

Annual Work Plan

Fiscal Year

2024

Annual Work Plan in support of a long-term adaptive management strategy for the on-going review and evaluation of the regulation plans and the expedited review of Plan 2014.

Covering
October 1, 2023 to
September 30, 2024

January 9, 2024

GLAM Committee Annual Work Plan for 2024

WORK PLAN

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Blue text identifies other International Joint Commission Board and Committee affiliations

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NOTE: The Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee was established by the International Joint Commission (IJC) as a sub-committee of the Boards and is comprised of an equal number of members from the United States and Canada. Members of the Committee serve at the pleasure of the IJC and are expected to be full participants in all activities of the Committee. As with all IJC Boards and Committees, the GLAM Committee members serve in their personal and professional capacity, not as a representative of their agencies or employers.

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Purpose

This work plan identifies the priority activities to be carried out or initiated by the GLAM Committee in the period covering October 1, 2023 through September 30, 2024. Tasks are focused on supporting Phase 2 of the expedited review of Plan 2014, with additional tasks related to the Plan 2012 review and the longer-term adaptive management effort.

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Introduction

On January 16, 2015 the International Joint Commission (IJC) issued a Directive establishing the Great Lakes-St. Lawrence River Adaptive Management (GLAM) Committee which reports to the three Great Lakes-St. Lawrence River Boards (the International Lake Superior Board of Control (ILSBC), the International Niagara Board of Control (INBC), and the International Lake Ontario – St. Lawrence River Board (ILOSLRB), collectively referred to in this document as Boards). The GLAM Committee is to carry out the required monitoring, modelling and assessment related to on-going evaluation of the regulation plans and address other questions that may arise due to changing conditions, in consultation with the Boards.

In the summer of 2019, the IJC requested the GLAM Committee begin planning for an expedited review of Plan 2014 with the goal of further moderating flooding that occurred because of record water supplies to the Lake Ontario-St. Lawrence River system in 2017 and 2019. The GLAM Committee proposed a two-phased approach. Phase 1 of this expedited review was officially launched by the IJC in February 2020 and ended with a report from the GLAM Committee to the Commission in November 2021 ([GLAM Expedited Review of Plan 2014: Phase 1 | International Joint Commission \(ijc.org\)](#)). The first phase focused on information to support the International Lake Ontario – St. Lawrence River Board when they must make high water deviation decisions. Phase 2 will more closely evaluate options over a longer period to determine whether changes can be made to Plan 2014 or its limits to reduce the impact of extreme high and low water level conditions and is scheduled for completion in the spring of 2025.

This document presents the ninth annual work plan of the GLAM Committee, as approved by the Boards, covering Fiscal Year 2024 (FY24) from October 1, 2023 through September 30, 2024 and coinciding with the United States fiscal year for federal agencies. It prioritizes GLAM Committee requirements for Phase 2 of the expedited review of Plan 2014 and associated funding for ongoing review of Plan 2012, the outflow strategy used by the ILSBC to manage the flow through the St. Marys River from Lake Superior into Lake Michigan-Huron.

Purpose and Objectives

As outlined in the [January 2015 GLAM Committee Directive](#), the objective of the GLAM Committee is to provide information to the Boards and advise them and the IJC regarding the effects control structures (approved in the Commission's Orders of Approval and Directives) have on the flows and levels in boundary waters and the impacts the regulation plans have on

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the affected uses and interests. This includes the on-going review and evaluation of regulation plans related to:

- a) the effectiveness of the existing regulation plans in managing outflows in the Lake Ontario-St. Lawrence River system (Plan 2014) and the Lake Superior, St. Marys River and Lake Michigan-Huron system (Plan 2012).
- b) examining how the system may be changing over time and whether any modifications to the regulation plan(s) may be warranted; and
- c) any other questions requested by the Boards and/or IJC that may affect the Boards' water management decisions over the long-term.

The 2015 Directive tasks the GLAM Committee to design a work plan for review and approval by the Great Lakes Control Boards and the IJC that supports long-term efforts to address the following questions:

1. How well are the impacts of flows and water levels represented by current data and models used in the evaluation?
2. How will future water supplies differ from those used to test the current management of outflows?
3. How are other physical, chemical, biological, and/or socio-economic conditions of the system changing over time?
4. How can the management of outflows benefit other physical, chemical, biological and/or socio-economic conditions?

The FY24 GLAM Committee work plan builds on activities undertaken since the committee was formed in 2015 and addresses priority requirements resulting from the request in February 2020 by the IJC for an expedited review of Plan 2014 and the associated funding that has been identified. The committee has developed its [short-term and long-term strategy](#) (covering 1 to 15 years, consistent with the timelines of the updated Orders), to deliver on the requirements in the directive and the expedited review.

Through its strategy document, the GLAM Committee has identified various components of the broader adaptive management framework to support review of the regulation plans (Figure 1).

The core components relate to

- (1) hydroclimate conditions;
- (2) calculating water levels and flows (regulation plan simulation);
- (3) developing and using predictive models to assess outcomes;
- (4) evaluating plan performance, and;
- (5) supporting the IJC and Boards in making decisions based on the available information.

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The feedback aspects of these core components include monitoring and testing changes, validating and improving impact models, and re-considering assessments of plan performance if key objectives change.

