Publics Services and Procurement Canada

Timiskaming Dam-Bridge of Quebec Replacement Project (Quebec)

Environmental Impact Statement

Summary

TETRA TECH

Project number : 715-32760TT
February 2023

PUBLIC SERVICES AND PROCUREMENT CANADA

Environmental Impact Statement
Timiskaming Dam-Bridge of Quebec Replacement Project (Quebec)

Our Reference: 32760TT (60ET)

Tetra Tech QI inc.
7275, Sherbrooke Street East
Office 600
Montréal (Québec) H1N 1E9
☎ 514-257-0707

Verified by:

<Original signed by>

Jacqueline Roy, M.Sc., biologist, PMP
Project manager

February 2023
Revision 01

REVISIONS

Revision nº	Description	Date	By
00	EIS – Version for the Impact Assessment Agency Review	September 2022	JR
01	EIS – Second Version for the Impact Assessment Agency Review	February 2023	JR

PROJECT TEAM

Name	Role
Tetra Tech	
Jacqueline Roy, M.Sc., biologist, PMP	Project manager
Hélène Dussault, M.Sc., biologist	Biological aspects
Jean Gauthier, eng., M.Sc-Eau	Physical aspects, hydraulic
Régis Xhardé, M.Sc., Ocean., Ph.D	Physical aspects, sedimentology
Guillaume Nachin, eng., M.Eng.	Physical aspects, GHG
Elisabeth Nault, geog., DESS	Geomatic specialist
Caroline Houle, M.Sc.	Geomatic specialist
Louis-Philippe Lavoie, B.Sc., biologist	Biological aspects and geomatic specialist
Marie-Pierre Langlois, environmental technician	Biological aspects
Daniel Néron, M.Sc., geog and environmental technician	Biological aspects
Samuel Boucher, B.Sc., biologist	Biological aspects
Caroline Cyr, assistant	Word processing
Odonaterra	
Caroline M. Coburn, MA, RPP, MCIP	Managing Director
Katherine Card, MNRM, EP	Senior Research & Operations Manager
Devin Waugh, M. Sc.	Lead, Indigenous Land Use & Knowledge
Fiona Wirz-Endrys, BES, MEnv	Environment & Consultation Planner
Stephanie Ruddock, MA, PMP	Communications and Project Manager
Jaime Malone, BA, M. Env	Intern Researcher
Blue Heron	
Nathan Towsley	Communications Specialist

TABLE OF CONTENT

LIST OF TABLES

1 INTRODUCTION AND ENVIRONMENTAL ASSESSMENT CONTEXT

Public Services and Procurement Canada (PSPC) it the federal owner of the facilities of the Timiskaming Dam of Quebec.

The Timiskaming Dam Complex was built on the Ottawa River, or Kichi-Sibi[1], between 1909 and 1913. It consists of the Quebec and Ontario Dams which regulate, in consultation with the Ottawa River Regulation Planning Board, the water level of the Ottawa River throughout the navigable period, including during flooding season to mitigate flooding downstream and facilitate navigation on Lake Timiskaming. The dam complex is not designed to generate electricity, but it does ensure the water retention required for the hydropower facilities located downstream. In addition, the dam complex is a roadway that links the provinces of Quebec and Ontario. As such, the dam must be rebuilt to maintain the environmental and socio-economic benefits it offers.

As the site of the Quebec Dam replacement project is located on PSPC owned lands between the provinces of Quebec and Ontario, the project is therefore subject to federal regulations.

The project falls under the *Canadian Environmental Assessment Act* (CEAA 2012) as it is listed on the Regulations Designating Physical Activities (RDPA), i.e., “construction, operation, decommissioning and abandonment of a new international or interprovincial bridge or tunnel”. Following the submittal of the *Project description* to the Canadian Environmental Assessment Agency (CEAA) in 2018, the Agency stated that an environmental assessment (or EA) was required and instructions describing the expected content of this report were sent to PSPC. Consultations took place, as required by the *Canadian Environmental Assessment Act*. The Impact Assessment Agency of Canada (IAAC, formerly the Canadian Environmental Assessment Agency) is the government authority responsible for the federal environmental procedure. The Project (under CEAA 2012) has been selected by IAAC to be a pilot for the new IAAC 2020, although it is not subject to it. This pilot project is specifically aimed at involving Indigenous groups in the preparation of the environmental impact statement (EIS) and also in preparing the Environmental Assessment Report with IAAC. PSPC engaged and financially supported each Indigenous groups' participation in the preparing the EIS.

Given that the Project encroaches in fish habitats, an application for authorization in accordance with paragraph 35(2) of the *Fisheries Act* (RSC (1985), c. F-14) will be sent to the Department of Fisheries and Oceans Canada (DFO). Approval from Transport Canada (TC) under the *Canadian Navigable Waters Act* (R.S.C., 1985, c. N-22)) will also be required. Indigenous groups will be consulted by DFO and TC in the preparation of these two authorizations.

Some regional (MRC) and municipal (Thorne and Temiscaming) authorizations may also be required. In general, the contractor is responsible for identifying and obtaining the required authorizations, based on construction method specifications.

[1] The Ottawa River, otherwise known as the Big River, has also be referred in the Algonquin language as “Kichi-Sibi”, “Kichissippi”, “Kitchissippi” and “Kichisippi”.

PSPC is also committed to implementing its Departmental Sustainable Development Strategy in response made from the Federal Sustainable Development Strategy and from the Greening Government Strategy and specific actions under the Greening Government goal will be apply to the Project.

Furthermore, PSPC planned activities under its property and infrastructure core responsibility support Canada's efforts to address the United Nations 2030 agenda and the sustainable development goals (SDGs).

This project has also expectation to leverage the participation of the Indigenous businesses in the federal procurement and advance socio-economic benefits in support of the Government of Canada's reconciliation agenda. Also, the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which the Government of Canada has endorsed and enacted, including the principle of free, prior and informed consent have guided the consultation activities using a collaborative, nation-to-nation approach throughout the preparation of the EIS.

2 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

Aside from the location used to rebuild the existing dam, there are no alternatives for the other Project components. The road's location depends on the dam relocation option, since the road must be built on the dam to avoid further encroachment, to meet the road design criteria (including the minimum curve radius) and because the options are limited by the available space. The same applies to the power line that must follow the road. With respect to the Énergir natural gas line that is currently attached to the dam, Énergir determined that the pipe will be attached to the new, rebuilt dam.

The location of the temporary cofferdam during construction also depends on the option selected and is determined based on the space required by the contractor to perform the work. The contractor is free to choose the method (blasting, if required, will be limited to what is strictly necessary) used to demolish the existing dam. Demolition will likely be carried out using jackhammers, which were used in the reconstruction of the Ontario side of the dam. The temporary access roads depend on the location of the cofferdam to ensure that the contractor can access the dried work area.

All three dam location options include the creation of a fishway across the dam (which is currently not passable by fish on either the Quebec or Ontario side). The construction of this fishway near the dam on the Quebec side is one of the conditions of the authorization from DFO for the recent reconstruction of the dam on the Ontario side. The Quebec side of the river is technically more feasible than the Ontario side for the fishway because it is narrower and deeper which encourages fish to swim toward the fish passage. DFO's authorization for the Ontario dam is specifically for the construction of an eel ladder. During consultations with Indigenous communities, some of them proposed a migration passage to enable other fish species to pass through, including lake sturgeon. However, Antoine Nation expressed strong reservations about the installation of a multi-species fish passage because of uncertainty, lack of scientific data on the impact on fish populations upstream and downstream from the dam, and the resulting impact on their fishing rights. In light of these concerns, PSPC has proposed four options that will need to be discussed further with DFO experts and Indigenous communities before an option is selected:

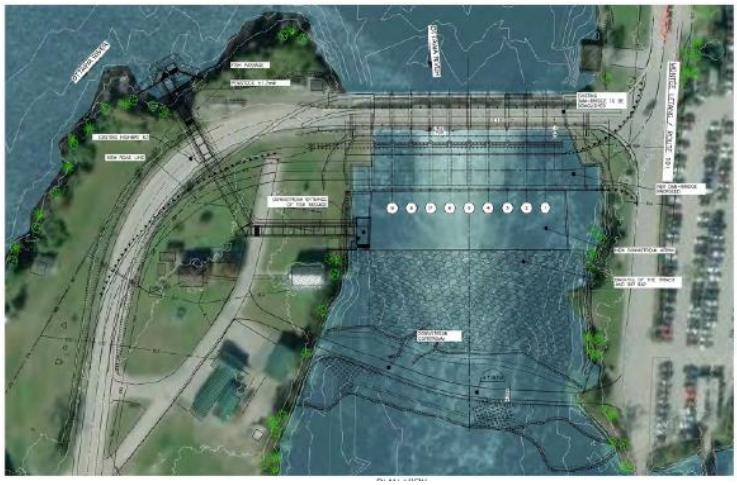
- A passage for eel only (as mentioned in DFO's authorization for the Ontario dam) (example on the right photo);
- A multi-species fish passage (example on the left photo);
- No fish passage;
- Delaying the construction of a potential fish passage until a more detailed impact assessment has been carried out as part of a Fisheries Management Plan for the Ottawa River.

In summary, since this requirement was taken from DFO's authorization for the Ontario dam, Indigenous groups and DFO experts will be stakeholders in the DFO's authorization process for the Quebec dam. These stakeholders will help analyze the merits of these four options and, if necessary, design a fish passage that meets the requirements of the various targeted fish species.

Three options were considered for the replacement of the dam:

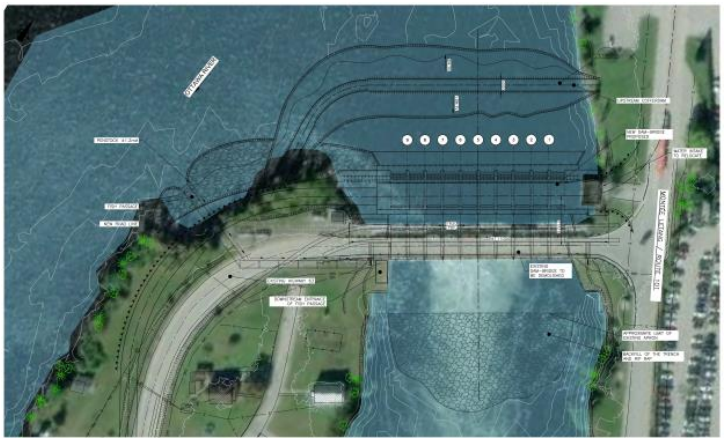
<u>Option 1</u>: Construction of a new dam downstream of the existing dam and demolition of the existing dam

This option consists in building a new dam approximately 19 m downstream of the existing structure or 25 m between the downstream faces of the future dam and the existing dam. Construction would require the extension of the downstream apron and the installation of some riprap materials as well as the installation of a temporary cofferdam downstream, approximately 70 m from the existing dam.



<u>Option 2</u>: Construction of a new dam upstream of the existing dam and demolition of the existing dam

This option consists in building a new dam approximately 19 m upstream of the existing structure or 25 m between the downstream faces of the future dam and the existing dam. Construction would require a 20-meter extension of the existing apron and a temporary cofferdam 70 m upstream of the existing structure.



<u>Option 3</u>: Reconstruction of the dam based on the same layout as the existing dam and demolition of the existing dam

This option consists in rebuilding the dam on the same layout as the existing dam. Construction would require building a temporary cofferdam 80 m downstream of the existing dam.

The main differences between the three options are:

Option 1 (downstream of the current dam) respects the Project schedule which was established to mitigate the impacts on the water management during critical periods such as the spring freshet. It is identical to the solution implemented on the Ontario side. Though it is slightly more expensive than Option 3, it involves the least number of risks, and does not impact vehicle traffic on the dam. It is also the most feasible option in terms of constructability. It addresses the critical risks and non-compliance code issues.

Option 2 (upstream of the current dam) also respects the Project schedule. However, it involves significant risks in terms of timeline and cost due to the presence of the Rayonier pumping station, which interferes with the layout of the new dam. All interventions at the pumping station would have to be carried out prior to the construction of the new dam. This option is the most expensive.

Option 3 (same location as the existing dam) has significant disadvantages. Though it involves the lowest cost, this option does not respect the Project schedule set out in the Project brief, since the work period would be extended and would impact the regular operation of the dam for which in turn could impact the management of the spring freshet or a potential flooding event. Furthermore, implementing this option would have a significant impact on vehicle traffic on the dam during the performance of the work. The main advantage is that it has the less loss of fish habitat (11,153 m^2 compared to 12,361 for option 1 and 13,315 for option 2). The reconstruction of the dam is much more risky as many risks are unknown and more significant than for a new construction.

The comparison based on the potential effects indicates that there is little discrepancy among the three options in terms of interactions between Project elements and Valued Components (VCs). Option 2 stands out because of a few additional potentially negative interactions due to the installation of an upstream cofferdam, which would threaten the Rayonier water intake for fire prevention, as well as the archaeological potential on the left bank of the Ottawa River. Option 3 is distinguished by additional potentially negative interactions due to the greatest restriction to road traffic during the performance of the work.

From a techno-economic point of view, Option 3 must be eliminated due to several significant construction risks. Option 2 must also be eliminated due to the technical complexity of building a cofferdam upstream of the work site, as well as the presence of a water intake where the left bank abutment should be located. As such, Option 1 is PSPC's preferred option for the replacement of the Timiskaming Quebec Dam: construction of a new dam downstream of the existing dam. It should be noted that the status quo option is not viable, as the current dam has reached the end of its service life, and must be rebuilt to continue its functions of flood management and navigation maintenance.

Options	Key advantages	Key disadvantages
1	• Road traffic maintained. • Totally new structure. • Most feasible option in terms of constructability and addresses the critical risks and non compliance code issues.	• Requires downstream apron extension. • Impact on Section 35 Aboriginal Fisheries.
2	• Road traffic maintained. • Totally new structure.	• Highest cost. • Relocation of the Rayonier water intake. • Relocation of the steam system. • Largest upstream cofferdam. • Embankment upstream of Long Sault Island. • Impact on Section 35 Aboriginal Fisheries.
3	• Minimal impact on road layout. • Less total loss of fish habitat. • Lowest cost. • Greater protection of Section 35 Aboriginal Fisheries.	• Alternating traffic for 17 months. • Temporary relocation of the gas line. • Higher unknown risk.

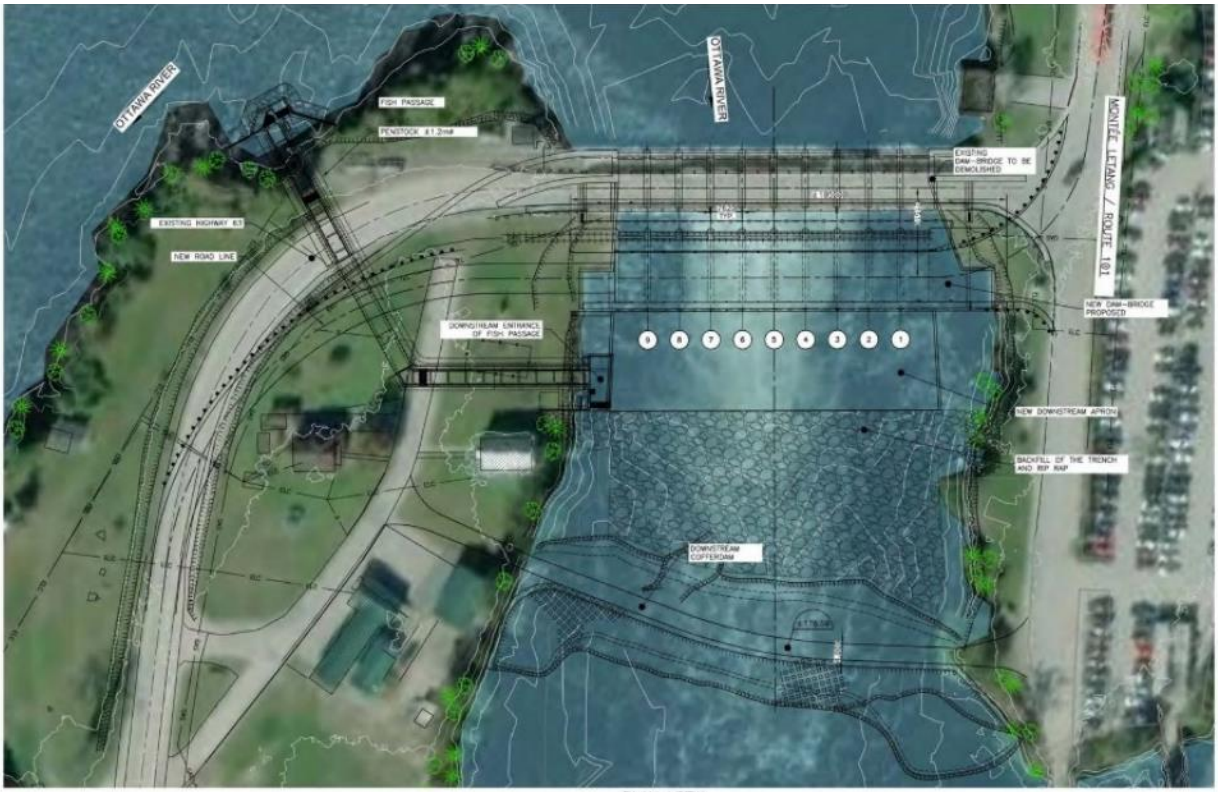
Table 2.1 Options Compared – Advantages and Disadvantages

