ Under the COA, 2014, this committee is called the COA Management Committee, and each federal project lead now reports directly to the federal COA Annex Lead, who is also their manager.

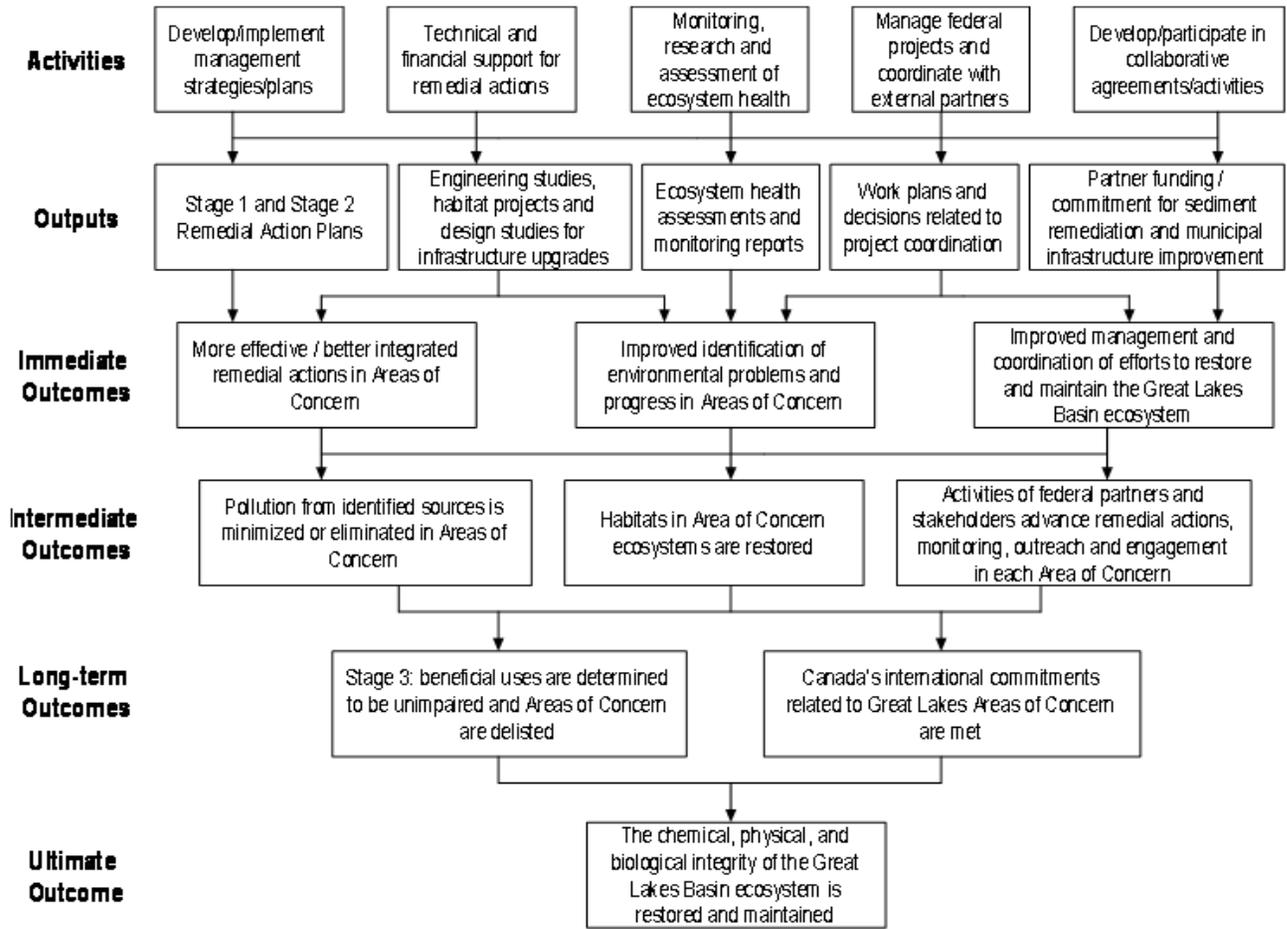
ANNEX B – Program Logic Models

1. Great Lakes Nutrient Initiative
2. Great Lakes Action Plan
3. Great Lakes Sediment Remediation Projects