Overarching components that apply to all aspects of the framework (6) include broader engagement and outreach, Indigenous engagement, peer review, information management, institutional arrangements, and project management.

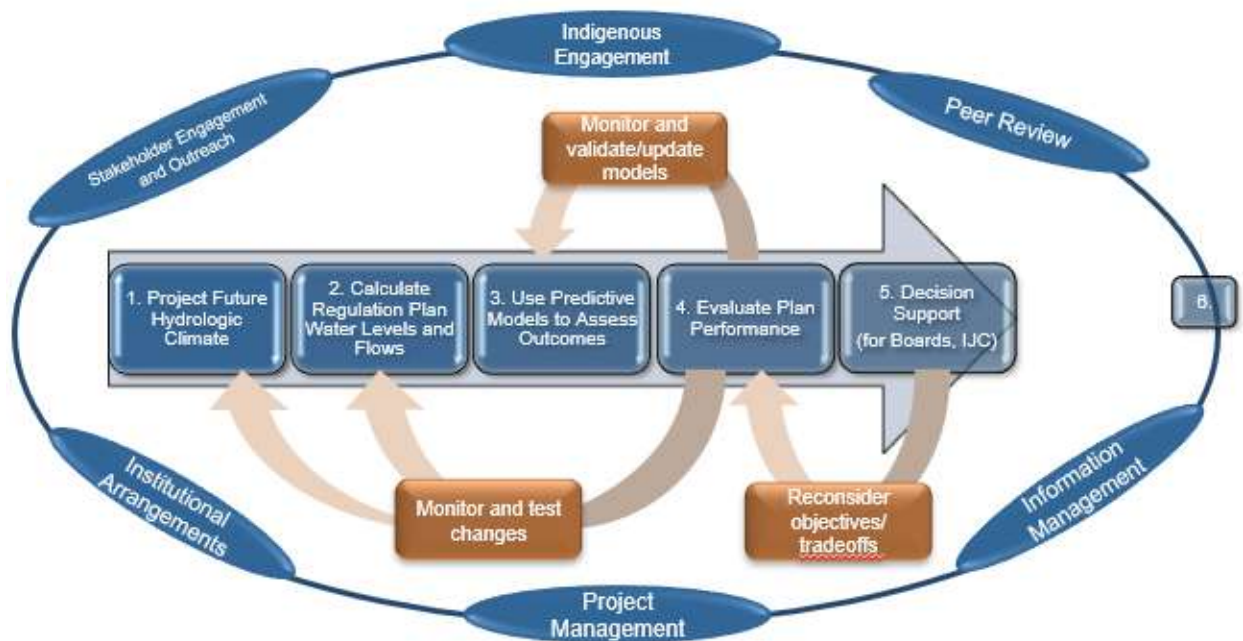


Figure 1: Illustration of the GLAM Committee's adaptive management framework

Scope and Timeline

The adaptive management process undertaken by the GLAM Committee is part of a long-term and on-going effort that recognizes the dynamics of the large and complex Great Lakes – St. Lawrence River system. This includes the regulation plans currently in use by the International Lake Superior Board of Control (Plan 2012) and the International Lake Ontario – St. Lawrence River Board (Plan 2014).

Within this long-term context, the GLAM Committee must also address the immediate requirements of the expedited review of Plan 2014 which was requested by the IJC in response to the 2017 and 2019 flood events on Lake Ontario and the St. Lawrence River. A focus of the expedited review is identifying the best solutions possible for managing Lake Ontario outflows,

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especially during periods of extreme conditions while recognizing that no regulation plan will be able to prevent extremely high and low water levels and flows or eliminate their impacts.

Practically speaking, the expedited Plan 2014 review reflects an adaptive management approach for ensuring the effectiveness of Lake Ontario outflow management, albeit at a shorter time frame from the 15-year review outlined in the updated 2016 Orders of Approval. As part of the committee's short and long-term strategy, a phased expedited review process was outlined:

Expedited Review Phase 1 - An 18-24-month (20 month) effort specific to Lake Ontario – St. Lawrence River, ending fall 2021, focused on flow releases under **Board deviation authority** recognizing recent conditions and high inflows in the foreseeable future.

Phase 1 is complete

Expedited Review Phase 2 – An additional 3 year assessment of the regulation plan(s) that will more closely evaluate options over a longer period to determine whether changes can be made to Plan 2014 or its limits, triggers or Board deviation decisions to reduce the impact of extreme conditions. The assessment will consider **many possible extremes**, both high and low, and combinations of extremes, to consider plan performance over the longer term (beyond the current/near term conditions). *Funding has been made available for much of Phase 2.*

This FY24 work plan, therefore, is based both in the context of the immediate requirements of the expedited review and the long-term initiative for the 15-year reporting period within the IJC Orders for the International Lake Superior Board of Control and the International Lake Ontario – St. Lawrence River Board. Outflows from Lake Superior through the St. Marys River into Lake Michigan-Huron are managed in accordance with Plan 2012, whose 15-year review period ends in 2030. Outflows from Lake Ontario into the St. Lawrence River are managed in accordance with Plan 2014, whose 15-year review period ends in 2032.