Issues	Criteria	Option 1 - Downstream		Rating	Option 2 - Upstream	Rating	Option 3 – Current layout	Rating
Environmental	Contaminated site	No impact, work outside contaminated site.			No impact, work outside contaminated site.		No impact, work outside contaminated site.	
	Fish habitat	Loss of fish habitat of 12,361 m^2; temporary loss of 3,907 m^2; permanent loss of 8,454 m^2.			Loss of fish habitat of 13,315 m^2; temporary loss of 5,921 m^2; permanent loss of 7,394 m^2.		Loss of fish habitat of 11,153 m^2; temporary loss of 7,582 m^2; permanent loss of 3,571 m^2	
	Fish passage	Requires further study.			Requires further study.		Requires further study.	
	Residual materials	High volume (cofferdam and dam demolition).			Very high volume (longer cofferdam and dam demolition).		Lower volume (cofferdam and a portion of the dam).	
		Concrete/asphalt.	7,075 m^3.		7,204 m^3.		2,290 m^3.	
		Metals.	40,000 kg.		40,000 kg.		32,000 kg.	
		Granular materials.	9,695 m^3.		15,695 m^3.		9,695 m^3.	
	Limited in-water work	Significant impact.			Significant impact.		Moderate impact.	
Economic	Estimated construction cost, Class D, to start in 2019	Intermediate among the three options ($56 M)			Highest ($58 M)		Lowest ($54 M)	
	Indirect costs				Displacement of the Rayonier water intake.			
	Risk costs	Lowest			Highest		Intermediate among the three options	
Societal	Maintenance of mobility	Maintenance at all times at full capacity.			Maintenance at all times at full capacity.		Limited maintenance with alternating traffic.	
	Tourism and recreation	Loss of one spawning season.			Limited impact.		Loss of one spawning season; travel made more complex by alternating traffic.	
	Archaeology	Cofferdam near vestiges of the original dam.			Cofferdam near possible vestiges on the Quebec side.		Cofferdam near vestiges of the original dam.	
	Nuisances	Negligible impact.			Negligible impact.		Negligible impact.	
	Timeline	Substantial completion by November 2027.			Substantial completion by December 2027.		Substantial completion by August 2028.	
	PSPC operations	No impact.			No impact.		Moderate impact.	
Technical	Hydraulic regime							
	Evacuation capacity	Same as current.			Same as current.		Same as current.	
	Flow management during work							
	Phase 1	100% manageable on the Ontario side.			100% manageable on the Ontario side.		100% manageable on the Ontario side.	
	Phase 2	100% manageable on the Ontario side and 50% on the Quebec side.			100% manageable on the Ontario side and 50% on the Quebec side.		100% manageable on the Ontario side and 50% on the Quebec side.	
	Geotechnical	Infiltration control required.			Infiltration control required.		Infiltration control not required.	
	Road infrastructure							
	Road configuration	Moderate impact.			High impact.		Low impact.	
	Traffic	Maintained on existing structure.			Maintained on existing structure.		Alternating for 17 months.	
	Natural gas line	Relocation upon completion of work.			Relocation upon completion of work.		Two relocations planned.	
	Demolition	Partial on downstream apron and existing dam.			Existing dam.		Upstream end of existing piles.	
	Operation and commissioning	Low impact.			Low impact.		Moderate impact.	
	Design and regulatory requirements	Full implementation.			Full implementation.		Full implementation, but certain constraints possible for the existing structure.	
	Land acquisition	Moderate encroachment on Rayonier property.			Significant encroachment on Rayonier property.		Low encroachment on Rayonier property.	
	Service life	Meets 75-year objective.			Meets 75-year objective.		Meets 75-year objective.	
	Risks	Known (similar to Ontario dam).			Less known.		Less known and more significant than for a new construction.	
	Possibility of adding lift gates	Easy.			Easy.		Possible.	
Total								

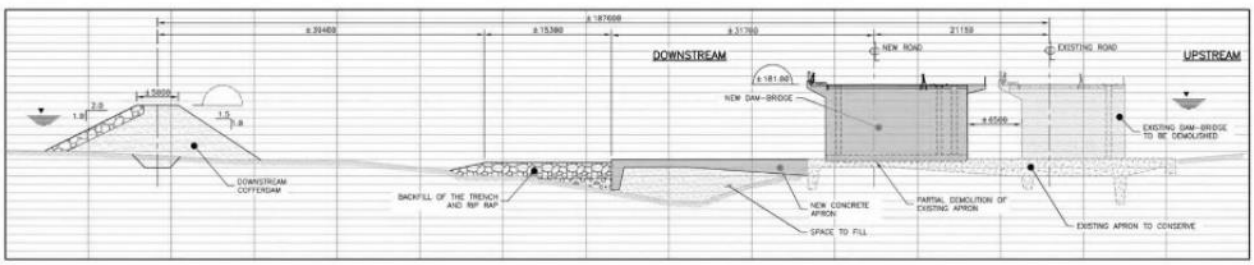
3 PROJECT OVERVIEW

PSPC's preferred option is to build a new structure downstream of the existing dam, with a distance of 19 m downstream of the existing dam or 25 m between the downstream faces of the future dam and the existing dam. Its features will be identical to that of the existing dam, i.e., it will be a water level regulation structure without hydropower generation capabilities complete with a roadway that will link the provinces of Quebec and Ontario.

From a technical point of view, the structure will be 75 meters long and will feature ten bays equipped with vertical sluice gates. The roadway will consist of two traffic lanes and a sidewalk (which will also allow for snowmobile traffic), and the existing Routes 101 and 63 will be realigned slightly to connect to this new roadway. There will be no bike path but a sidewalk will be built along the edge, as it is now. The roads will be lit as they are now, according to departmental standards, and winter maintenance will also be done as it is now. An agreement was reached for the current dam, in which the duties and responsibilities of PSPC and the Ontario and Quebec ministries of transportation in relation to the work and maintenance of the road and approaches thereto are defined. A similar agreement should be drawn up for the new dam. The road's drainage system will be rebuilt so that it is similar to the existing drainage system and has stormwater pipes that release water into the river immediately downstream from the dam. Settling ponds will be built along the road to trap suspended solids before the water is discharged into the river.



PLAN VIEW



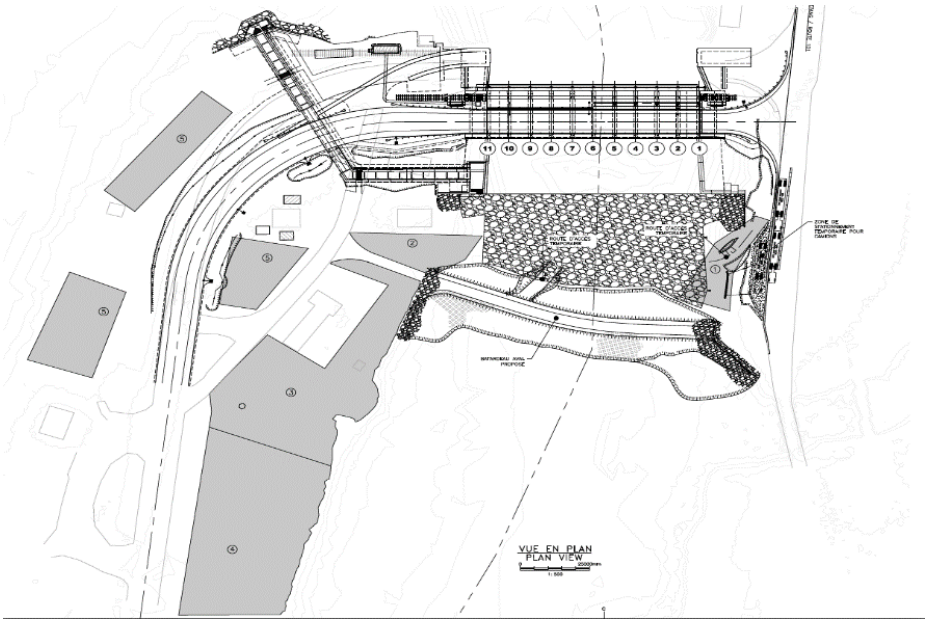
The natural gas line will be reinstalled on the new structure (attached to the dam) and then connected to the pipe that runs along the existing road. The pipes for power and telephone cables will be rebuilt under the roadway and will connect to pipes on either side of the roadway. Énergir is responsible for installing its pipes. Hydro-Québec and Bell Canada are responsible for their respective power and telephone lines.

A fish passage could be added to allow the free passage of fish through the structure. Finally, an audible and stroboscopic alarm is planned. The alarm must be activated by the operator before a sluice is operated, particularly when opening it, to alert people who may be on the shore or on the water downstream.

No technical changes were made to the Project from the original proposal, other than developing the four options for the fish passage. The changes were primarily related to the addition of mitigation or optimization measures to reduce impacts on some VCs, as well as improvements to the monitoring and follow-up program.

No innovations have been considered for this Project. For dams, PSPC can only source a developed, tried and proven technology to ensure the safety, durability and reliability of the infrastructure. However, the use of materials such as low-carbon concrete is explored, but no compromises can be made with regards to the three above-stated principles. Yet not too many studies or researches exist to prove that.

Temporary facilities (in grey below) will be mainly located on Long Sault Island (6 297 m^2) but also on the left band (2 156 m^2). If blasting is required for the demolition of the existing dam, blasting equipment would be temporarily stored in those grey areas and will be brought in as needed. Vegetation will be replaced by granular material for traffic purposes. Safety fence will be installed around the working areas. Those areas will be restored at the end, in collaboration with Indigenous groups. Appropriate signage will be installed to ensure the safety of the road and all pedestrians, cyclists, snowmobilers or all-terrain vehicle riders who travel through the area and will continue to do so during construction.



Construction will last 30 months. Between 10 to 50 workers will be at the construction site based on the various construction phases. Since the contractor has yet to be selected, it is difficult to determine where the workers (if they are not local) will be accommodated. For the Ontario dam, the contractor, who was not local, rented homes near the site to accommodate employees.

Regional economic benefits are anticipated during the construction period. Depending on the contractor selected, its employees will use services available in the region (restaurants, lodging, etc.), which will result in local businesses being positively impacted. A component will also be included in the tender documents of the contractor's construction contract to encourage the participation of Indigenous groups involved in the

Project in the construction work. This could take the form of specific measures to hire Indigenous labour on the site, training or awarding contracts to Indigenous companies. In addition, some materials will probably come from the Abitibi-Témiscamingue region, thus leading to further positive impacts to the region. In social terms, the reconstruction of the dam will maintain the role in flood management, boating and other recreational uses of the water body upstream.

The four phases of the construction and the water management during those are described on the next page. Fish rescue activities will be undertaken at certain phases and the beginning of in-water work will be scheduled according to the water temperature to minimize impacts of the spawning period.

The main materials required for the construction of the new dam are concrete and granular materials of various diameters. Granular material is also required for the Phase 1 cofferdam. The amounts of material required are as follows:

- Concrete: approximately 12,000 m^3;
- Backfill materials: approximately 45,000 m^3;
- Cofferdam materials: approximately 10,000 m^3.

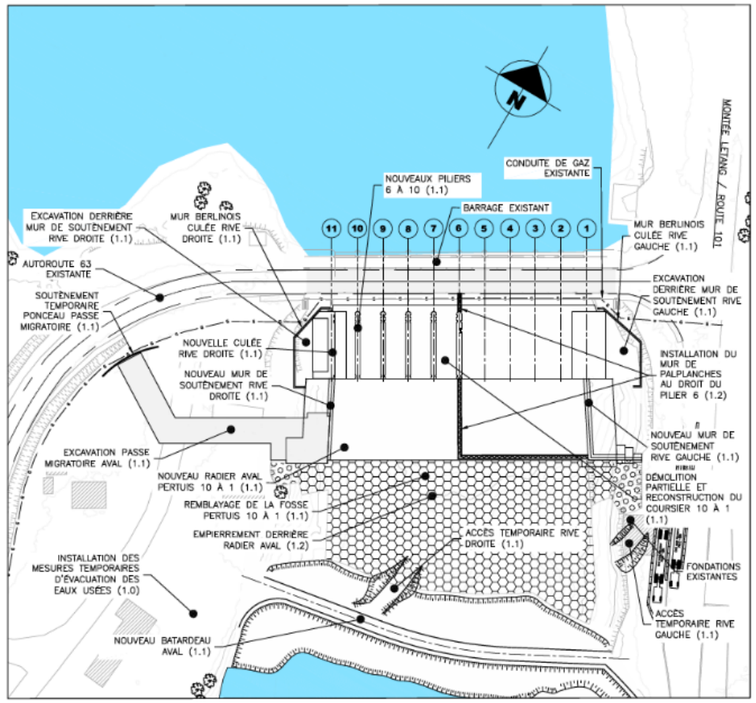
In the context of a project of this scale, construction, renovation and demolition (CRD) waste must be managed in accordance with the national protocol on the management of non-hazardous CRD waste. A CRD management plan favoring reuse and recycling will be established for the Project to avoid burial in landfill sites as much as possible.

The contractor is responsible for supplying concrete, so its source is currently unknown. PSPC will include incentive clauses in the contract to reduce GHG emissions and will explore options for carbon neutrality for this Project. The contractor may choose to install a mobile concrete plant on or near the site to reduce project emissions. The other types of materials will come from existing regional quarries and sand pits, as selected by the contractor. The project does not require new borrow pits. The contractor must select quarries and sand pits that have all of the required environmental authorizations. The material from these quarries and sand pits must be clean and uncontaminated.

The new dam’s minimum useful life is 75 years. The dam will be operated to fulfill its purpose to regulate the water of the Ottawa River in conjunction with the Timiskaming Dam Complex’s Ontario Dam. The management of the water levels in Lake Timiskaming will remain identical to current management. There is a possibility that the DFO will request some upgrades or optimizations to favour fish spawning, among others, achieved by alternating the opening of the gates, similarly to the provisions included in the application for authorization for the Ontario Dam. This specific management will be discussed with the DFO but it will not change the overall management of the water levels.

The main constraint will be to guarantee adequate maintenance to keep the dam in running order. During its 75 years of operation, upgrading the structure to integrate technological changes and account for the evolution of best practices, as well as economic, environmental and social changes will be necessary. The dam and road will need to be inspected and maintained for the structure’s entire useful life (road resurfacing, concrete repairs, mechanical sluice gate repairs, if required, etc.). PSPC will ensure the dam’s maintenance, as it is the case now.

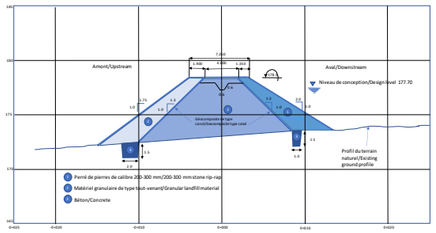
Currently, there is no plan for the dismantling of the new dam. At this stage of the Project, it is difficult to anticipate the decisions that will be made in terms of management for this structure for a 75-year horizon, until 2104. If applicable, the authorities will decide if the dam will have to be replaced, simply dismantled or if it's useful life will be extended. Environmental authorizations will be requested in accordance with the regulation in force in 2104. As well, PSPC will consult with Indigenous groups during the permitting process.

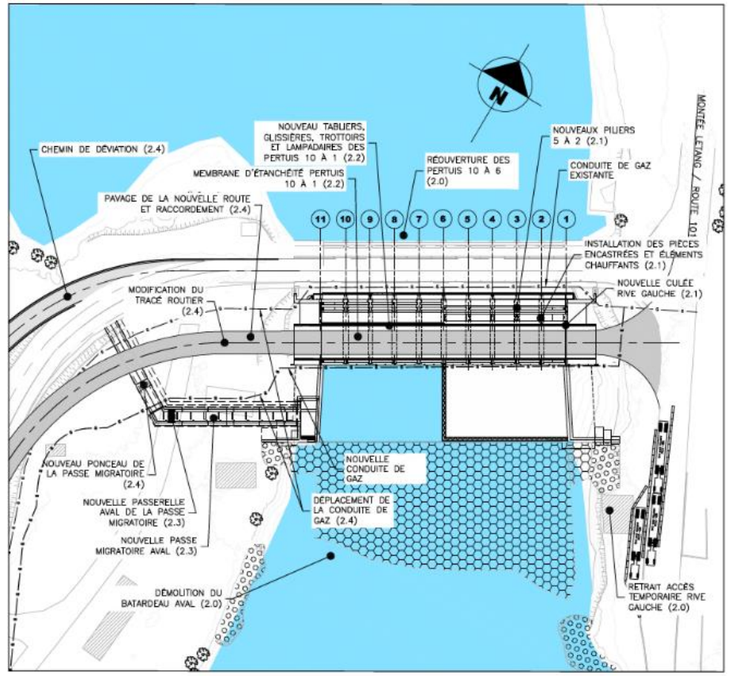


Phase 1 – Mid-July to December - First year

Quebec Dam will be completely closed for 6 months.
Water only managed through the Ontario Dam.
Outside the spring freshet and the spawning period.

Installation of the turbidity curtain around mid-July (10-day period following a temperature of 18°C which should be approximately mid-July) and fish rescue.
Construction of the cofferdam after fish rescue and before early October.
Before the end of December, demolition of the cofferdam.

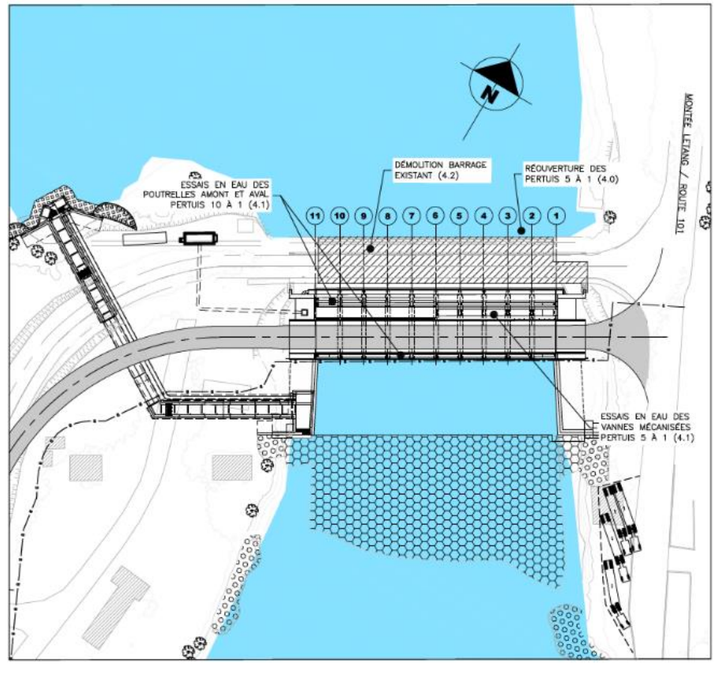




Phases 2 and 3 – January to December – second year

Quebec Dam will be half-closed for 11 months;
Water managed through the Ontario Dam and the half of Quebec Dam.
Occur during one spring freshet and spawning area.

Sheet pile wall removed in December (installation of a turbidity curtain if possible).



Phase 4 – January to October – 3rd year

In January and February, testing of the mechanical sluice gates, and then demobilization of the contractor.
Between March to May, the old and new dams fully opened during the spring freshet and spawning period.
In July, remobilization of the contractor.