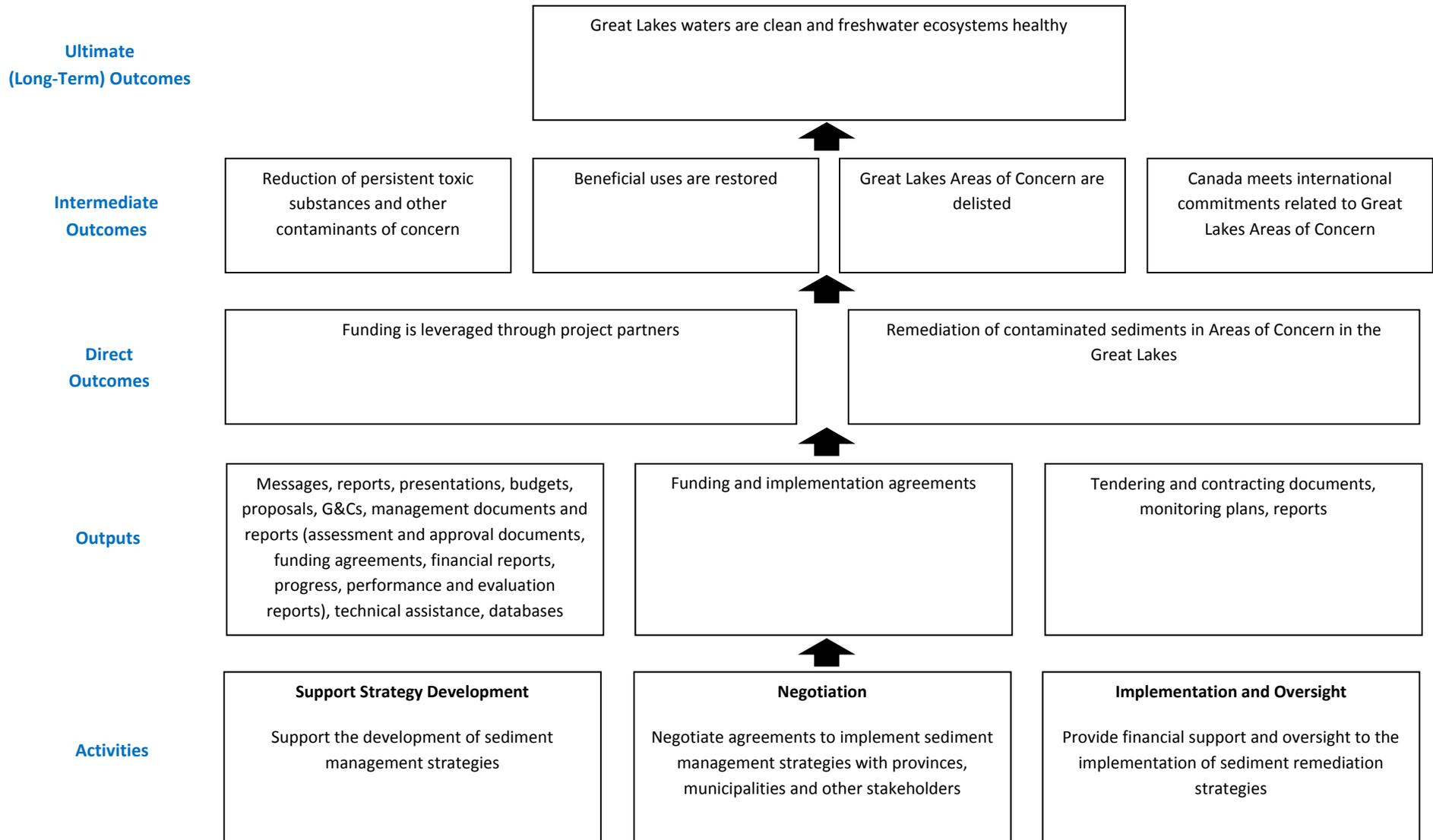
Logic Model – Great Lakes Nutrient Initiative



Logic Model – GLAP IV



Logic Model: Sediment Remediation Projects in the Great Lakes Area of Concern Program



ANNEX C – Details on Evaluation Methodology

The research methods⁸⁶ utilized to collect evidence for the evaluation are described below.