This is the ninth work plan prepared by the GLAM Committee and it builds on work initiated and information gained through implementation of the [2016](#) through [2023](#) work plans with a focus on Phase 2 of the expedited review of Plan 2014. Individual work plan tasks contribute to a particular aspect of the GLAM Committee's overall Directive and the six components of the adaptive management framework (see Figure 1) as they relate to the long-term requirements as well as the short-term needs of the expedited review. Tasks specific to the Lake Ontario – St. Lawrence River basin are generally being done in support of Phase 2 of the expedited review or as follow up to recommendations from the Phase 1 report. Tasks specific to the Lake Superior, St. Marys River and Lake Michigan-Huron system as well as Great Lakes – St. Lawrence River basin-wide tasks generally support the long-term adaptive management needs. Many

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hydroclimate and cross-cutting tasks apply more generally basin-wide. These tasks are outlined in the work plan tables, starting with Component 1.

The FY24 work plan includes some tasks initiated in FY23 (and sometimes earlier) and continuing into FY24 (i.e. tasks from a previous work plan that have not yet been completed, either as expected for multi-year tasks or in some cases due to delay) as well as newly identified tasks. Information on progress related to past work plan tasks can be found in previous GLAM Committee semi-annual reports, the GLAM Committee’s Phase 1 report (ijc.org/sites/default/files/GLAM_ExpeditedReview_Phase1Report_2021-11-19.pdf) and more recently as updates in Board semi-annual reports. **The tasks in the work plan are based on the resources that are expected to be available over the October 1, 2023 to September 30, 2024 period based on anticipated IJC Phase 2 expedited review funds (approximately \$1.095 million USD for the year with matching Canadian funds) as well as in-kind agency support. FY24 funding amounts are not yet confirmed and are subject to change. AS well, in-kind agency resources can vary throughout the year based on operational requirements in support of IJC regulation boards and may impact overall delivery.**

Expedited Review of Plan 2014 – Phase 2 Framework

The FY24 work plan is consistent with a peer-reviewed Phase 2 Expedited Review of Plan 2014 Strategy that has been developed by the GLAM Committee with Board approval.

Phase 2 of the Expedited Review is expected to be mostly complete by the end of December 2024 with the final report submitted to the IJC by April 2025. At the end of Phase 2, the Board will recommend to the IJC whether improvements to the regulation plan are warranted. Select FY24 milestones are identified in Figure 2 to illustrate general timing requirements for the Phase 2 effort.

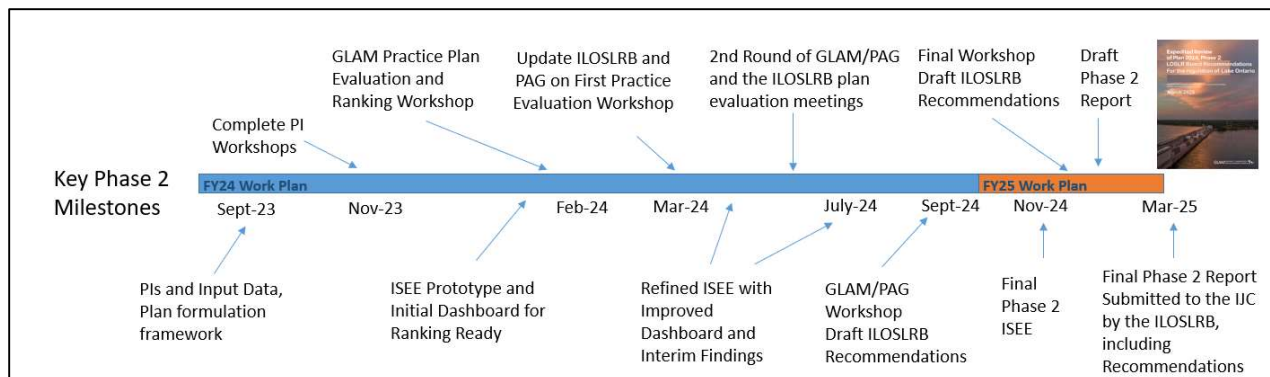


Figure 2: Rough identification of Phase 2 milestones

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In addition to the Plan 2014 review, the GLAM Committee is also funded to support the on-going review of Plan 2012 (the outflow management strategy used by the ILSBC to manage the flow through the St. Marys River, from Lake Superior into Lake Michigan-Huron). As part of this review, the GLAM Committee is directed by the Board to verify whether the intended benefits of Plan 2012 were attained or achieved. This work plan covers activities to be carried out or initiated in FY24 in support of these two efforts. Progress on the on-going review of Plan 2012 has been delayed due to the pressing deadlines of the expedited review of Plan 2014 though efforts continue related to hydrodynamic modelling in the St. Marys River, Indigenous engagement, and planning for ecosystem data related to changes in rapids flows.

As with all GLAM Committee work, the Phase 2 Expedited Review strategy is consistent with the overall Adaptive Management Strategy outlined in [GLAM's Short and Long Term Strategy](#) shown in Figure 1. The Phase 2 strategy is designed to give the Board what it needs to feel confident that it has made a good recommendation, and to give others the information they need to understand why the Board made the recommendation. The strategy begins with the Plan Evaluation and Ranking Framework which is grounded in the assessment of whether a regulation plan meets the Boundary Water Treaty of 1909, can comply with the existing 2016 Supplemental Order, has the best mix of preferred outcomes in terms of trade-offs, is robust in the face of climate changes and is easily understood and transparent to the public. The strategy will evolve over Phase 2 as the Board and stakeholders react to interim results.