Closing of the new dam and installation of a turbidity curtain upstream around mid-July (10-day period following a temperature of 18°C) and fish rescue.
Demolition of the old dam, until the end of September.

4 ENGAGEMENT WITH INDIGENOUS PEOPLES

Consultation with Indigenous groups is a requirement for EAs conducted pursuant to CEAA 2012. The Crown, as represented by the IAAC, retains the duty to consult with Indigenous groups and to determine the depth of consultation required to identify any potential impacts to Indigenous Peoples and their rights from the Project. Further, if impacts cannot be mitigated, the Agency has the duty to accommodate. PSPC was responsible for the procedural aspects of consultation with Indigenous groups during the preparation of the EIS. Funding was provided by PSPC for all consultation activities which were based on a collaborative, nation-to-nation approach.

Throughout the consultations, PSPC acknowledged the Indigenous groups' interests in being more involved in informing Ottawa River management through the Ottawa River Regulation Planning Board, the Ottawa River Regulating Committee, and the Ottawa River Regulation Secretariat. PSPC advised that the authority to change the governance structure lies with Environment and Climate Change Canada and invited Indigenous groups to engage directly with this federal agency to discuss this issue.

Indigenous Groups Consulted on the Project

The Indigenous groups to be consulted on the Project were identified in the EIS Guidelines. These included Kebaowek First Nation (KFN), Wolf Lake First Nation (WLFN), and Timiskaming First Nation (TFN); the Algonquins of Ontario (AOO) representing Algonquins of Pikwàkanagàn First Nation (AOPFN), Mattawa/North Bay First Nation, and Antoine Nation (AN); Métis Nation of Ontario (MNO) representing Mattawa Métis Council, North Bay Métis Council, and Temiskaming Métis Community Council; and Nipissing First Nation. AOPFN and AN later decided to pursue direct consultation rather than being represented by the AOO. Nipissing First Nation advised that the "*Temiskaming Dam Replacement Project falls outside of the Nipissing Historical Territorial lands [and suggested] that Nation's closer to this dam site would be better prepared to answer to their involvement in the project. However, this being said, if there is employment opportunities for Nipissing Nation Members we would like to be included with the acknowledgement of those Nation's closer to the project*" (J. McLeod, personal communication, February 15, 2019).

Consultations evolved throughout the preparation of the EIS and varied as a result of interests and preferences of each Indigenous group. Consultations included discussions about potential environmental, socio-economic, cultural, and rights impacts of the Project. Additionally, consultations informed mitigation, monitoring, and follow-up activities. Funding was provided by PSPC for Indigenous-led environmental, socio-economic and traditional knowledge and land use studies and for technical reviews of early drafts of the EIS and technical studies.

As part of the consultation process, Indigenous groups were also provided opportunities to comment on the Project Description, draft EIS Guidelines, and both the Preliminary Draft EIS and Final Draft EIS prior to the EIS submission to the Agency.

Planned Activities to Consult Indigenous Groups

Indigenous groups will be invited to provide feedback on the EIS once it is submitted to the Agency for review. Addendums to support the impact assessment may be accepted from Indigenous groups following submission of the EIS to the Agency at the Agency's discretion. The Agency will publish the EIS on its website to provide opportunities for Indigenous groups to review and comment.

4.1 Consultation with the Statement of Assertion of Rights and Title (SART) Communities of Kebaowek First Nation (KFN), Timiskaming First Nation (TFN), and Wolf Lake First Nation (WLFN)

Based on proximity to the Project, several First Nations, including Kebaowek and Wolf Lake First Nations, were provided initial notification of the Project in 2016. In the spring of 2017, these First Nations were advised an Environmental Effects Evaluation (EEE) was being completed and asked for information on treaty rights and traditional activities. In 2018, the Agency designated the Project and commenced an EA. Indigenous groups had the opportunity to comment on the Project Description and the draft EIS Guidelines and several changes were included in the final EIS Guidelines as a result.

To honour the request for a strengthened nation-to-nation relationship, PSPC negotiated a process agreement with the Statement of Assertion of Rights and Title (SART) communities of KFN, TFN, WLFN to establish procedures and funding for consultation activities. Funding also supported technical reviews of studies completed by PSPC and supplementary Indigenous-led studies to expand on baseline data. Consultation planning was ongoing and flexible between 2018 and 2021 accounting for the needs and interests of the community, and later, the COVID-19 context. The SART communities were provided a copy of the fish and turtle survey protocol in January 2021 and provided suggestions on the methodology.

The first meeting with the SART representatives occurred in November 2021. The SART communities were also invited to a site tour with PSPC in the fall of 2021; however, the Nations declined to participate.

Meetings in January and February 2022 were held to review the rights-based assessment approach and to receive updates on the SART communities' socio-economic impact assessment, land use and occupancy study, vegetation study, and archaeological work. The SART communities indicated support for using UNDRIP as the basis for the rights-based assessment. At this time, the SART communities also advised species at risk studies of sturgeon were planned for the summer of 2022 and that the Agency had been made aware of the timing and would accept technical reports outside of the current EIS submission schedule. A bat survey was also planned for the peak nesting period. The SART communities advised a confirmed list of VCs and the baseline sections would be provided to PSPC for inclusion in the EIS.

Between March and May 2022, the Indigenous groups were provided 45 days to review the Preliminary Draft EIS. A follow up meeting was scheduled in April but was cancelled by the SART communities. In May, the SART provided comments on the Preliminary Draft EIS. PSPC revised applicable sections and shared the Final Draft EIS for review and comment in June 2022. Additional comments were included in the EIS submission to the Agency. Section 13.1 which was authored by the SART was included in the September 2022 version for submission to the Agency. Additional information will be included in this section and a revised Section 13.1 is expected by mid-March 2023. uUpon reception, Section 13.1 will be integrated into the EIS for re-submission to the Agency.

Summary of the SART Communities' Key Issues and Concerns

The SART communities chose to author their own section in the EIS and to conduct their own studies to enhance the data available to support the EIS. It was inferred from the topics identified for further investigation that impacts to water, including contaminants, flow rates, and related ecosystem services were of concern. Issues related to the fish studies and methods were identified and included requests to support the development and execution of future Algonquin-led fish studies. Interest in participating in the fish passage selection process was also indicated. Concerns were noted about the well-being of land-based wildlife, birds, and species at risk, including bats; associated mitigations would be provided by the SART communities. Vegetation was also a noted area of interest with concerns related to maintaining access to plants for food, medicine, and ecosystem services, as well as possible opportunities for soil remediation using plants and fungi. Expanding the baseline of socio-economic conditions and the potential for economic development on Long Sault Island, were also noted. Indigenous rights related to land and water use, occupancy, knowledge, stewardship, fishing, trapping, and burial sites were identified as concerns. Similarly, an interest in reviewing the archaeological studies and expanding the study area to include Gordon Creek was noted. Finally, cumulative effects on the Ottawa River and historic cultural and industrial impacts were also issues identified by the SART communities.

4.2 CONSULTATION WITH ANTOINE NATION (AN)

In July of 2016, several First Nations, based on their proximity to the Project, were provided informal notice of the Project, including the Algonquins of Ontario (AOO), which was representing AN at the time. In April 2017, the AOO was formally notified of the Project and advised an EEE was being completed. In 2018, the Agency designated the Project and commenced an EA. Indigenous groups had the opportunity to comment on the Project Description and the draft EIS Guidelines and several changes were made to the final EIS Guidelines as a result, including listing AN as "*Indigenous Peoples expected to be most affected by the project*".

AN collaborated with PSPC to create, and when needed, to update a work plan and budget that would facilitate community engagement activities during the preparation of the EIS. AN worked with an independent technical advisor (I.D. Nor) and a consultant retained by PSPC (Odonaterra) to conduct health and socio-economic studies and an Algonquin Knowledge and Land Use Study (AKLUS). The AN work plan outlined 12 monthly, topic-specific, information-sharing meetings between April 2021 and May 2022 with internal representatives and PSPC. An additional three community meetings and a site tour were also included.

Several internal meetings were held between June and September 2021 to provide an overview of the Project and to discuss various topics of interest, including hydrology, fish and fish habitat, and the Algonquin AKLUS. The first community meeting occurred in July 2021 to provide the membership with a summary of the construction activities, outline the socio-economic and rights-based studies and the AKLUS, and support a discussion of the Project. I.D. Nor established a website specific to the Project for AN to publish updates for and gather feedback from its membership. An online survey was open from July 15 to October 1, 2021, to collect community member feedback on the Project.

In September 2021, approximately 25 AN members participated in a site tour to view the Timiskaming Dam Complex and adjacent areas and to ask questions and share concerns. In November 2021, meetings were held to discuss baseline health and socio-economic information and the related impact assessment, and to provide community members an update on the Project and another opportunity to discuss concerns. In December 2021, committee members met with PSPC to review the impact assessment method, including the rights assessment framework. DFO declined to participate in this meeting to the dismay of AN representatives.

Antoine Site Tour – September 2021

A follow up meeting was held on January 11, 2022 to review the rights-based assessment in more detail, including confirming the rights indicators and impact severity. Options for the fish passage were also discussed. On January 25, 2022, a committee meeting reviewed specific rights assessments, including potential Project pathways, effects, and enhancement and mitigation measures.

Between March and May 2022, the Indigenous groups were provided 45 days to review the Preliminary Draft EIS. Overall, AN indicated that the Preliminary Draft EIS accurately captured the consultation process and the interests and concerns expressed. AN reiterated concerns about lack of consultation by DFO on the fish passage and its potential impacts, while noting appreciation for PSPC's willingness to collaborate on post-construction fisheries and environmental monitoring. AN requested further acknowledgement for historical impacts and the lack of consultation or compensation on earlier projects. Finally, it was requested that a summary of AN rights be included to reflect that impacts should be associated with specific UNDRIP rights, that the fish passage requires further consultation to reduce lasting impacts to fishing, and to acknowledge that the consultation process met the right to be consulted and established a precedent for future projects.

PSPC revised applicable sections and shared the Final Draft EIS for review and comment in June 2022. Additional comments were included in the EIS submission to the Agency.

Summary of Antoine Nation Key Issues and Concerns

Concerns were related to water quality and waterway obstructions, including potential impacts of changing flow rates and the possibility of contaminants entering the water during dam construction and demolition. Fish and the potential fish passage were also noted as concerns, with AN expressing a need for DFO to conduct meaningful consultation on fisheries and to determine the potential impacts on fishing rights from the proposed fish passage. Concerns about socio-economic conditions including employment, training, and transportation were highlighted. Indigenous rights were also an area of interest, including the consultation process, the potential for artefacts found during construction to be removed from the region, and impacts to traditional land use. Environmental management and monitoring and cumulative effects of projects along the Ottawa River were also noted concerns.

4.3 Consultation with the Algonquins of Ontario (AOO)

The AOO were notified of the Project in 2016 and in the spring of 2017, and responded to indicate interest in the archaeological studies in progress. Initial meetings occurred in July and October of 2017. In 2018, the Agency advised the AOO of the Project Description and requested comments and identification of potential environmental effects. Given the Project Description, the potential for adverse environmental impacts, and comments received from the public and Indigenous groups the Agency designated the Project and commenced an IAAC-led EA. The AOO had the opportunity to comment on the draft EIS Guidelines and several changes were made to the final EIS Guidelines as a result. These revisions included assessing potential impacts to fish and fisheries, adding the fish passage to the list of Project components, defining spatial and temporal boundaries based on Indigenous land and resource use for traditional purposes, and listing AOO, AOPFN, AN, and Mattawa/North Bay First Nation as Indigenous Peoples expected to be most affected by the Project.

A Project consultation and accommodation protocol was negotiated between the AOO and PSPC and approved in April 2019 to support consultation and participation of the AOO during the preparation of the EIS. The protocol included funding for a Community Liaison Officer (CLO); however, the position went unfilled and related responsibilities fell to the AOO and PSPC technical consultants. A supporting work plan and budget were developed to facilitate community engagement to identify and verify valued components (VCs), develop an AKLUS, complete technical reviews of EIS documents, and negotiate an Indigenous Participation Plan (IPP).

Preliminary consultation planning meetings started in January 2019 at which time it was noted that additional targeted consultations might be required with AOPFN, AN, and Mattawa/North Bay First Nations.

Regular meetings with representatives of the AOO and PSPC occurred between November 2020 and September 2021 to implement the focused consultation approach. Meeting topics included health and socio-economic conditions, archaeology, Indigenous rights, fish and fish habitat, surface and groundwater, vegetation, and wildlife, and AKLUS.

The AOO was provided a copy of the fish and turtle survey protocol in January 2021 and several changes were made based on the comments provided, including extending the survey 500 m upstream and focusing on painted and snapping turtles.

A community meeting was hosted in May 2021 to introduce the Project and the AKLUS to members, and to request feedback on identified VCs, potential effects, and assessment methodologies. A complementary survey was also launched online in May 2021 and was extended to the end of September 2021 at the request of the AOO to collect members feedback and concerns. In June 2021, the AOO provided a preliminary list of VCs for inclusion in the EIS.

A site tour in September 2021 provided community members an opportunity to view the Timiskaming Dam Complex and the adjacent study area, ask questions, and provide comments. Despite ongoing efforts by the AOO staff supported by PSPC, participation by Algonquins represented by the AOO was low in the online survey and site tour. In November 2021, the AOO shared its final AKLUS report and final VCs, which PSPC including in the EIS.

At a meeting in February 2022, the AOO suggested that monthly meetings had worked well and should be continued, and PSPC provided an overview of the Preliminary Draft EIS, the review process, and timelines. Additionally, PSPC noted that the IAAC would consult with each community after the EIS is submitted. PSPC advised that the AOO would need to determine whether it would like to conduct the rights assessment with PSPC as part of the EIS development or complete it with the Agency once the EIS has been submitted.

Between March and May 2022, the Indigenous groups were provided 45 days to review the Preliminary Draft EIS. Overall, the EIS was noted to have advanced avoidance and mitigation measures to address potential impacts of the Project; however, several recommendations were provided to reflect Algonquin rights and interests. These AOO comments related to the geological and hydrogeological, surface water, aquatic, and terrestrial environments, human and ecological health, socio-economic conditions and community well-being, Algonquin history, knowledge, and land use, archaeological and cultural heritage resources.

PSPC revised applicable sections and shared the Final Draft EIS for review and comment in June 2022. Additional comments were included in the EIS submission to the Agency.

Summary of AOO Key Issues and Concerns

Fish, fish habitats, and fish spawning grounds were of concern with key species of interest identified as American eel, lake sturgeon, walleye, bass, yellow perch, northern pike, and lake trout, as well as freshwater mussels. Fish monitoring was also of interest. Wildlife was similarly important, with amphibians, reptiles, birds, monarch butterflies, and species at risk noted as issues of concern, along with the potential impacts to these species of contaminated water or air, and noise. Vegetation and the impacts of potential flooding or pollutants to riparian plants and medicine species were noted concerns.

Socio-economic conditions, especially capacity-building through training and employment, business opportunities associated with the Project and potential impacts to community health and well-being were of interest to the AOO.

Impacts to Algonquin Aboriginal rights and interests were identified as concerns, including potential adverse effects on valued relationships with the Ottawa River, Long Sault Island, archeological resources, and culturally important wildlife, bird, and plant species. The AOO expressed a belief that meaningful consultation and accommodation, respectful of inherent rights, would support a more environmentally and socially responsible project and enable the identification and mitigation of potential effects.

Concerns about the cumulative effects of past development on the Ottawa River and adjacent resource extraction on lands and waters the AOO relies on for well-being were noted. A lack of consultation on these projects and the impacts of colonization on the AOO way of life were also identified concerns.

4.4 CONSULTATION WITH ALGONQUINS OF PIKWÀKANAGÀN FIRST NATION (AOPFN)

In July of 2016, several First Nations, based on their proximity to the Project, were provided informal notice of the Project, including the AOO, which was representing AOPFN at the time. In April 2017, the AOO was formally notified of the Project and advised an EEE was being completed. In 2018, the Agency designated the Project and commenced a federal EA. Indigenous groups had the opportunity to comment on the Project Description and the draft EIS Guidelines and several changes were made to the final EIS Guidelines as a result, including listing AOPFN as "*Indigenous Peoples expected to be most affected by the project*". No comments were provided directly by the AOPFN on the Draft EIS Guidelines.

Following the decision in September 2019 to be consulted independently from the AOO, an initial meeting was held in October 2019 to discuss the Project and community consultation activities related to the EIS. A work plan and a budget for consultation activities were prepared collaboratively between AOPFN and PSPC, including monthly, topic-specific meetings. Funding was included to support hiring a community liaison, managing project administration, hosting community meetings, developing an AKLUS, and completing cumulative effects analysis and technical reviews of background studies and EIS documents.

In November 2019, three in-community meetings were held to gather information on AOPFN health and socio-economic conditions. In December 2019, a meeting occurred with Chief and Council, AOPFN Knowledge Keepers, and community members to introduce the Project and gather initial comments and concerns about its potential impacts.

Several meetings occurred in late 2020 to review the Project Description, reintroduce the Project to AOPFN and review early draft sections of the EIS.

Opportunities to provide comments on the 2021 turtle and fish study protocols and to support fish and turtle monitoring activities were offered to AOPFN by PSPC. However, due to COVID-19 restrictions, participation in the spring 2021 fish and turtle survey was not possible. Further, the fall fish survey was cancelled to address methodological issues identified by other Algonquin communities.

Regular meetings occurred throughout 2021 to review baseline socio-economic and health information, early draft sections of the EIS, alternative means assessment, wildlife, hydrology and fish. Meetings also focused on reviewing the AOPFN-led cumulative effects analysis, the ongoing consultation process, and the AKLUS. A site tour was proposed in September 2021, but was declined by AOPFN due to COVID-19 concerns.

Between March and May 2022, the Indigenous groups were provided 45 days to review the Preliminary Draft EIS. AOPFN provided initial comments in May advising that engagement with AOPFN members on the Preliminary Draft EIS was ongoing. Additional comments focused on concerns related to impact significance ratings, preference for conducting the rights impact assessment with the IAAC, a need for further consultation on alternatives, inadequacy of the baseline socio-economic conditions, and a need for further integration of AOPFN Algonquin knowledge. PSPC removed recommendations and indicators for assessing impacts to AOPFN rights and revised additional sections, as applicable. A site tour, and meetings to review the Preliminary Draft EIS, including impacts to fish and water, and the associated significance ratings, were held in spring 2022. The Final Draft EIS was shared with AOPFN for review and comment in June 2022. Additional comments were included in the EIS submission to the Agency.