Document and Literature Review

Documentation and literature were reviewed to gather evidence to help address each of the evaluation questions. This involved a review of program documentation and reports, for example, the State of the Great Lakes reports on environmental indicators, updates on Lakewide Action and Management Plans, and COA Progress Reports. In addition, relevant departmental and federal government documents were reviewed, including ECCC Reports on Plans and Priorities (RPPs) and Departmental Performance Reports (DPRs); previous evaluations; Speeches from the Throne; and Federal Budgets. A review of selected literature focused on relevant studies related to the ongoing need for the program as well as some aspects of the efficiency analysis. The evidence was summarized, by evaluation question, in a template.

Review of Financial and Performance Data

Financial, project and performance data were reviewed to contribute to the assessment of evaluation questions related to the program's efficiency/economy and effectiveness. This included a review of financial information (to assess any gaps between budgets and expenditures, as well as the administrative costs associated with disbursement of Gs&Cs), and performance information available in updates, progress reports, DPRs and the 2007–2012 COA database.

Grants and Contributions Project File Review

This component of the methodology involved a review of a sample of 40 project files. All of these projects were funded under the Great Lakes Sustainability Fund (GLSF) as part of the Great Lakes Action Plan (GLAP). This included a review of approval forms, contribution agreements, project activity reporting, financial files (e.g., requests for payment, cash flow statements, recipients' accounting of expenditures), annual and/or interim reports, and final project reports. Data gathered from project files were recorded in a standard file review template.

In the evaluation timeframe, there were 167 funded projects which had been completed. A random sample of completed projects was selected, stratified by criteria such as dollar value of contribution funding and fiscal year when funding began, in order to ensure that a representative number of different types of projects was included in the review.

Key Informant Interviews

In order to obtain feedback related to all of the evaluation questions, in-depth interviews were conducted with key informants. A representative number of different types of relevant stakeholders, both internal and external to ECCC, were sampled from a larger list of interview candidates compiled with the assistance of program representatives. A total of 43 key informant interviews were completed with respondents in the following categories:

- ECCC program managers, staff and internal partners (n=14)
- Federal government partners in other departments (n=3)
- Provincial government partners (n=4)
- Project proponents and unfunded applicants (n=12)

⁸⁶ A Data Collection Instruments Technical Appendix, which contains the instruments used for each methodology, is available under separate cover.

- Other external stakeholders, including representatives of the IJC, conservation authorities, First Nations organizations and academic experts (n=10)

Interview guides consisting of open-ended questions were designed for each major type of key informant. Interviews were conducted by telephone or in person (in the National Capital Region) and were 45 to 90 minutes in duration, depending on the type of respondent. Findings from the interviews were captured in templates organized by evaluation question.

Case Studies

Case studies were conducted for an in-depth examination of two specific aspects of the Great Lakes program: (1) implementation of the 2012 Canada–US Great Lakes Water Quality Agreement, with a focus on the effectiveness of the governance structure and processes; and (2) the scientific process by which phosphorus targets are set for Lake Erie. The methodology for each case study involved a small number of interviews with stakeholders, a review of documentation and data, and preparation of a brief report.

Online Survey of Stakeholders

An online survey was conducted to obtain quantifiable responses from a large group of stakeholders, beyond those consulted in the key informant interviews. A survey questionnaire, consisting primarily of closed-ended questions, was developed to assess a number of evaluation questions related to relevance and performance. All stakeholders on lists provided by the program (excluding those consulted in interviews) were sent the questionnaire. Of 193 stakeholders invited to participate, responses were received from 108 stakeholders for a response rate of 55.9%.⁸⁷ For some survey questions, such as those on the achievement of outcomes for a specific program, only a sub-set of these stakeholders provided responses (i.e., those with sufficient knowledge and experience to respond, based on their role related to the Great Lakes program).