The GLAM Committee has established a number of technical teams (also referred to as working groups) to support efforts in the on-going review of Plan 2012 and the expedited review of Plan 2014 for the outflows of Lake Ontario, consistent with the overall AM Framework outlined in Figure 1. Figure 3 below shows the GLAM Committee structure for Phase 2 and the associated components identified in the AM Framework from Figure 1.

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Figure 3: GLAM Committee team structure to support Phase 2

FY24 Work Plan Task Descriptions

The GLAM Committee has organized priority FY24 tasks based on each component of the adaptive management framework identified in Figure 1 and discussed in the Phase 2 expedited review strategy. These tasks are further separated as ones that apply to the Plan 2012 review (ILSBC), the Plan 2014 review (ILOSRLB) and/or broadly across the full Great Lakes – St. Lawrence River basin (i.e. both systems). Individual tasks may be supported through in-kind resources, identified funding, or a combination. Remaining sections of the work plan briefly highlight critical tasks for the coming year. In a number of cases, these tasks are continued from those previously described in the FY23 work plan and are noted as such. These continued tasks are typically expected as the tasks were planned for multiple years, though in some cases, the continued tasks are due to delayed implementation and had to be pushed forward.

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Component 1 – Project Future Hydrologic Climate (Hydroclimate Team)

Component 1 is designed to understand and model the full range of hydroclimate conditions that should be considered when evaluating regulation plan performance. It includes tasks that help to reduce uncertainties in the modelling of the water balance and tasks that help better project future water supply conditions to support outflow regulation decisions.

Activities for Component 1 are led by the Hydroclimate Team.

Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Understanding Water Supplies	FY24-1.1	Prepare routine hydroclimate assessment for the 2018 through 2022 period to support tracking of hydroclimate conditions within the Great Lakes Basin as they relate to outflow management plans (Plan 2012 and Plan 2014).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.1	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-1.2	Prepare summary documentation of key hydroclimate products developed and delivered to support Phase 2 of the expedited review of Plan 2014 for use in Phase 2 reporting. Topics of reference include documentation for: <ul style="list-style-type: none"> - Stochastic (statistical) water supply sequences. - Updated historical data required for evaluation of Plan 2012 and Plan 2014. - Climate change sequences - Approach used for including Ottawa River and other downstream tributary components 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.3, and 1.4	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-1.3	Evaluate weather generator derived hydroclimate datasets for use in vulnerability analysis (Note: these datasets are being developed outside of GLAM for the “Framework for Resilient GLRI Investments” project).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.5	FY25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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	FY24-1.4	Complete analysis of future ice conditions under a changing climate for the St. Lawrence River between Lake Ontario and Montreal for use in updates to the Lake Ontario-St. Lawrence River (Phase 2) regulation plan.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.6	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-1.5	Based on outcomes from FY23-1.7 investigating the possibility of extending the Regional Deterministic Reforecast System (RDRS) prior to 1980, initiate extension to better understand long term drivers of water balance changes in the Great Lakes and St. Lawrence River (NOTE: this task may be undertaken external to the GLAM Committee, which may impact timing of completion).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY24	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Projecting Future Water Supplies	FY24-1.6	Continue to update climate change simulations for use in undertaking Plan 2012 and Plan 2014 (Phase 2) regulation plan forecasts and longer-term (decade) plan simulations to compare alternative plan and deviation strategies.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.8	FY24	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-1.7	Identify indicators of hydroclimate change to support dynamic decision making through collaborative academic partnership (Note: this is the implementation of FY23-1.9)	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-1.9	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Component 2 – Calculate Regulation Plan Water Levels and Flows (Plan Simulation and Formulation Team)

To simulate the effects of a regulation plan and compare alternatives in a consistent way, the GLAM Committee must be able to accurately model how water travels through the system and how regulation rules, water supplies and other hydro-meteorological conditions (e.g. river ice conditions) impact water levels and flows.

The FY24 work plan focuses on ensuring effective simulations of alternative regulation plans, both for the Lake Ontario-St. Lawrence River system and the Lake Superior, St. Marys River, and Lake Michigan-Huron system. For Lake Ontario and the St. Lawrence River, simulation output will be linked with the Integrated Social, Economic and Environmental (ISEE) system to allow for calculation of impact indicators for use in the plan evaluation process.

Activities for Component 2 are led by the Plan Simulation and Formulation Team.