Summary of AOPFN Key Issues and Concerns

Water quality, flow rates, and temperature, as well as the potential introduction of chemical or particulate contaminates to surface water during demolition, construction, or operation, were all identified concerns. Fish health, habitats, spawning grounds, and historical baseline populations were also of key interest to AOPFN, in addition to concerns about the fish passage. Potential impacts to wildlife and riparian habitats were issues of note with several species identified for monitoring including the painted turtle, snapping turtle, two-lined salamander, beaver, birds (shoreline, nesting, and migratory), eagle, ducks, and geese. Concerns were also raised about studying and monitoring culturally important plant species, aquatic vegetation, and addressing invasive plant species.

Socio-economic concerns focused on potential economic benefits of the Project, including employment and procurement opportunities for AOPFN. Issues related to Indigenous rights focused on the current use of lands and resources for traditional purposes, lack of consultation on previous projects and on archaeological studies and impacts to fishing rights.

Cumulative effects were also noted concerns, especially lack of consultation on previous projects and failures to compensate for legacy effects, including historical impacts of projects on species, the operation of dams along the Ottawa River, and the potential future impacts of climate change.

4.5 CONSULTATION WITH THE MÉTIS NATION OF ONTARIO (MNO)

The MNO was notified of the Project in 2017 when PSPC advised an EEE was being completed and requested information on Aboriginal and treaty rights. In 2018, the Agency designated the Project and commenced an EA. Indigenous groups had the opportunity to comment on the Project Description and the draft EIS Guidelines. No comments were provided directly by the Métis Nation of Ontario on these documents.

Consultation with the MNO was guided by a Regional Consultation Protocol for the Mattawa/Lake Nipissing Traditional Territory to ensure the regional rights-bearing Métis were effectively consulted through the Regional Consultation Committee (R5CC), and if appropriate, accommodated for impacts to rights. Through an MOU between MNO and PSPC, a process, including consultation funding and a work plan, was established to support community engagement activities related to the Project. Activities included meetings with the R5CC, a technical review of the draft EIS, an independent Métis-led Traditional Knowledge and Land Use Study (TKLUS), and a workshop to determine the communities' VCs.

MNO was provided a copy of the fish and turtle survey protocol in January 2021 and asked to comment on it, and to indicate their interest in participating in the spring survey. No feedback was received.

In April 2021, the work plan was reviewed with the MNO; however, no comments were received following the meeting, nor in various follow up communications with MNO representatives between May and August 2021. Following an email from PSPC on EIS deadlines, a meeting was convened with MNO in November 2021 on submission of the MNO-led studies. These studies were expected at the end of 2021 to be incorporated into the final EIS in 2022.

A meeting between representatives from MNO and PSPC's consultant occurred in January 2022 to discuss next steps for receiving studies, and for engaging the community on the rights-based assessment. A follow up email was sent in February to confirm meeting dates with the R5CC and to request an update on when the TKLUS would be received.

Between March and May 2022, the Indigenous groups were provided 45 days to review the Preliminary Draft EIS. The MNO provided comments in May related to the overall EIS, Métis rights, the biological environment, the physical environment, and potential emergencies. The MNO identified gaps in baseline data and a need for more details on the assessment of impacts and mitigation measures, especially related to water, fish, wildlife, vegetation. PSPC advised availability to collaborate with the MNO on a rights assessment and advised rights could also be discussed directly with the IAAC. PSPC revised applicable sections and shared the Final Draft EIS for review and comment in June 2022. Additional comments were included in the EIS submission to the Agency.

Summary of MNO Key Issues and Concerns

MNO key issues and concerns were centered on fish, the fish passage, and interest in participating in the fish and turtle monitoring surveys. During the review of the Preliminary Draft EIS, the MNO indicated concerns about the Project's potential impacts to Métis rights, way of life, stewardship, access, and well-being. Concerns related to having access to culturally important places and the ability to hunt, trap, fish, and gather in preferred locations. Stewardship of fish and changing economies related to the future availability of resources were also identified as issues based on the comments provided during the MNO review of the Preliminary Draft EIS.

5 ENGAGEMENT WITH THE PUBLIC

The purpose of consulting the public is to identify, address, and manage environmental, cultural, and socio-economic issues related to the Project. The public in this context is defined as any members of the population that have an interest in and/or could be impacted by the Project. This includes local government, landowners, businesses, interest groups, and others. The public is differentiated from Indigenous groups because of the different legal relationship between government and Indigenous groups and the related obligations for consultation.

Activities Undertaken to Consult the Public

A public consultation event was held on June 22, 2017, in the municipality of Temiscaming, during which the public had the opportunity to ask questions and provide opinions about the Project. A presentation provided an overview of the project background, scope, and timelines, as well as the location of the new dam, and the stakeholders to be consulted, excluding Indigenous groups. The presentation also outlined the Environmental Effects Evaluation (EEE) that was underway at the time and public comments were invited.

In June 2017, PSPC also met with representatives from other jurisdictions, including the Ville de Temiscaming, as well as management from the Rayonier Mill, to inform them of the project, planning, and schedules.

No additional public consultations were held at the regional level prior to the Project being added to the Designated Projects list, however, several notices were published in local papers and social media pages, as well as on PSPC's website to provide details of the Project.

PSPC also engaged federal authorities, including DFO, Transport Canada, and Environment and Climate Change Canada. Provincial authorities responsible for the environment, transportation, energy, natural resources, forests, wildlife, and parks have also been contacted.

Public notices and news releases were published by the Agency to the Canadian Impact Assessment Registry between April and August 2018 to inform the public of the Project and seek feedback on the Project Description and the draft EIS Guidelines.

Summary of Key Issues and Responses

The main concerns identified in the June 22, 2017, public engagement session were related to the management of water levels during the construction, water levels being too high and potentially leading to erosion, the location of the new dam, and longer-term regional economic impacts. Local residents were noted as being generally optimistic about the planned construction phase.

Planned Activities to Consult the Public

The public will be invited to provide feedback on the EIS once it is submitted to the Agency for review.

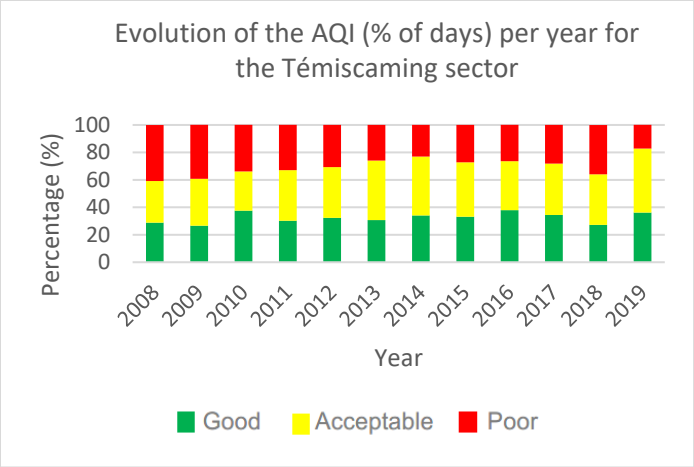
6 SUMMARY OF ENVIRONMENTAL EFFECTS ASSESSMENT

6.1 AIR QUALITY (AIR CONTAMINANTS, GHG)

Description of the Baseline

The Ministère de l'Environnement et de la Lutte contre les changements climatiques (MELCC) data concerning local air quality indicates poor quality between 17% and 41% of the time (based on ozone emissions and fine particulate matter ($PM_{2.5}$)), primarily from emissions from Rayonier. Particulate matter ($PM_{2.5}$) vary from 9 to 13 µg/m^3.

Rayonier plant is the main source of GHG in the study area. However, the emissions have been declining over the last few years.



Anticipated Changes to the Environment

Some components of the Project are likely to result in the emission of air pollutants that could affect air quality (CO, VOC, $PM_{2.5}$), including the use of machinery that runs on fossil fuels (trucks, generators, pumps, etc.). Blasting, if needed, will be minimized.

Activities related to the installation and removal of the cofferdam and the demolition of the existing dam are the Project elements that are most likely to result in the dispersal of dust for which dust abatement measures must be planned. This will be particularly important in this case given the presence of a provincial road on the dam, for road safety reasons, and the presence of an aquatic environment around the work site.

GHG emissions are anticipated only during the construction of the new dam and the demolition of the existing dam. During operations, emissions are deemed negligible due to the use of electricity for the operation of infrastructure equipment and are not considered in this analysis. The GHG emissions for the Project total 3,197 t-CO_2e. The annual GHG emissions for the Project total 1,066 t-CO_2e/year. Measures for mitigating GHG emissions are planned, namely to explore the option to install a portable concrete plant near the site to reduce transportation distances as well as exploring options for carbon neutrality. Planning of the work foresees transporting the concrete by truck mixer from North Bay, over a distance of 70 km (one way). By installing a temporary concrete plant on or near the site, transportation distances can be reduced (reduction of 66 t-CO_2e).

Mitigation measures and Significance of the Residual Effect

Considering the application of the mitigation measures listed in the tables below, residual effects on air quality (air contaminants, dust and GHG) are non-significant.

Mitigation measures for Air Quality during Construction
1) Requirement to limit idling (shut off engines when truck or vehicle is stopped for extended periods of time); 2) Off-road construction equipment and on-road transport truck engines would be required to meet the latest Tier 4 emission standards of the U.S. Environmental Protection Agency (EPA); 3) Machinery and transportation trucks should be well maintained and kept in good working condition (e.g., exhaust system in good condition); 4) Manage loading and unloading activities to minimize idling time; 5) Cover loads on trucks transporting materials to and from the site; 6) Minimize any blasting.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Emission of Dust during Construction
1) Visual inspection and monitoring of dust emissions on and around the Project site should be carried out on a regular basis (i.e. daily or weekly). 2) Activities involving significant emissions of dust, or causing nuisance due to air emissions, should be identified, and mitigation measures should be implemented if necessary (i.e. dust clouds reaching privately owned or publicly accessible areas). 3) Complaints from neighbours regarding dust or air quality should be registered, analyzed, and addressed with the adequate mitigation measures. 4) Water work areas (water-based dust suppressants due to the proximity of an aquatic environment). 5) Clean public roads with sweeper trucks, cover stored materials. 6) Sweeping the access roads and circulation areas. 7) Cover truck loads with tarps. 8) During the cutting of concrete, water the work area. 9) During demolition, all measures must be put in place to limit dust emissions. Work should be stopped during high winds if a significant amount of dust is moved. 10) Limit speed to 20 km/h on on-site roads. 11) Prevent dirt track-out from the Project site to the public road network, using track-out grates or other technology. 12) Applying water to stockpiles that are causing dust emissions due to wind erosion. 13) Cover stockpiles that are causing dust emissions due to wind erosion 14) When available, dust control systems such as wet suppression systems (water sprays) and enclosures should be used. This applies most notably to drilling, crushing, and screening activities.
Overall Assessment of the Residual effect: Non-significant
Mitigation measures for GHG during Construction
1) Explore the option to install a portable concrete plant near the site to reduce transportation distances. 2) Assess the possibility of using materials with a lower carbon footprint, particularly low-carbon concrete. 3) Explore options for carbon neutrality.
Overall Assessment of the Residual effect: Non-significant

6.2 NIGHT LUMINOSITY

Description of the baseline

Current sources of light in the area are the Rayonier plant on the left bank of the river; streetlights along the road that runs across the dam and the Island; adjacent residential areas on both the Temiscaming and Thorne sides; and a few buildings on the Island. No measurements of light levels were taken. These light conditions do not change with the seasons or weather conditions, since they are regulated under Quebec Ministry of Transport and Ontario Ministry of Transport lighting standards as well as the safety standards that govern the Rayonier industrial site and dam operations.

Anticipated changes to the environment

Based on MTQ and MTO standards for streetlamps, the lighting of the site and its surroundings is not expected to be modified during the Project, as it must meet the standards from those departments. As for the lighting of buildings and facilities owned by PSPC, it cannot be changed for security reasons (movements of dam operators at night). Finally, the rest of the light is from the Rayonier facilities and also cannot be changed for security reasons. In short, the levels of night luminosity will not be changed by the Project. The only difference is that the dam, and thus the streetlights, will be located 25 m downstream from their current position. During construction, lights will be directed towards the construction area and will be used only during short fall or winter days, at the beginning and end of the working days.

Mitigation measures and Significance of the Residual Effect

No residual effect is therefore anticipated in construction nor during the operation, as the current levels will not be changed by the Project and measures will be taken during construction to avoid the effects by directing lights towards the construction area during the shorter days of fall or winter.

6.3 NOISE

Description of the Baseline

Measurements were taken in five sensitive areas near the Project to estimate baseline noise levels. The results were compared with applicable recommendations from Health Canada. Based on these recommendations, in order not to interfere with the understanding of speech, the latter must be at least 15 dB louder than ambient noise. Therefore, it is recommended that outdoor noise not exceed 60 dBA.

The actual main sources of noise come from Rayonier, the roadway traffic and the river flow through the dam.

Results show that for location P2 (Canoe rental cie and the residence of the dam operator on Long Sault Island), the noise levels exceed the levels recommended to understand speech (60 dBA) and that the noise levels at location P3 (residences on the Ontario bank of the river and facing the dam) nearly reach the limit recommended by Health Canada.

Anticipated changes to the environment

Noise levels were estimated for each construction phase and compared with the criteria. It should be noted that based on the results, the daily noise levels caused by the various phases of the Project comply with and are lower than the maximum prescribed threshold (75 dBA). Also, based on the results, the changes in the percentage of people highly annoyed for the various construction phases comply with the maximum threshold to be met (%HA increase of 6.5%). Therefore, only the daytime period is presented because, according to the municipal bylaw from the City of Temiscaming, no work other than emergency work can be carried out during the night.

Recommended Target	
Ld (7:00-22:00) Speech Understanding (Day Noise Level Between 7:00 and 22:00)	<60 dBA
LRdn (Normalized Noise Level over a Period of 24 hours)	<75 dBA
Increase of the Percentage of People Highly Affected by the Noise Level %HA	<6.5%

In the Long Sault Island sector (P2), noise contributions from construction Phases 1.1 (mainly construction of the cofferdam and demolition/reconstruction of the apron), 2.3 (construction of the fish passage downstream and under the road), 2.4 (deviation road, modification of the road layout), 3.2 (construction of the fish passage upstream) and 4.2 (demolition of the existing dam) will further reduce speech intelligibility on the island.

At receptor P3, the noise contribution of the work is close to the limit for speech intelligibility. Noise from the work, added to already high background noise, will exceed the speech intelligibility criterion during certain phases of the work.

For the other receptors, the noise from the work will meet the speech intelligibility criterion used by Health Canada for each phase of the work.

The daily and 24-hour noise contribution from blasting is low compared to the peak sound levels that will be heard at the time of detonation.

During blasting, peak sound levels can be significant. Sound levels will be highly dependent on the distance and the explosive charge used. Therefore, it is recommended that a 150 m radius around the blasting site be unoccupied. In addition, to reduce the magnitude of the peak sound levels, a delay between each charge is recommended. Since blasting operations take place over a very short period of time, the change in the percentage of people severely inconvenienced is zero.

Metric	Daytime noise levels ($Ld_{(7h-22h)}$) Speech intelligibility (<60 dBA)	Standardized noise levels over a 24-hour period (L_RDN) (<75 dBA)	Increase in the percentage of people highly annoyed %HA (<6.5%)
Reference/measured (Situation prior to work)	**Yes for P1, P4 and P5** **Limit for P3** **No for P2**	-	-
Construction Phase (Situation during the construction phase)	**Yes for P1, P4 and P5** **Limit for P3 (phases 1.1, 2.3, 2.4 and 3.2)** **No for P2 (phases 1.1, 2.3, 2.4 and 3.2)**	**Yes**	**Yes**

Mitigation measures and Significance of the Residual Effect

In terms of acoustic monitoring of the noisy phases, the contractor must mandate a firm specializing in sound surveys to confirm noise levels using a method of their choice. If work phases are found to be noisier than expected, mitigations must then be adopted to meet the Project targets as set out in the Project noise monitoring plan. During certain construction phases the noise can affect the staff and costumers of the Algonquin Canoe Company. If the proposed measures do not mitigate adequately the effects, modifications to the mitigation measures will be discussed and determined in consultation with WLFN. Giving the application of those measures, the residual effect is non-significant.

Mitigation measures for noise during Construction	
1)	If levels are too high based on actual site conditions, quickly adopt alternative methods to meet the Project targets as set out in the Project noise monitoring plan.
2)	During certain construction phases, the noise can affect the staff and costumers of the Algonquin Canoe Company. If the proposed measures do not mitigate adequately the effects, modifications to the mitigation measures will be discussed and determined in consultation with WLFN.
3)	Provide advance notification to residents and Indigenous communities concerning construction duration, activities and their expected duration.
4)	Provide information to neighbours and Indigenous communities before and during construction through media.
5)	Install an information board in front of the Project site with contact information for Project and the Project's website address.
6)	Regularly train workers and contractors to use equipment in ways that minimize noise.
7)	Ensure that site managers periodically check the site, nearby residences and other noise-sensitive receptors to identify and quickly address problems.

8) Avoid the use of radios and stereos outdoors and the overuse of public address systems where neighbours can be affected.
9) Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours and other relevant practices (e.g. minimizing the use of engine brakes and periods of engine idling).
10) Examine and implement, where feasible and reasonable, alternatives to rock-breaking work methods, such as hydraulic splitters for rock and concrete, hydraulic jaw crushers, chemical rock and concrete splitting, and controlled blasting, such as penetrating cone fracture.
11) Consider alternatives to diesel and gasoline engines and pneumatic units, such as hydraulic or electric-controlled units, where feasible and reasonable. When there is no electricity supply, consider using an electrical generator located away from residences.
12) The shock absorbers on dump trucks help reduce noise levels during trucking operations. There should also be ongoing monitoring to remind truck drivers who needlessly bang the panels on their dump trucks.
13) Avoid the use of reversing alarms by designing the site layout to avoid reversing, such as by including drive-through for parking and deliveries.
14) Smart alarms can be used for the contractor's equipment that will be on site throughout the work. However, it would be hard to install reversing alarms for suppliers or subcontractors who occasionally come to the site.
15) The smart alarm must be adjusted to a maximum of 10 dB(A) above the ambient noise on the site. However, the installation of smart reversing alarms must take into account the safety of workers on the site.
16) The ECCO SA914, GROTE 73080 and PRECO 1048 models are examples of smart reversing alarms that can be used for equipment on the site.
17) When materials or equipment are delivered, they must be carefully placed on the ground and not dropped, to avoid impact noises.
18) The use of engine brakes is prohibited on site and on access roads to the site except where safety may be compromised.
19) To limit noise and air pollution, idling of truck engines is limited to a maximum of five minutes. After that time, the engine must be shut down.
20) If blasting is required, ensure that a 150 m radius around the site to be blasted is cleared and ensure that there is a delay between charges.