Survey respondents included representatives of various program-related committees, including the Great Lakes Executive Committee, COA Management Committee, GLWQA Annex Subcommittees and Extended Subcommittees, and BUI Working Groups. The distribution of the 10 respondents is as follows:

- ECCC (n=16)
- Other federal government departments (n=13)
- Provincial and regional governments (n=20)
- US federal government (n=12)
- US state governments (n=18)
- Other external stakeholders, including NGOs, international organizations and First Nations organizations (n=29)

Analysis of the survey data included the computation of overall descriptive statistics by question and cross-tabulations to assess differences by types of stakeholder organizations.

⁸⁷ In the experience of Goss Gilroy Inc., the contractor which conducted the online survey, a response rate of approximately 50% is typical for most stakeholder surveys in evaluations.

ANNEX D – Summary of Findings⁸⁸

Relevance

Evaluation Question	Acceptable	Opportunity for Improvement	Attention Required	Unable to Assess	Not Applicable
1. Is there a continued need for the Great Lakes program?	•				
2. Is the Great Lakes program aligned to federal government priorities?	•				
3. Is the Great Lakes program consistent with federal roles and responsibilities?	•				

Performance

Evaluation Question	Acceptable	Opportunity for Improvement	Attention Required	Unable to Assess	Not Applicable
4. Is the Great Lakes program design appropriate for achieving expected program results?	•				
5. To what extent is the governance structure clear, appropriate, and efficient for achieving expected results?		•			
6. Is the Great Lakes program undertaking specific activities and delivering products at lowest possible cost? How could the efficiency of the activities be improved? Are there alternative, more economical,	•				

⁸⁸ The ratings and their significance are outlined in Table 2 in Section 4.

ways of delivering the program outputs?					
7. Are performance data being collected and reported for the Great Lakes program? If so, is this information being used to inform senior management / decision makers?			•		
8. To what extent have intended outcomes been achieved as a result of the Great Lakes program?	•				

ANNEX E – Estimated Administrative Ratios

Estimated Administrative Ratios for RDGO–Ontario

Program Components	1. Total Salary	2. Estimated Salary Associated with Gs&Cs	3. Total O&M	4. Estimated O&M Associated with Gs&Cs	5. Gs&Cs Disbursed	6. Number of Projects	Estimated Administrative Ratio ([Col. 2 + Col. 4]/Col. 5)
2010–2011							
Great Lakes Action Plan	\$1,508,758	\$502,919	\$618,288	\$20,000	\$2,899,500	45	0.18
2011–2012							
Great Lakes Action Plan	\$1,217,162	\$405,721	\$920,514	\$20,000	\$2,900,000	46	0.15
2012–2013							
Great Lakes Action Plan	\$1,128,358	\$376,119	\$1,269,425	\$20,000	\$2,900,000	56	0.14
Great Lakes Nutrient Initiative	\$110,653	\$50,000	\$358,598	\$5,000	\$100,000	2	0.55
2013–2014							
Great Lakes Action Plan	\$1,058,769	\$352,923	\$1,215,770	\$20,000	\$2,900,000	53	0.13
Great Lakes Nutrient Initiative	\$287,287	\$50,000	\$370,679	\$5,000	\$125,000	4	0.44
2014–2015							
Great Lakes Action Plan	\$1,123,207	\$374,402	\$1,426,647	\$20,000	\$2,899,314	52	0.14
Great Lakes Nutrient Initiative	\$304,244	\$25,000	\$277,346	\$5,000	\$105,000	2	0.29
Total	\$6,738,438	\$2,137,084	\$6,457,267	\$115,000	\$14,828,814	260	0.15

Figures from ECC's financial system as provided by Finance Branch, July 17, 2015. For purposes of calculating administrative ratios, estimates of salary and O&M associated with administering the Gs&Cs were provided by the Great Lakes program (see columns 2 and 4). For example, program representatives estimated that one-third of staff time/salaries is spent on Gs&Cs administration for GLAP. Estimated O&M consists of costs for travel and overhead such as postage, courier and photocopying.