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Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Calculate Regulation Plan Water Levels and Flows	FY24-2.1	In coordination with the working group leads of the other adaptive management framework components and particularly the Plan Evaluation and Ranking Team (Task FY24-4.1), continue to identify and align priorities.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-2.1	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-2.2	Finalize development of baseline or reference regulation plan simulations along with basis of comparison conditions within the new binationally coordinated regulation and routing model for the Great Lakes Basin. This will include coordination with the Plan 2014 ISEE, Plan Review and Decision Support Teams to ensure software compatibility.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-2.2, and 2.4	FY24 for Plan 2014 FY 25 for Plan 2012	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-2.3	Coordinate with hydroclimate team to undertake annual updates and documentation of input databases and datasets required to include water supply conditions from the most recent years in simulations of outflows under a range of alternative regulation strategies	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-2.3	FY24	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-2.4	Continue annual Plan 2012 and reference simulations (e.g. pre-project, Plan 1977-A) to support assessment of whether recent deviations have met intended Plan 2012 goals.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-2.5	On-going	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	FY24-2.5	Explore, formulate, simulate and optimize alternative outflow strategies for review of Plan 2014 performance, including the options identified through the Phase 1 effort. This includes coordination with the Plan Evaluation and Ranking Team.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-2.6, and 4.3	FY24 and On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-2.6	Prepare summary documentation on Phase 2 Plan Simulation and Formulation activities as contributions to the Phase 2 report and as reference documentation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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Component 3 – Use Predictive Models to Assess Outcomes (Integrated Social, Economic and Environmental Team)

Component 3 relates to the development, monitoring and modelling of metrics and tools needed to support regulation plan evaluation. The GLAM Committee represents outcomes in different ways, including hydrologic attributes, performance indicators, and impact ranges. The aim of this component is to improve and reduce uncertainties inherent in the models and indicators that relate water levels and flows associated with regulation plans to socio-economic and environmental outcomes.

A primary focus for FY24 is to complete the development of the Integrated Social, Economic and Environmental System (ISEE) for use in the Phase 2 process. The ISEE system is the modelling framework for calculating performance indicators, the results of which can be represented through visualization tools to compare regulation plan alternatives. Indicators are being developed for ecosystem, shoreline impacts, hydropower, and commercial navigation. In addition to performance indicators within the ISEE system, further progress is expected in FY24 on the additional hydrologic attributes and impact ranges which will support plan evaluation.

Activities for Component 3 are led by the Integrated Social, Economic and Environmental (ISEE) Team and a series of teams dedicated to Ecosystem, Shoreline Impacts (including Municipal and Industrial, shoreline property, recreational boating and tourism and social impacts), Commercial Navigation, Hydropower and Indigenous Communities indicator development.

Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Overarching	FY24-3.1	Maintain coordination with the working group leads of the other adaptive management framework components and particularly the Plan Evaluation and Ranking Team (PERT) (Task FY24-4.1). The intent is to ensure ISEE activities and indicators are directly linked to Phase 2 Plan 2014 review requirements and the on-going review of Plan 2012.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.1	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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	FY24-3.2	Support the GLAM Committee in the interpretation of Performance Indicator and Impact Range results and in reporting of Technical Team progress to the Boards, the Public Advisory Group, the IJC and broader public.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Ecosystem Indicators	FY24-3.3	Complete evaluation of existing Meadow Marsh Algorithm using recent Lake Ontario and upper St. Lawrence River monitoring data. This task builds on previous GLAM Committee monitoring and modelling efforts and will include testing and verification of new modelling approaches (i.e. the Coastal Wetland Response Model) for a subset of Lake Ontario and Upper River wetland sites.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY22FY 23-3.3	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.4	Further develop priority ecosystem indicators for Lake St. Lawrence that are sensitive to critical Board operational decisions, particularly winter outflow adjustments, and low water levels in late-summer and early-fall during periods of high outflows. These includes winter survival of muskrat and three species of turtles as well as the area of exposed riverbed.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.4	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.5	Continue planning for the development of a Performance Indicator for the St. Marys Rapids that provides ecosystem benefits and impacts of gate changes and flow/water level fluctuations that can be integrated into a model framework for plan comparison. Previous St. Marys River IERM output can be used as a starting point and supplemented by additional field data collection which is expected to occur during the fiscal year. Feedback from further discussion with the Batchewana First Nation (see task FY23-6.6) and the Federally recognized US Tribes (See Task FY23-6.6) will be incorporated into this task.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.5	FY25 (subject to delays)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	FY24-3.6	Lake Ontario and upper St. Lawrence River coastal wetland monitoring (vegetation and ground truth data). The intent is to undertake monitoring, using previous methods, at a suite of sites on both the Canadian and US shoreline of Lake Ontario and the upper St. Lawrence River.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.6	FY24/ On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.7	Finalize ecosystem indicators and impact ranges for use within the ISEE model. Anticipated indicators (subject to change) include: <ul style="list-style-type: none"> - Wet meadow marsh (surface area) - Coastal wetland class distribution of large wetland classes (surface area) - Wild rice (survival probability) - Northern Pike (spawning habitat suitability and/or young of year recruitment) - Timing sensitivity of fish community (sensitive period of spawning) - Marsh birds community index (species richness, total abundance) 	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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		<ul style="list-style-type: none"> - Spring migratory wildfowl (habitat suitability) - Least bittern/Black Tern (nesting habitat suitability) - Muskrat (lodge density or viability) - Turtles wintering habitat (survival probability) - Exposed River Bottom in winter (surface area of exposed riverbed) 					
	FY24-3.8	Prepare summary documentation on Phase 2 ecosystem indicators, including PI fact sheets and contribute to technical team summary report (see Task FY24-6.11).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Shoreline Riparian Indicators (includes Municipal and Industrial Water Users, Shoreline Property Owners, and Recreational Boating and Tourism)	FY24-3.9	Finalize indicator selection for shoreline component of Phase 2, ensuring coordination with ISEE developers and PERT members. This includes indicators for municipal and industrial water users, shoreline property owners and recreational boating and tourism.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.9	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY23-3.10	Finalize consolidated baseline datasets of critical shoreline characteristics and vulnerabilities for Lake Ontario and the St. Lawrence River as well as a data visualization framework. These datasets would include public and private infrastructure at risk of impact under various water level and flow sequences. Specifically, datasets should include: <ul style="list-style-type: none"> - Building footprints - Building use classification (basic) - Road locations - Shore protection locations, type, and characteristics - Shoreline use (broad classification) - Crop types - Beach outlines 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.8	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.11	Continue planning for the development of an initial flooding performance indicator for the Whitefish Island. For the current FY, this task will primarily focus on identifying data and model needs in the context of feedback from further discussion with the Batchewana First Nation and Indigenous Nations (see task FY23-6.6).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.10	FY25 (subject to delays)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	FY23-3.12	Support ISEE development through evaluation and integration of refined wave runup component based on Phase 1 USACE effort and initiation of validation data collection and review.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.11	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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FY24-3.13	Ongoing development and refinement of water level impacts ranges and associated Story Maps for some sites to support both the Phase 1 Decision Support Tool as well as Phase 2 expedited review efforts. This includes seeking feedback and input on prototype versions.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.12	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY24-3.14	Finalize Phase 2 expedited review shoreline flooding indicators for both Lake Ontario and the St. Lawrence River downstream to Trois Rivières related to building, infrastructure, and agricultural inundation through: <ul style="list-style-type: none"> - Input and validation data acquisition. - Algorithm development. - Integration in the ISEE system along with validation. - Use of ISEE output to refine Phase 1 Decision Support Tool flood impacts. 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.13	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY24-3.15	Improve predictive capacity for Lake Ontario shoreline bluff recession (erosion) associated with changing water level conditions by testing applicability of new approaches for monitoring bluff recession and undertaking a review of existing cohesive sediment erosion tools.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.15	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY23-3.16	Develop and test shore protection failure predictive tool for Lake Ontario through integration of NRC guidance from FY23: <ul style="list-style-type: none"> - Pilot study of shoreline protection failure using the ISEE system including a sensitivity analysis and plan comparison (ongoing). - Validation based on a subset of field sampled structures. - Possible upscaling based on the results of the pilot. - Consolidated inventory of shoreline protection assets. 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.14	FY24 and on-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY23-3.17	Continue implementation of GLAM Committee shoreline impacts questionnaire, processing of all results from previous years, and development of a visualization product.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.16	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY24-3.18	Undertake detailed data collection and consolidation for Lake St. Lawrence impact range refinement, including detailed database for priority metrics.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.17	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FY24-3.19	Review high and low water impact indicators for municipal and industrial water users (water intakes and wastewater plants) within the ISEE by supporting facility-specific data acquisition on vulnerabilities and identification of critical thresholds.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.18	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	FY24-3.20	Develop preliminary recreational boating and tourism indicators for use in the ISEE model, through <ul style="list-style-type: none"> - Consolidated inventory of recreational boating and tourism assets such as marina/yacht club locations, dock locations, facility elevations and draft, slip usage information, public beaches, etc. - Survey of marina operators to inform the development of a rec boating indicator. - Identification of response to high and low water levels through direct engagement with marina facilities and park managers and extrapolation of previous response functions (e.g. 2017 survey responses) - Field validation for a sub-set critical data needed for ISEE application 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.19	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.21	Seek subject-matter expert input on proposed Municipal and Industrial Water Use, Shoreline Property Owner, and Recreational Boating and Tourism indicators and ISEE integration through a workshop, virtual engagement sessions, or similar.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.20	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.22	Undertake study of census data related to the shoreline population to better understand population vulnerability to variable water levels and the capacity of communities to respond. The information will be used to contextualize ISEE results and the plan evaluation process.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.23	Undertake pilot assessment of social vulnerability for shoreline communities, to complement performance indicator and hydrologic attribute information used for plan comparisons.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.24	Prepare summary documentation on Phase 2 shoreline indicators, including PI fact sheets and contribute to technical team summary report (see Task FY24-6.11).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Hydropower	FY24-3.25	Finalize hydropower indicators and impact ranges for use in the ISEE system and DST and coordinate with ISEE team for integration into the model. Document PI fact sheets and indicator descriptions as well as critical thresholds and constraints and contribute to technical team summary report (see Task FY24-6.11).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.21	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Commercial Navigation	FY24-3.26	Finalize commercial navigation indicators and impact ranges for use in the ISEE system and DST (to include both the upper and lower St. Lawrence River) and coordinate with ISEE team for integration into the model. Document PI fact	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.22	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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		sheets and indicator descriptions as well as critical thresholds and constraints and contribute to technical team summary report (see Task FY24-6.11).					
	FY24-3.27	Liaise with commercial navigation sector to seek input on identified indicators and modify indicators as necessary.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.23	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Indigenous Communities	FY24-3.28	In collaboration with Indigenous Liaison, finalize Indigenous Research Plan and initiate implementation efforts. This may include development of PIs or impact ranges that are relevant to Indigenous communities.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Integrated Social, Economic and Environmental (ISEE) Tool Development	FY24-3.29	Finalize development of Integrated Social, Economic and Environmental (ISEE) system for use in Phase 2 of the expedited review including: <ul style="list-style-type: none"> - Database structure - DEM development - Updated hydrodynamics - Wind parameters - Wave runup 	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.24	FY24 and on-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.30	Collaborate with Ecosystem, Shoreline Impacts, Hydropower and Commercial Navigation teams to ensure indicator development is aligned with ISEE requirements.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.25	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.31	Work with the Plan Simulation and Formulation Team to ensure plan simulations can be integrated with the ISEE.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.26	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.32	Develop interface and visualization dashboards for the purposes of ISEE simulation and review, connecting ISEE with the plan formulation process, and using ISEE output to support plan evaluation and ranking. This includes back-end development requirements to ensure effective and efficient data transfer.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.33	Coordinate with the Plan Evaluation and Ranking Team (PERT) to test ISEE output for use in Phase 2 decision framework including visualization approaches.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.27	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.34	Establish and document procedures for comparing base ISEE hydrodynamic output with other tools and undertake validation.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-3.28	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-3.35	Initiate ISEE documentation as part of technical team report (Task FY24-6.11) to support Phase 2 reporting and ensure longer-term reference material including validation methods and procedures.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Component 4 – Evaluate Plan Performance (Plan Evaluation and Ranking Team)