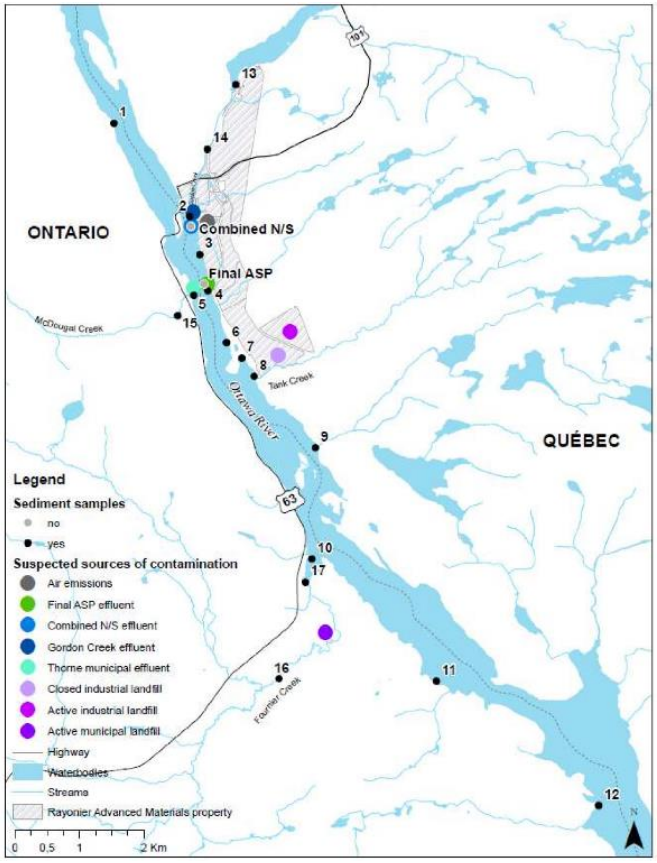
Overall Assessment of the Residual effect: Non-significant

6.4 SEDIMENT VOLUMES AND QUALITY

Description of the baseline

There is no data available on the level of contamination of sediment on the riverbed in the portion of the study area that is likely to be directly impacted by the work. Due to the minimal amount of sediment present and the dangerous currents in the river, no sampling could be undertaken to analyze the sediment for contamination prior to the work in order to assess sediment quality. However, sampling where sediment is visible will be conducted in the area inside the cofferdam when it is dry and the sediment will be managed based on its level of contamination if there is. There is no evidence to suggest that the sediments are contaminated, given that there are few sources of contamination upstream and that the downstream area of the dam is not an area of sediment deposition or accumulation because of the strong current

A study conducted as part of a master's degree project by Camilla Arbour (2020) provided some data on sediment quality in areas impacted by human activities, including those occurring at Rayonier. Amongst all sampling locations in their study area (17 sites), Stations 1 (upstream of the dam), 2 (downstream of the dam, at the mouth of Gordon Creek) and 3 (downstream of the dam, downstream of Rayonier's effluent) had the lowest levels of total nitrogen, organic matter and sulphur; they also are consistently (among the 17 sites) the lowest concentrations of aluminum, barium, beryllium, calcium, cobalt, copper, iron, mercury, manganese, vanadium, nitrites and silicon. For the 3 stations noted above (1, 2, 3), mercury was the only parameter that exceeds the Occasional effect level sediment quality Quebec guidelines criteria for the protection of aquatic life. All other stations downstream of Station 3 had however higher mercury concentrations.



According to the report, the observations and analyses indicate that the contamination in the upstream portion (Station 1), specifically from the mining and pulp and paper industries in the upper part of the watershed, does not appear to be adversely affecting the environment. Although the levels found at Stations 2 and 3 generally do not exceed the guidelines, they do show the past and current effects of releases from Rayonier, including those of lead and mercury accumulated in sediments.

Anticipated changes to the environment

During the installation of the cofferdam (Phase 1), sediment may be suspended again while depositing the materials that make up the cofferdam. Note that very little sediment is present in the riverbed in that area due to the strong current that prevent it from settling. To limit this dispersion, and that of finer particles from the cofferdam materials, a turbidity curtain will be installed downstream of the cofferdam area before it is installed, to capture potential sediment. This turbidity curtain will be secured to the riverbed and surrounding embankment.

Sediment samples will then be taken in the areas where sediment is visible. These will be analyzed and managed based on their level of contamination.

During the removal of the cofferdam at the end of Phase 1, sediment is likely to be carried downstream. To limit this effect, the turbidity curtain installed at the start of Phase 1 will remain in place throughout that phase. Sediments will be captured by the curtain and can be recovered before the curtain is removed. Despite the efforts to contain the sediment, it may not be possible to fully recover the finer particles present in the curtain and some may be carried downstream. These fine particles from the cofferdam do not contain any contaminants as the cofferdam will be constructed of clean material.

During Phase 4 (demolition of the existing dam), fine particles are likely to be generated by the erosion of the concrete during demolition, for example. To limit this effect, the new dam will be closed during this

operation to serve as a cofferdam and to avoid particles and debris being carried downstream. All debris and particles must be recovered before the new dam is opened. An underwater inspection will be conducted to ensure this is the case. Given that water is collected for fire safety at Rayonier nearby, and for buildings on the island upstream on the Ontario side, as a preventive measure, a turbidity curtain will also be installed upstream before the demolition of the existing dam begins.

Mitigation measures and Significance of the Residual Effect

Considering the application of the following measures, the residual effect is non-significant.

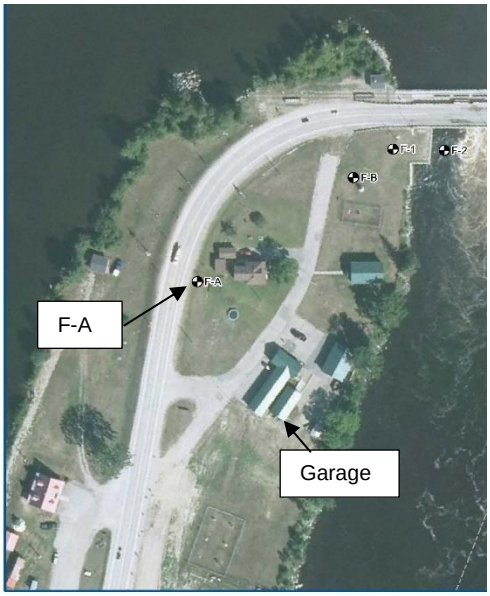
Mitigation measures for soil particles being carried to the aquatic environment, sediment being carried downstream, possible contamination from accidental spills
1) Install and maintain sediment barriers around the areas of the site. This turbidity curtain will be secured to the riverbed and surrounding embankment.
2) Conduct sampling where sediment is visible in the area inside the cofferdam when it is dry and manage sediment based on its level of contamination.
3) Install and maintain a turbidity curtain downstream of the cofferdam throughout Phase 1, and when possible during Phases 2 and 3.
4) Develop appropriate work methods with adequate measures to protect the shoreline.
5) Train employees to react and take action quickly in case of any accidental spill.
6) Recover most particles from the cofferdam before removing the turbidity curtain.
7) Use the new dam as a cofferdam during the demolition of the current dam and install a turbidity curtain upstream from the work area (Phase 4).
8) Develop appropriate work methods for the demolition of the existing dam.
9) Recover all debris and fine particles from the demolition of the current dam before opening the new dam.
10) Provide preventive measures to avoid accidental spills and prepare an emergency plan in the event of a spill.
11) Conduct regular checks for floating rafts of organic matter and recover them, as needed.
12) If measures to limit the erosion and transportation of sediment are deficient, stop the work until more effective measures are in place or the current measures are corrected.
13) Prepare a soil and sediment management plan and an erosion and sediment control plan.
Overall Assessment of the Residual effect: Non-significant

6.5 Soil Volumes and Quality

Description of the baseline

Many Environmental Site Assessment (phases 1 and 2) were done over the years in the Project areas, mainly on the island but also on the shorelines. Only one area showed some contamination (30 m^3), hydrocarbons in concentrations exceeding acceptable criteria for the maintenance pit. No action was recommended unless the garage has to be demolished and relocated, as the risk of migration was deemed to be low.

At the preparatory stage of the Project, a geotechnical study was carried out and the chemical analysis results showed that one sample (F-A, see Map) contained a significant concentration of manganese (1,100 mg/kg). Neither the Canadian Council of Ministers of Environment (CCME), nor the Ontario Government imposed directives regarding manganese. For comparative purposes, the MELCC's *Guide d'intervention protection des sols et réhabilitation des terrains contaminés* (intervention guide for soil protection and the rehabilitation of contaminated sites) states that such a concentration (B-C range; A and B threshold are 1 000 mg/kg and C is 2200 mg/kg)) is compatible with the proposed use of the site (road bed).



Kitchi Sibi Technical team conducted a soil sampling in 2021. Near the Project area, two samples were taken on the east shore, and two others on the island, at each end. Compared with the Quebec criteria, the results are generally lower than criteria A (background criteria - unrestricted reuse) except for S1-A and S1-B samples (which are on the east bank of the river, close to Rayonier) for arsenic, chromium, lead, molybdenum and tin. For S2-A sample (also on the east bank), only chromium exceed criteria A. As for the CCME criteria, they are exceeded only for arsenic in samples S1-A and S1-B (the criteria are the same for all land use).

Anticipated changes to the environment

Should the soils around F-A or S1-A, S1-B and S2-A be excavated, they will have to be managed in accordance with the applicable regulations and based on their final disposal site.

An accidental spill in the work areas could cause soil contamination in those locations. To limit the risk, preventive measures and an emergency plan will be applied to avoid such situations, or to quickly and effectively respond to them if they occur.

The use of a large amount of equipment operating on fossil fuels means that a significant number of hydrocarbons will be used and potentially stored at the site. The negative effects are related primarily to incorrect handling during fueling and transfer and incidents involving vehicles (collision, break of a hydraulic line, etc.). These potential effects can be mitigated by following restrictive hydrocarbons storage provisions and by developing and implementing a detailed environmental emergency plan.

Mitigation measures and Significance of the Residual Effect

Considering the preventive and mitigation measures, the residual effect is negligible.

Mitigation measures for contamination of soil by accidental spill
1) Inspect machinery on a daily basis to detect the presence of hydrocarbon leaks, etc.
2) Have an accidental spill recovery kit on the site at all times.
3) Limit storage of hydrocarbons onsite for one work week for the equipment used during that week
4) Require double containment structures for the storage of hydrocarbons.
5) Prohibit the storage of hazardous equipment or materials in the area dried by the cofferdam.
6) Report any spill as soon as possible in order to react quickly.
7) Develop and implement a detailed environmental emergency plan.
8) Require the use of vegetable-based hydraulic oils in machinery when working in water and in close proximity to water.
9) Prepare a sediment and soil management plan to address unexpected contaminated sediments and soils.
Overall Assessment of the Residual effect: Negligible

6.6 GROUNDWATER DYNAMIC (QUANTITY AND QUALITY)

Description of the baseline

The water table was not reach during the surveys on the island, so no water samplings could be done. On the left bank of the river, two observation wells reached the water table (which was located at a depth of 4.5 to 5 m) and that the results of the analyses showed that all the concentrations meet the applicable criteria (Soil Protection and Contaminated Sites Rehabilitation Policy, seepage into surface water or infiltration into sewers criteria).

Anticipated changes to the environment

The dewatering of the work area is an activity that is likely to result in a punctual drawdown of the water table on the land surrounding the dry area. Considering the relatively low permeability of the materials in which the groundwater table is located (silt-sandy), the anticipated drawdown will be over a short distance from the Ottawa River. Also, considering that the water table is at a depth of about 4.5 to 5.0 m below the ground level, the hydraulic gradient caused by the drying of the work area will be relatively low. Finally, considering that the water level of the Lake Timiskaming upstream of the dam will be maintained at its normal level for the duration of the work, the water pumped from the dewatering area will come largely from infiltration from the Lake Timiskaming. The anticipated impacts on the water table level due to the dewatering that could in turn impact the Gordon Creek are considered negligible.

There are no residences on the left shore of the river, to the right of the area to be dried. The buildings on the island are fed by a water intake located upstream of the island, on the Ontario side. As that water intake draws water directly from Lake Timiskaming, the potential decrease in the water table on the island has no impact on that supply. Once the area is covered in water again at the end of Phase 1, the water table level will quickly return, as the table is fed by the river.

The main risks for the groundwater quality are related to accidental spills that could contaminate this water.

Mitigation measures and Significance of the Residual Effect

Residual effects of the groundwater quality and quantity are negligible.

Mitigation measures for contamination of ground water by accidental spill
1) Require limitations on the storage of hydrocarbons on the site for one work week for the equipment used during that week.
2) Require secondary containment for the storage of hydrocarbons.
3) Report any spill as soon as possible in order to react quickly.
4) Develop and implement a detailed environmental emergency plan.
Overall Assessment of the Residual effect: Negligible

6.7 SURFACE WATER DYNAMIC – HYDRAULICS

Description of the baseline

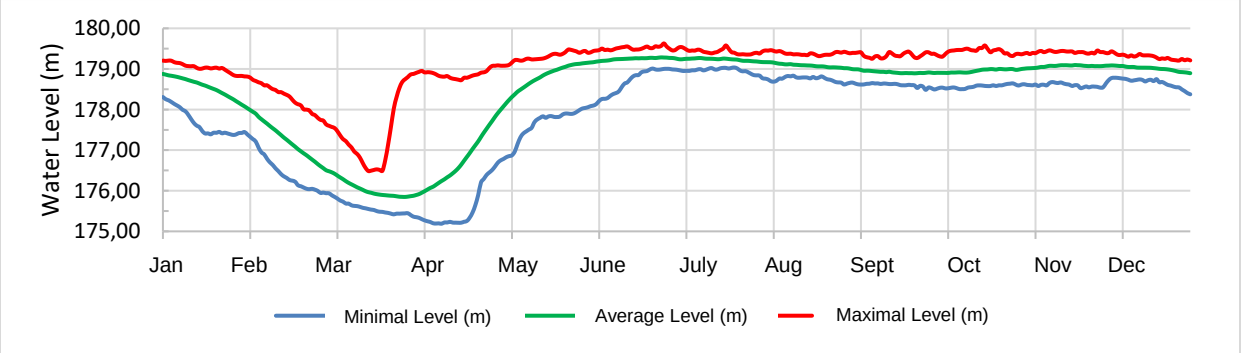
The Ottawa River is one of the most regulated rivers in Quebec. Forty-three dams manage high water levels from Témiscaming up to the mouth of the Ottawa River, including its effluents.

In summer, the maximum operational level for the Timiskaming reservoir is at 179.56 mASL (meter above sea level) to protect shoreline residents against flooding. This level is 1.2 m under the maximum level reached in 1909 before the construction of the dams. The maximum area of influence of the Timiskaming Dam Complex extends to Notre-Dame-du-Nord and thus includes Lake Timiskaming.

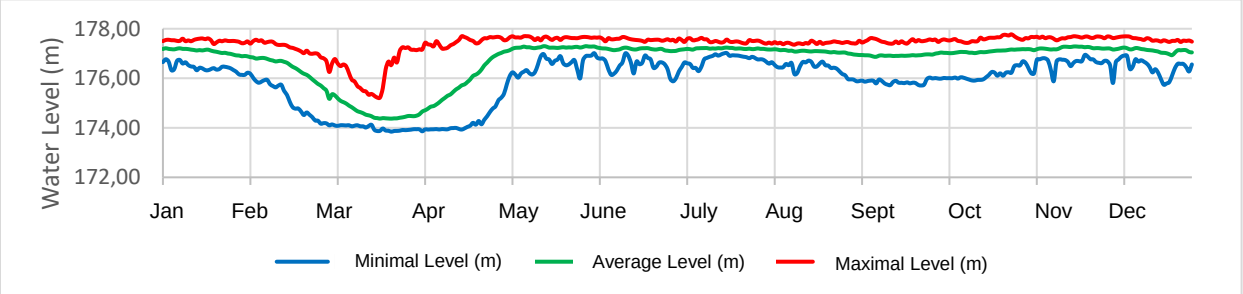
The minimum level required for navigation is at 178.65 mASL. This level is maintained in summer, from mid-May to mid-October, to ensure navigability. Generally speaking, the level of the reservoir is maintained at approximately 179.35 mASL and is lowered only during low flow periods, when flows from various tributaries are low, to maintain the desired minimum outflow rate of 300 m³/s.

From January, the bays of the Quebec and Ontario dam are opened gradually to lower the water level in the reservoir to 175.50 mASL. When the water level reaches 177.70 mASL and the spring freshet has begun, the bays are closed to regain hydraulic control and prepare for the storage of the spring freshet. As water retention begins in mid-April, the operation of the dams aims to lower the water level of the Timiskaming reservoir as much as possible to ensure the availability of the maximum storage volume for the spring freshet. This storage lowers the peak flow in the center and south sections of the Ottawa River's watershed.