Component 4 tests changes to both the deterministic rules of Plan 2012 and Plan 2014 and protocols for deviations from these rules, by comparing from the impact assessment tools (Component 3) for water levels and flows simulated using current rules and protocols (known as the base case) and comparing those to alternatives.

In FY24, the Plan Evaluation and Ranking Team will be developing key visualization tools to represent hydrologic attributes, performance indicators and impact ranges to support the plan trade-off decision process. Over the longer-term, the ISEE output will also provide the basis for improvements to the Phase 1 Decision Support Tool though that is not expected to be a priority in FY24 given commitments for Phase 2 of the expedited review of Plan 2014.

Activities for Component 4 are led by the Plan Evaluation and Ranking Team, who also lead the Component 5 (Decision Support towards Board Recommendations) work.

Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Evaluate Plan Performance	FY24-4.1	Continue to coordinate implementation of a Phase 2 strategy outlining overall requirements for Phase 2 of the expedited review of Plan 2014. The strategy development and implementation will be led by the Plan Evaluation and Ranking Team in collaboration with the other technical teams (see Tasks FY24-1.1, FY24-2.1, FY24-3.1 and FY24-5.1).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-4.1	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-4.2	Develop Phase 2 plan evaluation dashboard to support trade-off analysis and align with the plan evaluation and ranking framework	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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	FY24-4.3	Ensure the Phase 1 LOSLR Decision Support Tool remains updated, operational and documented so it can be used for Board decisions while the next generation of the LOSLR Decision Support Tool is developed with output from the ISEE.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-4.2	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-4.4	Upon completion of all PIs related to the Rapids (including Whitefish Island), compile data into cohesive tool to evaluate Plan 2012 over the course of a season (likely to include a forecast component) and the longer term. Initiate development of separate Shared Vision Model or Decision Support Tool for St. Marys Rapids area. (NOTE: this is a long-term requirement and work was largely deferred from FY23 due to expedited review commitments).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-4.4	FY25 (subject to delays)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Component 5 – Decision Support (Plan Evaluation and Ranking Team)

The Decision Support component provides the visualization and presentation of an array of performance evaluation data (e.g. hydrologic attributes, performance indicators and impact ranges) to assist the GLAM Committee and Boards in understanding and weighing trade-offs and support efforts to make recommendations for possible changes to the plans or deviation strategies. This includes an iterative process of practice decisions to improve the decision-making process. All the output from the earlier components is consolidated within the Decision Support effort. Activities for Component 5 are led by the Plan Evaluation and Ranking Team, who also lead the Component 4 (Evaluate Plan Performance) work.

For FY24, the Decision Support Team will continue to work with the International Lake Ontario – St. Lawrence River Board to refine the plan evaluation and ranking framework and will work with the Board to improve their understanding of required future decisions and to provide a feedback mechanism to the broader Phase 2 effort.

The Decision Support Team also hopes to make some progress related to the upper Great Lakes through work with the International Lake Superior Board of Control, though progress is expected to be limited due to Phase 2 expedited review priorities.

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Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Decision Support	FY24-5.1	In coordination with the working group leads of the other adaptive management framework components and particularly the Plan Formulation and Simulation team (Task FY24-4.1), continue efforts to align outcomes of GLAM Committee decision support efforts. The intent is to ensure decision support activities are directly linked to Phase 2 Plan 2014 requirements and the on-going review of Plan 2012.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-5.1	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-5.2	Continue to engage with the International Lake Ontario – St. Lawrence River Board (ILOSLRB) on defining and implementing the Phase 2 plan evaluation and ranking framework. Maintain regular communication with the Board and PAG and prepare options for consideration by the ILOSLRB along with descriptions of the evaluation framework.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-5.2	On-going to FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-5.3	Lead the GLAM Committee through evaluation process using the Phase 2 plan evaluation and ranking framework, to ensure tested, robust, and documented options for consideration by the ILOSLRB. This includes coordinating evaluation workshops and utilizing/testing plan evaluation and ranking tools.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-5.4	Continue to ensure the Phase 1 Decision Support Tool is maintained and functional (an update on FY23-5.3).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-5.3	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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Component 6 – Cross-cutting Items (Project Management, Public Engagement and Outreach, Peer Review, Information Management)

These tasks include project management and all aspects that help support and build trust in the simulations, including stakeholder involvement, Indigenous engagement, peer review, information management, partner collaboration, and succession planning. This component is led by the GLAM secretariat with support from the full committee.

A requirement for FY24 is the continued implementation of a public engagement process for both Phase 2 of the expedited review of Plan 2014 as well as the ongoing review of Plan 2012. These processes will likely differ based on the needs and characteristics of the two systems. However, public input is critical on both processes. The GLAM Committee will also be supporting ongoing Indigenous engagement related to the adaptive management effort to maintain connections made during recent years and build relationships to towards the effective involvement of Indigenous Communities to ensure that their unique perspectives, ways of knowing and traditional knowledge are a part of the on-going review of the regulation plans.

Theme	Task	Description	Status			Plan 2012 Review	Plan 2014 Review
			New	Continued	Expected Timeline		
Project Management	FY24-6.1	GLAM Committee Coordination, Management, and Reporting. This is an ongoing task but in FY24, there will be a priority on delivering Phase 2 requirements, updating the short and long-term strategy along with budgets/schedule for ongoing adaptive management requirements.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.1	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.2	Monitoring of current FY Work Plan delivery	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.2	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Information Management	FY24-6.3	Move GLAM Committee resources to new GLAM SharePoint site hosted by the IJC and operationalize.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.3	FY24	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.4	Develop strategy to support Phase 2 and long-term GLAM Committee information management needs.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.4	FY25	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Communication and Engagement	FY24-6.5	Continue efforts to engage Indigenous Communities on impacts from changing water levels for Lake Ontario and the St. Lawrence River. The GLAM Committee is working with an Indigenous liaison for engagement efforts.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.5	On-going	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.6	Continue engagement with Batchewana First Nation related to indicators for the St. Marys Rapids and broader Indigenous Nation engagement related to Plan 2012 assessment.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.6	On-going	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	FY24-6.7	Continue implementation of a communications, outreach and engagement plan for Phase 2 effort and align with International Lake Ontario – St. Lawrence River Board communication strategy.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.7	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.8	Support the Public Advisory Group (PAG) and seek PAG input on Phase 2 of the expedited review of Plan 2014 including ideas to support broader public engagement. The GLAM Committee has engaged a facilitator to support the PAG.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.8	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.9	Work with the ILOSLRB, the Public Advisory Group (PAG) and the IJC to advise on advisory group needs following Phase 2 of the expedited review of Plan 2014.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.10	Continue development and initial implementation of a strategy for public engagement in Plan 2012 review.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.9	FY24 (subject to delays)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	FY24-6.11	Develop outline for Technical Team Report that can be used to document key outcomes from Phase 2 effort and support roll up into the overall Phase 2 report. The outline will be developed in FY24 but the final technical report will likely be completed in FY25	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.12	Prepare annotated outline of Phase 2 expedited review final report	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY24	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	FY24-6.13	Initiate draft of the final report for Phase 2 of the expedited review of Plan 2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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Peer Review	FY24-6.14	Support the IJC in any peer review processes in support of GLAM Committee activities.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.11	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GLWQA Liaison	FY24-6.15	Maintain engagement with the IJC's Great Lakes Water Quality Agreement (GLWQA) activities including the Science Advisory Board and the Water Quality Board (per GLAM Committee Directive).	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.12	On-going	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Resiliency Team	FY24-6.16	GLAM Resiliency Team will support and coordinate a review of the status of resiliency planning and implementation along the Lake Ontario and St. Lawrence River shoreline in Ontario, Quebec and New York taking into consideration, for example, public and private lands, ecosystems, recreational boating (yacht clubs and marinas) and tourism, major shoreline infrastructure (roads, piers, airports, nuclear plants etc.), municipal and industrial water uses, and Indigenous Nations. Work with the other GLAM technical teams to gather info on resiliency planning by the commercial navigation sector and hydropower sector.	<input type="checkbox"/>	<input checked="" type="checkbox"/> See FY23-6.13	FY25	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Work Plan Prerequisites and External Dependencies

Prerequisites required to ensure the success of this work plan include the on-going annual support of the agencies represented on the GLAM Committee along with additional staff support as identified by those agencies. It also requires that funds identified by the IJC for Phase 2 are made available to the GLAM Committee in a timely manner. It also assumes that necessary implementation and contract arrangements can be made for individual projects.

As this is an on-going effort, the priorities set and commitments made are estimates based on what the committee understands to be the resources available. The expertise available through the partner agencies continues to be evaluated relative to the priorities identified. There may in fact be a need to readjust proposed products depending on the expertise required and available to complete the task. These assessments will occur throughout the year as the work plan progresses. The GLAM Committee will keep the Boards aware of progress through semi-annual reporting.