Average Annual Levels in the Témiscamingue Reservoir



Average Annual Water Levels Downstream of the Timiskaming Dam Complex

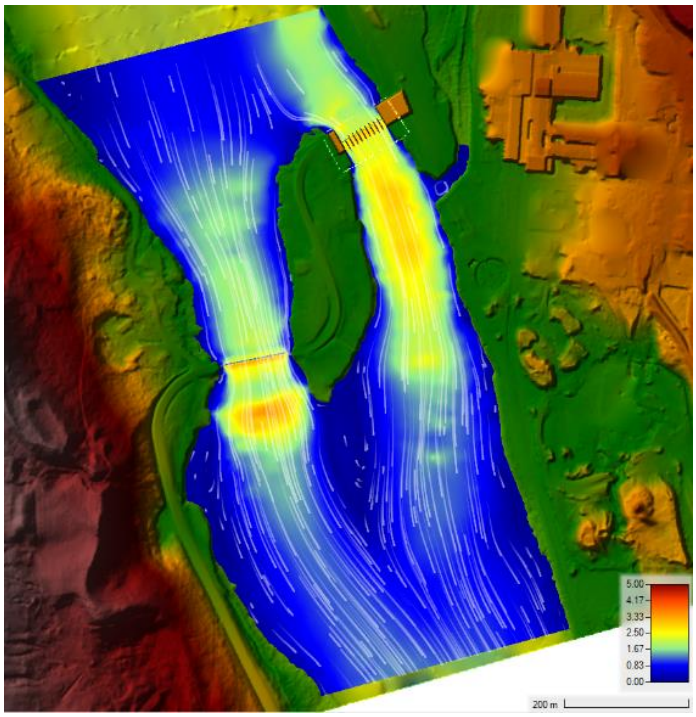


Statistical analysis was done to determine the return periods. The flow rate of 6,532.5 m³/s, corresponding to the 1,000-year flood + 1/3 Probable Maximum Precipitation (PMP), was used to design the dam. The mean flow discharge of the complex was estimated at 758 m³/s, with a maximum flow that reached 3,664 m³/s in 1960. For information, the mean minimum flow rate is about 200 m³/s near the dams (Timiskaming complex), and the historical minimum is 97 m³/s.

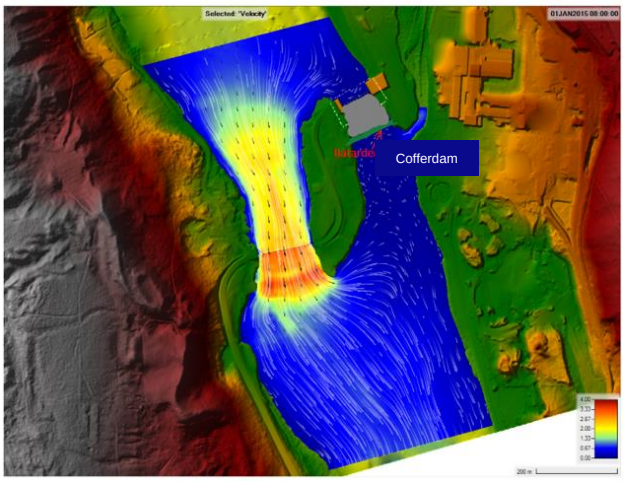
Return Periods of the Inflows to the Timiskaming Reservoir and Safety Check Flood

Return Period	Flow rate (m³/s)
2 years	1 885.3
10 years	2 793.5
100 years	3 995.4
1000 years	5 281.8
1000 years + 1/3 of the Probable Maximum Precipitation (PMP)	6 532.5

The figure opposite shows the results of the hydrodynamic simulations for a flood flow of 2,447 m³/s, which is equivalent to a flood slightly less than the 10-year flood. Considering that all the sluice gates of both dams are open, the figure shows the distribution of flows on both sides of the island. At a distance of about 200 m upstream of the dams, flow velocities are less than 1 m/s, increasing to around 2.5 to 3.5 m/s near the dams. Velocities gradually decrease downstream of the dam, reaching 1 m/s again just downstream of the island.

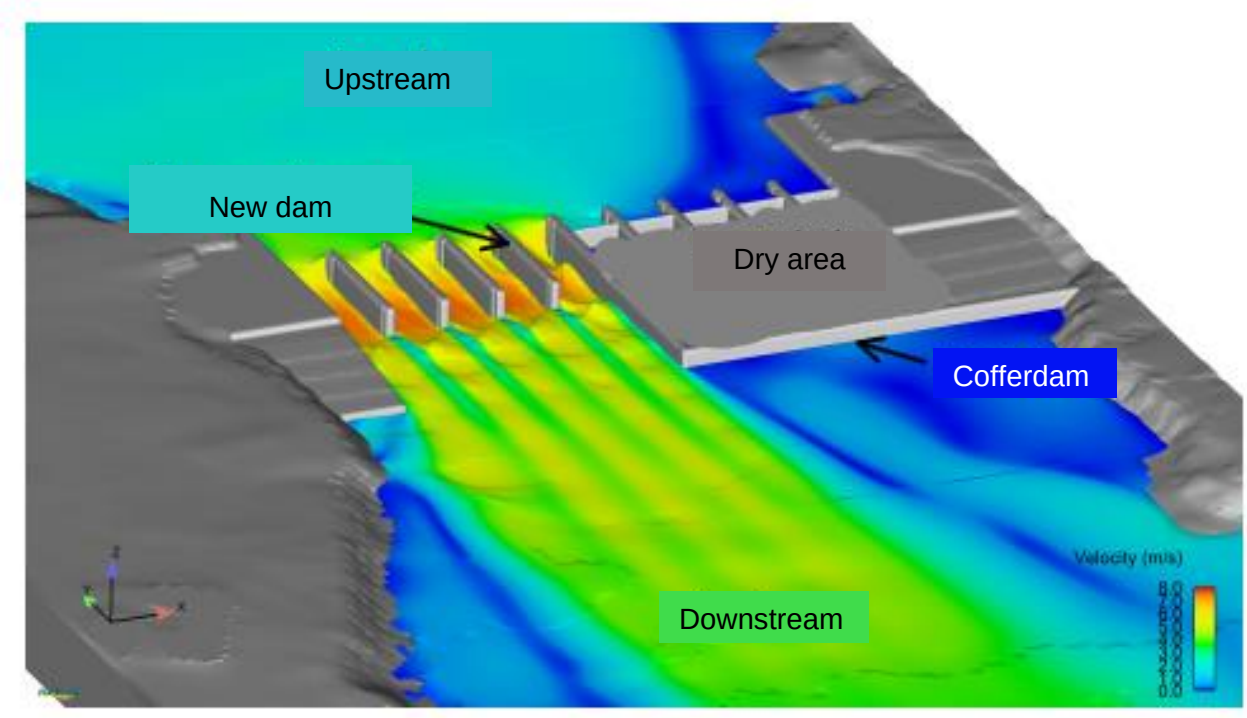


Anticipated changes to the environment

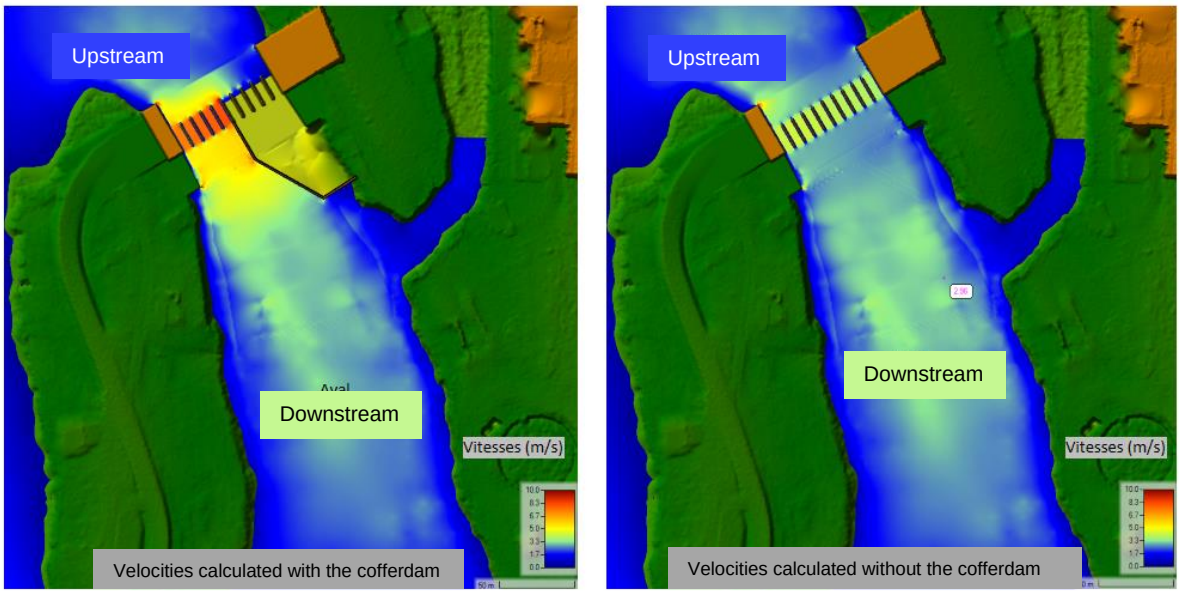


During Phase 1, all the flow will go through the Ontario Dam. This dam has a maximum hydraulic capacity of 1,955 m^3/s, corresponding to a 10-year flood. This capacity is deemed sufficient for this phase, which takes place in a period (mid-July to December) when the average flow entering the Timiskaming Dam Complex is 750 m^3/s. During this work, particular attention will be paid to monitoring the hydrological situation in the catchment area of the Ottawa River to anticipate potential floods and properly plan management of the dam on the Ontario side. Measures will be put in place to evacuate the site and remove the cofferdam within 24 to 48 hours if the hydrological forecasts show a high risk of exceeding the maximum operating level for the reservoir, to allow for water to be released on the entire dam on the Quebec side. The triggering of this emergency plan will be managed by PSPC based on hydrological forecasts and recommendations from the Ottawa River Regulation Planning Board. This phase has no impact on Gordon Creek.

During Phases 2 and 3, a cofferdam of sheet piles will be present on half of the Quebec side. The flow will go through the Ontario dam and half of the Quebec dam. In these conditions, the modeling shows that the flow velocities between the piles reach values of 8 m/s (orange area on Figure), while they reach 5.5 m/s on the concrete apron along the cofferdam (yellow area on Figure). The effect will continue for about 75 m below the dam.



Flow velocities calculated during flood periods with and without the presence of a cofferdam

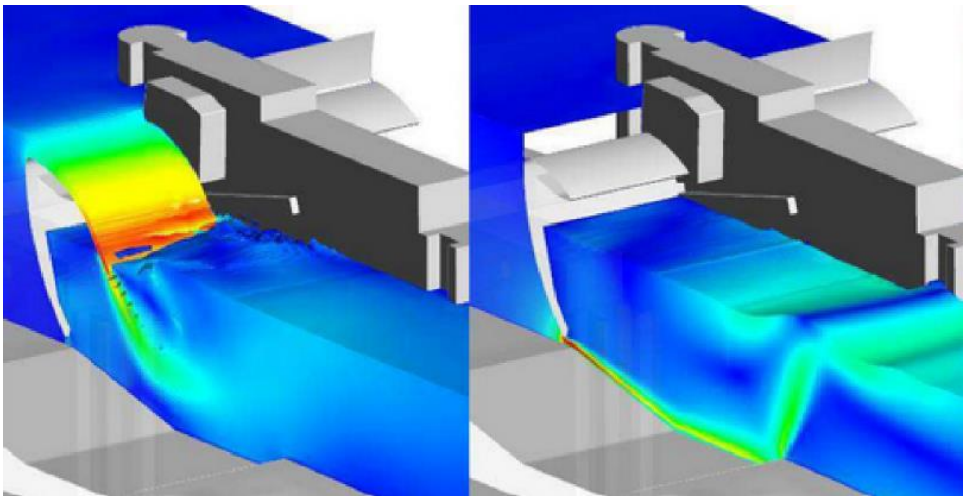


During the fourth and final phase of the work, which corresponds to the demolition of the existing dam, the new dam on the Quebec side will be closed. The effects are similar to those of Phase 1, but the duration is shorter (mid-July to the end of September).

During the operating phase, the new dam will operate under the current water management plan in place for the existing dam. The normal and maximum operating levels will remain the same. The winter emptying and spring filling periods will remain unchanged.

The new dam will be equipped with sluice gates rather than stop logs as seen in the current structure. In this context, the water flows through the base (the bottom), so under the sluice, rather than by flowing above the stop logs. The following figure shows an example of these two types of flow. On the left, we see a flow above the beams, creating more turbulence on the water surface, while the right shows water flowing below the sluice, creating higher velocities at the bottom of the river. Flow velocities are 4 m/s downstream of the sluice gates and 2 m/s downstream of the bays with beams. Note that this difference can be seen over a distance of about 50 m downstream of the structure.

Example of flow below a sluice gate vs. a beam



Mitigation measures and Significance of the Residual Effect

The residual effect is non-significant.

Mitigation measures for Changes in hydraulic conditions during the work
1) Prepare an emergency plan for high flow rates during phases when a cofferdam is present and follow the communication procedure included in the Emergency plan. 2) Ensure construction staging area and activities don't impact the dam operations.
Overall Assessment of the Residual effect: Non-significant

6.8 SURFACE WATER QUALITY

Description of the baseline

Based on data collected between 2013 and 2019, the overall quality of the water in the Ottawa River's main channel is good in terms of both physico-chemical and bacteriological parameters. This reflects the beneficial impacts of the urban water treatment interventions of the last 35 years on the watershed, as well as the limited contributions of diffuse sources of pollution from agricultural activity. The main sources affecting water quality in the watershed are the effluents from municipal outfalls, from metal mining facilities and from pulp and paper mills.

The median IQBP6[2] obtained between 2007 and 2015 shows that the water quality at the station located near the dam is good and allows all uses, including swimming. The portrait is similar in every aspect from 2017 to 2019. Overall, the water is freshwater, well oxygenated, with a pH that meets the criteria for aquatic life.

Anticipated changes to the environment

During construction, the work in water is the main source of impacts, such as the installation and removal of the cofferdam, drying the work area, construction of the upstream portion of the fish passage and demolition of the existing dam. There is also the risk of spills and leaks directly in the aquatic environment. The concrete of the new dam and the demolition of the old dam, as well of the discharge of concrete mixer wash water, could modify the pH of the Ottawa River, if no treatment is done before the release.

The main contaminants from these risks are the suspended solids and other contaminants, debris from the demolition of the existing dam, de-icing salt (during construction and operation) and water temperature during operation and finally, hydrocarbons from construction machinery (accidental spills).

Many scenarios have been modeled to estimate the concentration of fine particles during the construction of the cofferdam in Phase 1, which is the most at risk activity for suspended solids (SS) generation. Usually, criteria from DFO at 100 and 300 m downstream of the dam are respected. However, for some scenarios, they can be exceeded for some hours. Given that, a turbidity curtain will be installed before the construction of the cofferdam to limit the dispersion. As for other contaminants, simulations cannot be conducted, either because there is no model, or because the anticipated effects are practically zero considering the mitigation measures, or because the assumptions to be considered for predictions cannot be established with sufficient certainty. However, all the results of the water quality monitoring will be compared with CCME and Quebec Guidelines and if exceeded, mitigation measures will be put in place.

During consultations with Indigenous communities, several concerns were raised about the emission of other contaminants into the water, such as mercury or metals, or organic matter and other residues accumulated in the river downstream from Gordon Creek, along the left shore. Simulations show that velocities in areas where such accumulations are present will be similar to those seen during all phases of

[2] Median bacteriological and physicochemical water quality index based on six parameters ("indice de qualité bactériologique et physico-chimique, 6 paramètres" or IQBP6)

the work and during operation. Hydraulic modifications related to the construction will therefore have no impact on those areas.

As noted, there is very little fine sediment in the work area. A characterization of sediment, if any, will be conducted in the area between the cofferdam and the current dam to determine its quality and manage it based on its level of contamination before the cofferdam is removed. The turbidity curtain to be installed downstream before the cofferdam is put in place will help keep those particles near the work area.

In general, metals are highly absorbed by fine sediment and are only resuspended in the water when it is heavily disturbed, such as during dredging work. Given the very low quantity of fine sediments in the area of the cofferdam, and that the work will not disturb the sediment (no dredging work), there are no risks of these contaminants being desorbed to the point that they affect water quality, given the significant volume of water in the river.

As for the debris, which is mainly concrete from the existing dam that will be demolished, they could increase the pH of the water at times due to its basic nature. All debris will be recovered before the new dam opens and it will not be in direct contact with the downstream water. A pH monitoring will be done before reopening the new dam and measures will be taken if pH exceeds the criteria. However, considering the high flows passing through the dam, the effect should not be perceptible or detectable downstream.

De-icing operations on the road that crosses the bridge, both during construction and operation, are likely to affect the water quality through the release of chlorides, if they reach the aquatic environment. This situation is similar to the current situation. The departments of transport responsible for maintaining roads and bridges already have guidelines for minimizing the spread of de-icing salts into sensitive areas and for choosing substances that have the least possible impact on waterways. Here again, given the large volumes of water going through this area, there is a lot of dilution, and this effect is undetectable in the results from the water quality monitoring stations.

Given that the water will flow through sluice gates that open from bottom to top instead of stop logs that open from top to bottom, the water going through the dam will come more from the bottom of the Lake Timiskaming than from the surface layer. However, the reach upstream from the dam is much shallower than the rest of the lake and the disruption of water from high velocities on the approach to the dam is significant, such that it is very likely that there will be no thermocline there in the summer and that the water will be the same temperature throughout the water column. In addition, as it goes through the dam, there is a significant mixing of the water column, which also mitigates potential temperature differences compared to the current situation. In short, it would be highly unlikely that there would be a significant difference in water temperature downstream from the dam compared to the current situation.

Accidental spills can have a significant impact on water quality if the hydrocarbons reach the aquatic environment. Preventive measures and an emergency plan serve to prevent such situations and manage them quickly when they occur.

Mitigation measures and Significance of the Residual Effect

Considering the application of all those mitigation measures, and the water quality monitoring that will be done, the residual effect is non-significant.

Mitigation measures for the potential contamination of surface water
Work Preparation 1) Begin work on the start-work date. 2) Limit work to the designated work areas. 3) Recover trees and arable land. 4) Follow natural drainage patterns. 5) Avoid work and storage in the riparian strip (RS). 6) Provide areas for disposing of waste materials (and prepare a Waste Management Plan that will include waste reduction workplans). 7) Provide sediment and erosion control plan.

8) Provide a spill response plan.
9) Provide a health and safety plan.
10) Stabilize soils and plant vegetation.

Construction

Motors

11) Ensure they are in good condition, maintained and inspected.
12) Circulate in designated areas, outside waterways and RS, except when required and providing for cleanup.
13) Provide a response plan in the event of a leak or spill.
14) Handle petroleum products outside waterways and at least 30 m from them.

Turbidity, SS and other contaminants

15) Sample and analyze sediments between the current dam and the cofferdam once the area is dry and manage them based on their level of contamination.
16) Avoid the discharge of turbid water (treat pump water before discharging it into an aquatic environment).
17) Control water with sediment or other barriers and treat water using appropriate methods, settling tanks, etc.
18) Install a turbidity curtain downstream before construction of the cofferdam begins. This turbidity curtain will be secured to the riverbed and and surrounding shoreline .
19) Install a turbidity curtain upstream before the demolition of the current dam.
20) Provide appropriate cleaning areas.
21) Recover all debris from the demolition of the existing dam before the new dam is opened.
22) Use clean equipment and avoid cleaning it in the waterways or in the RS.
23) Provide portable toilets.
24) Work in the waterway in designated areas and ensure containment of all work in water.
25) Sample concrete mixer wash water daily and treat them, if needed, so they respect water quality criteria before its release in the environment (prepare a Waste Water Management Plan).

Debris and residual materials

26) Contain materials outside the waterway.
27) Provide appropriate storage areas.
28) Place residual hazardous materials (RHM) at least 30 m from the waterway.
29) Ensure that all discharged material is removed from the waterway.
30) Refuel equipment more than 30 metres from the river.

End of work

31) Recover at least 97.5% of the cofferdam construction material from Phase 1 during removal.
32) Provide for site cleanup.
33) Plant vegetation and stabilize the site and shoreline
34) Restore the riverbed.

Operation period

35) Ensure the containment of work to avoid discharges in the water.
36) Decontaminate and restore sites in the event of a spill.

Emergency situations

37) Provide an emergency procedure.
38) Provide sediment and erosion control measures.
39) Stabilize soils and plant vegetation.
40) Decontaminate and restore sites in the event of a spill.

Overall Assessment of the Residual effect: Non-significant

6.9 ICE REGIME

Description of the baseline

According to the operators of the Timiskaming Dam Complex, ice does not form in the river section directly upstream and downstream of the dam under normal operation and flow conditions (see adjacent photo). In fact, from January to March, the sluice gates are opened to reduce the water level of Lake Timiskaming in anticipation of the spring flood. Specifically, it appears that the limits of the ice cover are located in the Wyse sector, 1.6 km upstream and in the Eldee sector, nearly 6 km downstream. The operators added that ice cover forms at the dam only when it is closed for repairs or maintenance. No issues with frazil ice (ice fragments or crystals) have been reported by operators. This was also confirmed by the analysis of satellite images. Moreover, the analysis of the Ottawa River's thermal budget in the section under study, combined with the flow rate, show that it does not allow the formation of a complete ice cover that thickens as winter progresses.

The analysis also included the area downstream of the dam, where Gordon Creek discharges and brings relatively warm water from the reservoir located merely 2 km upstream. This source of heat, combined with the other discharges along the river and the flow rate in the narrow section downstream of the structure up to Eldee, renders the formation of a complete ice cover from shore to shore very difficult.

Anticipated changes to the environment

During construction of the new dam, ice cover conditions immediately upstream and downstream of the dam will be directly affected by the construction phases. During the first phase, when the dam on the Quebec side will be completely closed (mid-July to December), hydraulic conditions will be conducive to the formation of a full and stable ice cover that could cover the entire east channel depending on temperatures in November and December in the year in which the work takes place (see photo showing the effects during works on the Ontario side). Downstream, full ice cover may also be observed up to the confluence with Gordon Creek. Depending on the flow and temperature of the water in that creek, ice will likely not be able to form at its mouth (as is currently the case, with no ice forming there under current conditions). In the second and third phases of the work, when the left half of the bays on the Quebec dam will be closed (including the winter period from January to December of the second year), ice cover can be expected to form on the upstream side from the shoreline to extend toward the centre of the channel, running along the closed or partially closed bays. The extent may be limited to the areas with low velocities. The same phenomenon may be observed downstream in the protected area with low velocity due to the presence of the cofferdam on the left shore (half of the river).

Based on the description of the ice regime presented above, the new dam will have no significant impact on the formation and extent of the ice cover once the work is completed. The analysis conducted suggests that the ice regime is controlled by a combination of the thermal budget and flow velocity. These are dependent on weather conditions, the temperature of the river itself, warm water tributaries (typical temperatures of 1°C to 4°C) along the Ottawa River and the morphology of the river that generates an increase in flow velocities. The dam itself thus seems to have a very local impact on ice.

Mitigation measures and Significance of the Residual Effect

There is no mitigation measure for this effect. The residual effect is non-significant.

6.10 VEGETATION (TERRESTRIAL AND RIPARIAN VEGETATION, WETLANDS, SPECIES AT RISK)

Description of the baseline

There are no forest tracts in the Terrestrial Study Area, and the terrestrial natural environments (in green in adjacent map) present are small, disturbed and of poor quality compared to locations farther away in the study area. No wetlands, aquatic vegetation growth areas or rare plant associations were identified in the area. Inventories conducted in the spring of 2017 and 2021 did not reveal any special status plant species in the areas affected by the work. The CDPNQ indicates the potential presence of six special status plant species within 25 km of the Project. None of them are listed in Schedule 1 of the Species at Risk Act. During consultations with Indigenous communities, plants and natural materials were mentioned as a valued component. Some of these plants were identified by the AOO on Long Sault Island during a field visit in the fall of 2021. In August 2021, the Kitchi Sibi Technical team conducted a survey; one sample was on Long Sault Island and the 12 others on the Quebec side, in the City of Temiscaming. A total of 326 individual plants were surveyed, including some invasive species and species at risk. Many of the recorded plants are important for the Algonquin cultural and significance.

Anticipated changes to the environment

The installation of temporary site facilities will require vegetation clearing and grading of the site, resulting in a temporary and limited loss of vegetation cover, especially grassy areas (5,530 m^2). The vegetation that is left intact could also be damaged by machinery. The introduction and spread of invasive alien species (IAS) is possible. An invasive alien plant species management plan will be prepared and implemented. The permanent losses due to the approaches to the dam and relocation of the road total 1,025 m^2.

Mitigation measures and Significance of the Residual Effect

A revegetation plan will be developed in consultation with Indigenous communities. One of the objectives of the plan will be to plant native plant species of interest and to prioritize trees species known to filter the air, such as red pine or bacteria known to remove heavy metals, such as fungi. Given the implementation of the restoration plan and of the mitigation measures, the residual effect is non-significant.

Mitigation measures for Encroachment, alteration and loss of vegetation
Pre-construction 1) Install temporary construction fencing to delineate vegetation clearing areas. 2) During clearing, all trees and shrubs should be removed from work areas to avoid damage to remaining vegetation. 3) During clearing and earthmoving, do not push materials against remaining vegetation to protect plant communities beyond the limits of the work area. 4) Protect trees and vegetation at clearing limits. 5) Instruct site workers to always remain in designated work areas to avoid trampling plants and to minimize disturbance to remaining vegetation. 6) Limit machinery traffic in the work area to avoid soil compaction at the edge of the vegetation.

7) Keep equipment, storage sites and stored material away from remaining trees in the work area to prevent root damage from soil compaction.
8) Install a barrier 1 m beyond the drip line around residual trees that may be affected by the work. Keep barriers in good condition throughout the construction period.
9) Properly prune damaged residual trees.
10) If a substantial portion of a branch 25 mm Ø or wider is damaged, cut cleanly at the break or within 10 mm of its base.
11) Cut off any exposed roots that are 25 mm Ø or wider from the soil surface within five calendar days of exposure to the air.
12) Cut off damaged bark to an uninjured patch, without causing further injury, within five calendar days of damage.
13) Restore disturbed areas upon completion of the work through appropriate planting and seeding (restoration plan developed in consultation with Indigenous communities). If the topsoil in place is suitable for revegetation (according to the results of the soil analysis), salvage and stockpile it for reuse during restoration;
14) Define disposal areas for materials and excess excavated material outside of natural environments.
15) Require contractors to clean machinery prior to arrival at work sites and to ensure that it is free of mud, animals or plant fragments and invasive alien species (IAS).
16) Prepare and implement an IAS management plan (including a pre-work inventory in the work areas);
17) Rapidly revegetate exposed soils with native species to re-create habitats present prior to construction.
18) Do not import topsoil or other materials that may contain invasive alien species.
19) Allow representatives of Indigenous communities to access raspberry, wild blackberry, American elm, white pine, balsam poplar, yarrow, white birch and cedar for traditional uses prior to the commencement of work if these species will be affected.
20) If the large white pine near the cofferdam construction area is cut down, offer it to Indigenous communities for traditional crafts.
21) In consultation with Indigenous communities, prepare a revegetation plan for the island and areas disturbed by the work. Recommendations presented by the Kitchi Sibi Technical Team in their Vegetation study report will be considered when developing the revegetation plan.

Construction

22) Same as above.

Emergencies

23) Develop emergency response procedures
24) Develop sediment- and erosion-control measures
25) Stabilize soils and restore vegetation
26) Decontaminate and remediate sites in the event of spills

Overall Assessment of the Residual effect: Non-significant

6.11 Fish and Fish Habitat and Aquatic Species at Risk

Description of the baseline

A total of 23 fish species were identified in the aquatic study area. Spawning by some of these species has been confirmed in the area downstream of the Project, including three species that are abundant: walleye, northern pike and white sucker. Spawning of lake sturgeon, the only fish species at risk that is present in the area, was also observed in 2021. The Aquatic Study Area provides different types of potential habitat for lake sturgeon (spawning grounds, nursery and rearing, food supply, fall and winter refuge and migration).

The American eel has been identified as a species of interest by some Indigenous communities, although it is currently not present in the Project area, as downstream dams prevent it from moving upstream. The hickorynut, a special status bivalve species, has also been identified as a species of interest, primarily because of its relationship to sturgeon. However, like the American eel, this species is likely absent due to the lack of sandy substrate in the work area, but is closely linked to sturgeon during certain phases of its life cycle.

Table 6.1 Fish Species that Spawn or may Spawn in or Near the Work Area

Species	Scientific Name	Confirmed Spawning Grounds	Potential Spawning Grounds
Smallmouth bass	*Micropterus dolomieu*	TT-006, 008, 009, 011	TT-003
Walleye	*Sander vitreus*	TT-003, 007, 008, 009, 011, 013, 014	TT-002, 004, 005, 006, 012, 015
Logperch	*Percina caprodes*	TT-008, 009	–
Northern pike	*Esox lucius*	TT-007, 008, 009, 011, 013, 014	TT-001, 003
Mooneye	*Hiodon tergisus*	TT-007	TT-003, 004, 008, 011, 013
Goldeye	*Hiodon alosoides*	TT-006	TT-003, 004, 008, 011, 013
Trout-perch	*Percopsis omiscomaycus*	TT-003, 007, 008, 009, 012	TT-004
Lake sturgeon	*Acipenser fulvescens*	TT-006	TT-003, 004
Sauger	*Sander canadensis*	TT-007, 008, 009, 011, 013	TT-002, 003, 004, 005, 006, 012, 015
White sucker	*Catostomus commersonii*	TT-007, 008, 009	TT-003, 010, 011, 013, 014, 015
Longnose sucker	*Catostomus*	TT-007, 008, 009, 010, 011	TT-003, 013, 014, 015
Silver redhorse	*Moxostoma anisurum*	–	TT-007, 003, 006, 009
Shorthead redhorse	*Moxostoma macrolepidotum*	TT-008, 009	TT-003, 006
Rock bass	*Ambloplites rupestris*	TT-008, 009	–
Creek chub	*Semotilus atromaculatus*	TT-008, 009	TT-003
Yellow perch	*Perca flavescens*	–	TT-009

Anticipated changes to the environment

The project could alter fish habitat by the increase of suspended solids due to surface runoff and in-water works (ex: construction and removal of the cofferdam, demolition of the existing dam). The schedule is one of the main measures that was put in place to reduce the effects. Given lake sturgeon spawns between 8 to 18°C (Scott and Crossman, 1974**)** and the hatching period lasts approximately 7-10 days, to ensure more protection for spawning and hatching, temperature will be taken in the downstream area of the dam and in-water work for Phases 1 and 4 will only begin after a 10-day period following a temperature of 18°C (which should be approximately mid-July). Continuous monitoring of SS will be done during the Project to ensure DFO's criteria are respected. Increase turbidity should however be low considering the installation of a turbidity curtain before building the cofferdam.

Modification of flows at the Quebec dam can also alter fish habitat right below the dam. The total closing of the dam (Phases 1 and 4) has been planned after the spring spawning period, to limit the effects. However, the decrease in flow will have a temporary impact on the general habitat and spawning habitat for species that spawn in the fall. It could disrupt the activities of fall spawners on the Quebec side, because the supply of water and flow conditions will be significantly changed. Fall spawning (e.g., coregonids) will most likely not occur in this area during the first year of construction. It was noted during the fishing studies that there was no evidence of fall spawning or spawning grounds in this area.

When the Quebec dam is completely closed at the maximum reservoir operating level, flow velocities on the Ontario side of the dam will reach 2.5 m/s in the upstream channel and more than 4 m/s immediately downstream. Velocities will drop off about 200 m downstream of the tip of Long Sault Island. The magnitude of change in the hydraulics of the surface waters on the Ontario side during this phase will be comparable to major flood conditions when both dams are open. Closing all the gates of the Ontario or Quebec dams is a common practice in current operating mode.

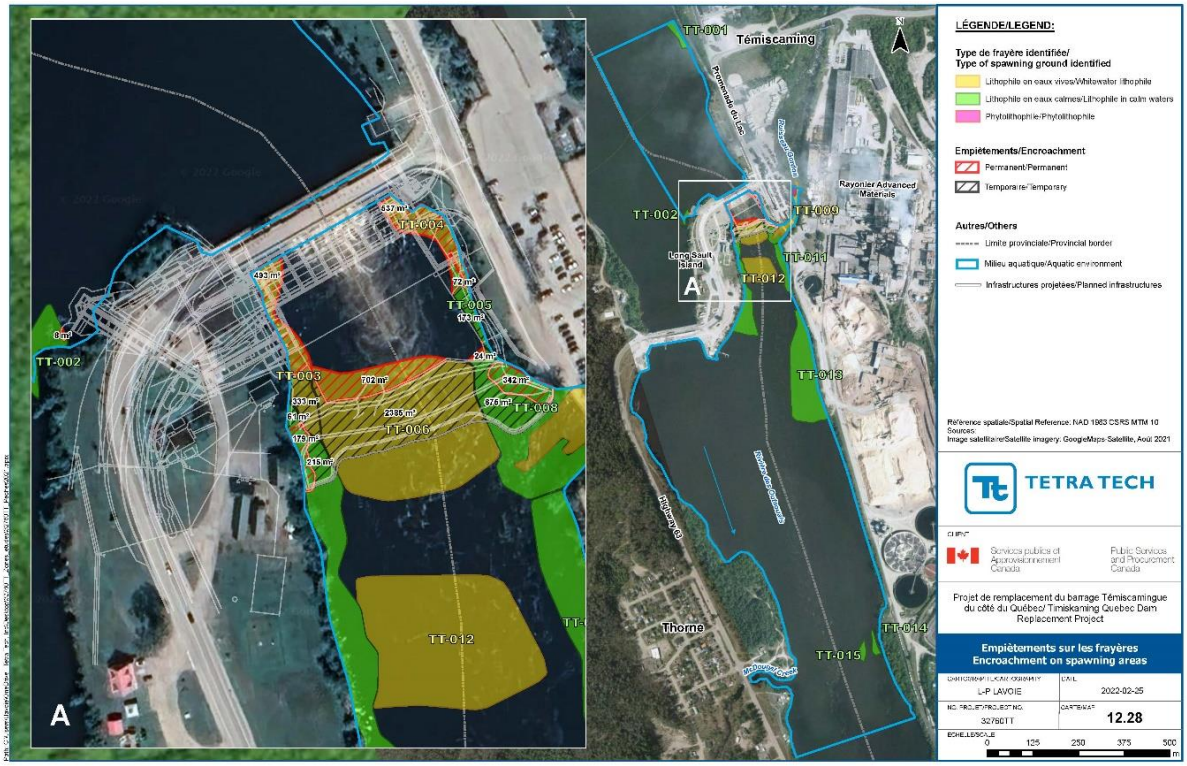
Velocities will also increase on the Quebec side during Phases 2 and 3, when the half (sheet piles) cofferdam blocks bays 1 through 5 and the Quebec dam is partly open. Water will therefore flow through the western part of the dam only. During periods of high flow, the water velocity will increase over a distance of approximately 10 m downstream and then gradually decrease until pre-cofferdam velocity is reached at about 75 m downstream. The area affected by these changes in velocity is therefore very limited.

Fish mortality could happen during Phases 1 and 4, due to the construction of the cofferdam and the demolition work. To minimize mortality, a turbidity curtain will first be put in place to isolate the area. Fish rescue will be undertaken in this area to catch as many fish as possible. The cofferdam will then be built, and another fish rescue operation will be done while the area is gradually dewatered. This should allow for the capture of most if not all the fish remaining in this area.

If blasting is required for demolition of part of the old dam, it will be carried out inside an enclosure closed by a turbidity curtain and the new dam. However, the effects of blasting could be felt upstream and downstream despite this measure. Phase 4 will take place from mid-July to the end of September. At this time, the reproduction of spring-spawning species is complete while that of fall spawning species has not begun. However, it is possible that fish (adult and juvenile) are present upstream or downstream of the isolated work area during the mid-July to the end of September period. To minimize the effects, the DFO's Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters will be followed.

Several habitat types will be affected by the Project, including spawning, rearing, shelter and feeding habitat. Some of these habitats may be located in the dewatered area (including the cofferdam), in the vicinity of the new permanent facilities or in the downstream area affected by changes in flow or water quality during construction.

The project will lead to permanent encroachments (spawning grounds: 2,347 m^2; other habitats with low potential for growth and feeding: 6,917 m^2) and temporary encroachments (spawning grounds: 3,842 m^2; other habitats with low potential for growth and feeding: 6,172 m^2), which total 12,361 m^2.



A preliminary fish habitat offsetting plan has been developed. It consists in the construction of spawning grounds downstream of the dam for walleye and lake sturgeon. At that stage, and during the consultations that DFO will hold before it issues its authorization, Indigenous communities will be consulted to obtain their comments on and suggestions for the preliminary plan, with a view to improving it, or to suggesting other offsetting strategies. A monitoring program will be implemented to assess the success of the final plan.

Finally, the effects of a potential multi-species fish passage, given the current state of knowledge of fish populations upstream and downstream of the dam, have raised concerns in the Antoine Nation community. Initially, the fishway was to be designed specifically for eels only and was considered as a mitigation measure that could restore free movement of fish (incorporated into DFO's authorization for the Ontario dam). With this in mind, PSPC identified four potential options that would require further discussion with DFO experts and Indigenous communities before a choice could be made. The fish species currently present upstream and downstream are similar. The only species present downstream that is not currently present upstream is the Hornyhead Chub, a small species of minnow in the Cyprinideae family.

Mitigation measures and Significance of the Residual Effect

Considering the application of the mitigation measures and the extensive offsetting measures that will be included in DFO authorization, the residual effect on fish, fish habitat and aquatic species at risk is non-significant.

Mitigation measures for permanent and temporary fish habitat alteration and mortality

1) Evaluate the four options for the fishway in conjunction with DFO experts and Indigenous communities and select one of the options.

Pre-construction

2) Develop and implement a Construction Environmental Management Plan, that will include, among other things, an Erosion and Sediment Control Plan, a Spill prevention and Response Plan, an IAS Management Plan, etc.).
3) Comply with construction start date. Take water temperature in the downstream area of the dam and begin the work in water for Phase 1 only after a 10-day period following a temperature of 18°C (which should be around mid-July).
4) Implement sediment- and erosion-control measures.
5) Educate workers on waste management.

Construction

6) Adhere to dam closure dates and periods and in-water work dates (see Measure #3 above).
7) Avoid work that could affect critical fish spawning dates.
8) Work must be done during low flow conditions, outside of the period from April 15 to June 30. The materials used must be free of fine particles for in-water works, while the machinery used must contain biodegradable oil.
9) Minimize the water footprint of the structures and works. The size of the work site and the equipment installed should be optimized to minimize the direct footprint on fish habitat, destruction or alteration, or incidental mortality of individuals.
10) Ensure that the cofferdam is installed quickly (mid-July to late September).
11) Implement an erosion and sediment control and mitigation plan that includes all the measures and additional measures suggested by the contractor.
12) Install erosion and sediment barriers.
13) Educate and train workers in relation to the fish and fish habitat constraints and the measures that will be implemented during the Project.
14) Provide work-containment and sediment- and erosion-control measures for all in-water work.
15) Filter pumped water when dewatering the area inside the cofferdam to reduce SS before they are discharged into the river.
16) Install a turbidity curtain prior to installation and removal of the rockfill cofferdam and during demolition.
17) Capture fish in the area between the old dam and the turbidity curtain and relocate them prior to the installation of the cofferdam. Redo the same process during the dewatering phase (Phase 1). Capture fish in the area between the turbidity curtain upstream and the new dam before the demolition of the existing dam (Phase 4).
18) Install filters on pumps during dewatering to prevent fish from entering (according to the criteria from DFO's Interim Code of Practice for End of Pipe Fish Screens (Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater (dfo-mpo.gc.ca)).
19) Use clean and appropriate-sized materials for in-water work.
20) Clean all equipment and boats that may come into contact with river water to prevent the spread of invasive alien species (IAS).
21) Prepare and implement an IAS management plan.
22) Report any IAS sightings and eliminate them properly.
23) Minimize the use of explosives near or in fish habitat. If necessary to use blasting, follow DFO measures for blasting near or in Canadian waters.
24) Before removing the upstream turbidity curtain and reopening the new dam after demolition, sample the pH inside that area. If the pH is higher than the criteria (>9) and if the pH does not naturally decrease after few hours or days, the water could be treated to lower the pH before removing the turbidity curtain and reopening the dam. The water treatment to be used and the methodology will be discussed with Indigenous groups.
25) Develop a contingency plan for excessive flood flows.
26) Monitor the work and planned measures.
27) Restore shoreline after the cofferdam is removed.
28) Restore habitat at the existing dam site.
29) Stabilize soil and restore vegetation.
30) Implement an offsetting plan and a monitoring program.

Operation period

31) Apply the Operational Management Plan (if needed, bonify it).
32) Contain work to avoid discharges into water.
33) Decontaminate and restore sites in the event of spills.

Emergencies

34) Develop an emergency response procedure.
35) Develop sediment- and erosion-control measures.
36) Stabilize soils and restore vegetation.
37) Decontaminate and restore sites in the event of spills.

Overall Assessment of the Residual effect: Non-significant

6.12 Wildlife and Habitats, including species at risk (reptiles, Amphibians, Bats and Mammals)

Description of the baseline

The terrestrial environments in the Project area cover a very small area, are disturbed and of poor quality; however, a woodchuck burrow and a beaver lodge were nevertheless found in the Terrestrial Study Area (TSA) and the Aquatic Study Area (ASA). Additional mammals, amphibians and reptiles are also present. It is highly likely that other species use the riparian habitats in the work area. Some Indigenous communities also said that wildlife uses the road passing over the dams and the island to travel to the other side of the river, and that this had been recorded on a surveillance camera. Once more details are obtained from these communities (e.g., species, frequency of movement, time of day/night movement, time of year), they will be provided as an addendum to the EIS. Regionally, other mammals like moose, deer, muskrat, etc. inhabit the forest on the Ontario side of the dam or the riverbanks in Ontario or Quebec.

The Ottawa River and Long Sault Island are transit and potential feeding habitats for the snapping turtle, a species listed as Special Concern under Species at Risk Act (SARA). This species appears to use the downstream section of the Ontario portion of the dam as a feeding area and occasionally visits the island. It should be noted that the characteristics of habitat on the Quebec side of the island are not suitable for this species. The shallow waters along the river and the Long Sault Island can be used for travel while rocky shores can serve as thermoregulation areas.

Source : La tortue serpentine | Tremblant Express

A number of bat species (4 special status and 4 non-status) have been observed in the TSA. An inventory was conducted in 2021 by KFN, WLFN and TFN in an area almost 1 km upstream of the dam, specifically in an abandoned building on the Quebec shoreline. This building is used as a maternity roost by a number of bat species. Bats were also heard in the cracks on the upstream side of the dam. Other than that, the study area could be mainly use as a feeding (over the river) or resting (in the forest) area.

Source : Faune et flore du pays - La petite chauve-souris brune (hww.ca) – Little brown bat

Anticipated changes to the environment

The Project involves direct impact as the destruction of terrestrial wildlife habitat (temporary; 5,530 m^2, permanent: 1,025 m^2 - early successional herbaceous habitat and shrubby/forested banks) as well as indirect impacts such as the effect of noise.

Noise can affect wildlife behavior, communication, distribution and foraging and therefore, cause stress to wildlife. This is particularly true for species that rely on noise for foraging (like bats) or reproduction (like amphibians or birds). Simulations done for the daytime only (Ld – 7h-22h) show that current noise vary from 62.9 dBA on the island (P2) to 53 dBA at P5 north of the road on the Ontario side. The work will bring noise level up to a maximum of 70.6 dBA on Long Sault Island (P2) during Phase 1.1, which is an increase of 7.7. dBA. Such an increase is notable, and mitigation measures such as absorbing noise barriers will be needed. It is important to remember that this phase will happen between mid-July and December, which is outside the breeding period of most wildlife species. During the other phases, noise will vary from 62.9 to 66.1 dBA (increase between 0 and 3.2 dBA). At the other points (P3, P4 and P5), the increase will be of lower amplitude, between 1.4 and 2.9 dBA during the following phases of work: Phase 1.1, 2.1 and 4.2. Globally, the noise increased during the daytime will be less than 3.2 dBA and only during a few phases, except on Long Sault Island. Mitigation measures will help reduce those levels.

Bats using the building upstream of the dam could be affected because the demolition will overlap the period of time where they are present. Given that no work will be done at night which is the time of day that bats feed, they should not be impacted by the demolition. Noise during the day could affect the bats present at the site, therefore follow-up will be undertaken to measure the effect.

Increased traffic at the site may increase the risk of mortality for some animals (vehicle collisions with wildlife). This is unlikely given the lack of quality habitat for terrestrial wildlife in the immediate vicinity of the dam. Animals that use the road over the bridge as a travel corridor may be at greater risk of being struck by a vehicle. Observations from the Ontario dam project did not record any wildlife mortality caused by traffic from project activities and it is expected to be similar for the Project. The operator of the Timiskaming Dam Complex, who has lived on the island for more than 50 years, has not observed any wildlife mortality due to traffic on the road.

Mitigation measures and Significance of the Residual Effect

The residual effect is non-significant, considering the application of the mitigation measures.

Mitigation measures for mortality, alteration of wildlife habitat

Pre-construction

1) Limit vegetation clearing and other interventions to required areas.
2) Optimize movement in the work area to minimize disturbance to wildlife.
3) Protect trees adjacent to the site by erecting a two-metre-high barrier situated one metre from the drip line.
4) Prune any tree branches damaged during pre-construction.
5) Clear vegetation and grade the site between early September and early March, which is outside the general wildlife breeding season.
6) Conduct a daily visual inspection of the work site and equipment to confirm the absence of animal species before work begins.
7) If an active animal is found in the work area, all work in the immediate area must cease. A standard wildlife-management protocol should be implemented to relocate animals that enter the work area. If individuals are observed, they will either be directed out of the work area (mammals) or captured by a designated employee trained in the safe handling and transport of wildlife, transported to the nearest available off-site location and released.
8) Control noise levels by using silencers on heavy equipment and portable generators.
9) Inspect equipment regularly and operate vehicles only when necessary.
10) Enforce the speed limit on the construction site to minimize the risk of wildlife mortality.
11) Keep the site clean to avoid attracting wildlife.
12) Record all incidental captures and accidents involving wildlife, and if significant levels are recorded at a particular location (more than 5, and more than 1 for species at risk), a biologist should be consulted to

determine, with Indigenous peoples, if additional mitigation measures are required (develop, in collaboration with Indigenous groups, and implement a wildlife management plan).

13) Notify Indigenous groups in the event of high wildlife mortality (more than 5, and one event for the species at risk).

14) Inform site workers of the potential presence of wildlife and of the measures that must be taken to avoid adverse impacts.

15) Install signage at the edge of habitats indicating the potential presence of wildlife.

Construction

16) Same as above.

Emergencies

17) Develop an emergency response procedure

18) Decontamination and remediation of site in the event of a spill

Overall Assessment of the Residual effect: Non-significant

6.13 MIGRATORY BIRDS AND BIRD SPECIES AT RISK

Description of the baseline

The inventories conducted in the spring of 2017 (28 species) and 2021 (70 species) identified several migratory bird species that use habitats in the study area. In fact, 73 bird species were observed during these inventories, 58 which are on the list of protected species under the Migratory Birds Convention Act. The Kitchi Sibi Technical Team conducted another survey on July 4, 2022 and 39 individual birds of 18 different species were recorded, including the Chimney Swift. In addition to the Ottawa River, vegetated riparian strips and grassy areas are present in the study area. These habitats are used by waterbirds and land birds of open habitats. These habitats are used during migration and as feeding areas. In addition, seven species for which breeding evidence was obtained (confirmed) were identified in the study area: Common Goldeneye, Common Merganser, Tree Swallow, Eastern Phoebe, American Wax wing, American Robin and Song Sparrow. Finally, 39 other species of migratory birds showed probable or possible breeding behaviour. Several birds (64 taxa) are also present during the fall period. Very few frequent the study area in winter.

A few bird species have the status of species at risk, among others: Barn Swallow, Peregrine Falcon, Chimney Swift, Bald Eagle and Common Nighthawk. The TSA does not have suitable nesting habitat for Peregrine Falcons, Chimney Swifts or Bald Eagles. Barn Swallows were observed during the 2017 and 2021 inventories. Although the dam provides a suitable structure for Barn Swallow nesting, no nests of this species or any other species, were noted at the dam. As for Common Nighthawk, nesting habitat, if present, is small and in man-made areas.

Source: Barn swallow | ontario.ca

Anticipated changes to the environment

The clearing and grading of the construction site will result in the temporary destruction of some of the existing vegetation cover. This will result in an episodic loss of habitat for terrestrial avifauna and of potential nesting sites for the duration of the construction work.

Birds can be disturbed by high noise levels. The current noise conditions within this area are already impacted by the road traffic, the noise of the water passing though the dams and Rayonier. Noise on Long Sault Island (P2) is already high (62.9 dBA) and will be slightly higher (62.9 to 70.6dBA) during all construction phases if no mitigation measures are implemented. For P3, on the Ontario side (current level: 59.2dBA), the criteria will be exceeded only during specific construction phases (between 62.0 and 61.6dBA) if no mitigation measures are implemented. For P4, the criteria is met for all phases (current level: 53.8dBA). A maximum increase of 10 dBA is considered adequate to limit the risk to avifauna. Measures

will be implemented to reduce the noise impact and to avoid exceeding the noise criteria. In addition, migratory birds using the area are used to this disturbed environment. Usually, waterfowl and migratory birds quickly adapt to noise from working areas.

With regard to the more aquatic avian species, the work will most likely affect the use of the aquatic area downstream of the dam by displacing species from the dam sector to other, quieter areas. On the other hand, the reduction in current velocities downstream of the cofferdam may attract some species that prefer calm water areas.

Increased traffic at the site may increase the risk of mortality for some migratory birds. This is unlikely given the lack of quality habitat along Long Sault Island and in the immediate vicinity of the dam.

Source : Common goldeneye - Wikipedia

Mitigation measures and Significance of the Residual Effect

The residual effect of the project on this VC is non-significant, considering the application of the mitigation measures.

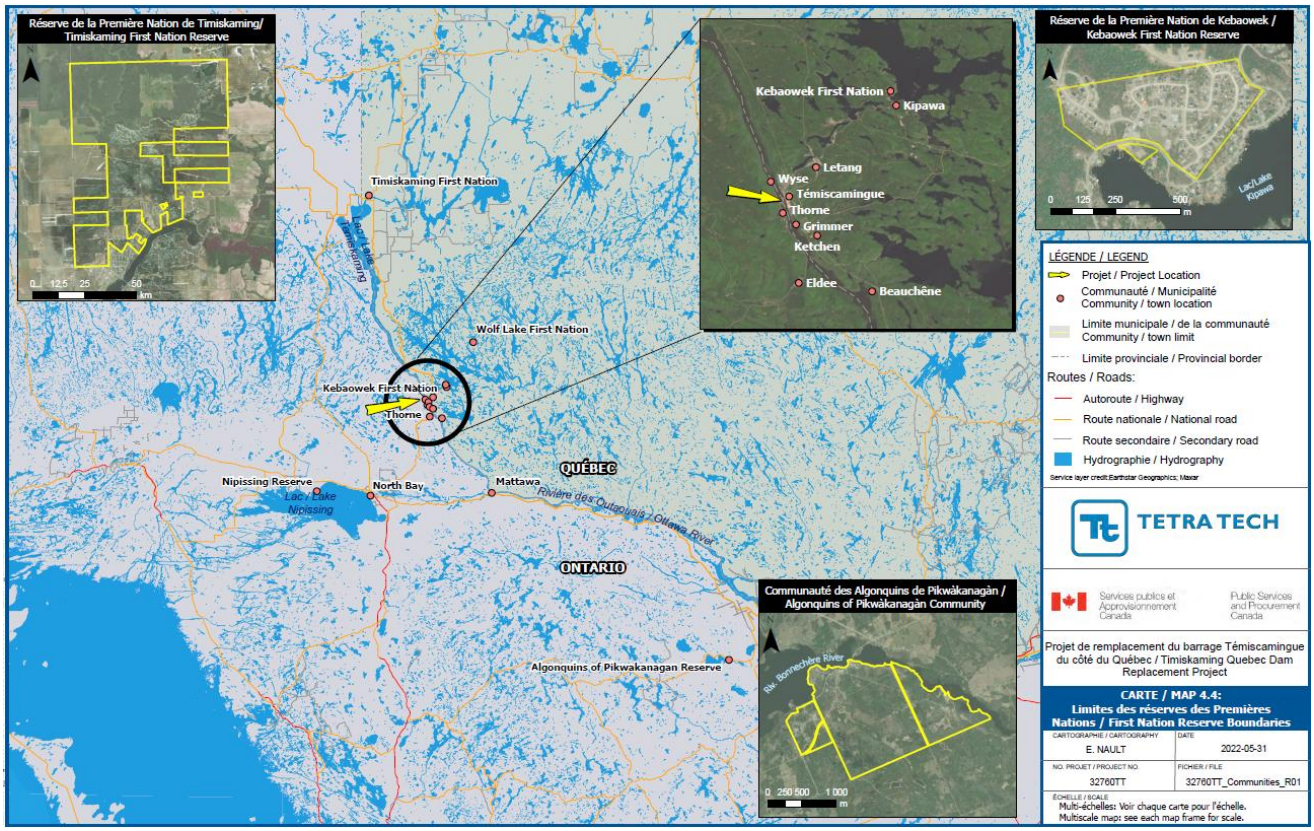
Mitigation measures for Mortality, alteration of nesting by migratory birds
Pre-construction
1) Limit vegetation clearing and work to the required areas
2) Clear and grade the site between early September and early March, which is outside the bird breeding season in the area
3) Protect trees adjacent to the site.
4) If clearing and grading cannot be scheduled to avoid the bird nesting season, prior to the start of the breeding season, install an audible bird scaring device to prevent birds from nesting in the planned work areas. A biologist should conduct bird surveys during the two days before the work is started. If nests are identified, develop a mitigation plan to minimize disturbance and access to the nest and wait until the chicks leave the nest to cut the tree or backfill the area. If this is not possible due to the work schedule, the work will be completed and incidental captures will be recorded, unless it is a SARA, COSEWIC or LEMV species, in which case, the chicks must have left the nest before the tree and any nearby trees can be cut.
5) If a nest of active migratory birds is discovered during the work, all work in the immediate area must cease and a biologist must be contacted to develop a mitigation plan.
6) Control noise levels by using silencers on heavy equipment and portable generators.
7) Inspect equipment regularly and operate vehicles only when necessary.
8) Enforce the speed limit on the construction site to minimize the risk of wildlife mortality.
9) Keep the site clean to avoid attracting wildlife.
10) Record all incidental captures, and if significant levels are recorded at a particular location (more than 5 or more than one event for species at risk), notify Indigenous groups and consult a biologist to determine, in collaboration with Indigenous groups, whether additional mitigation measures are required.
11) Inform site workers of the potential presence of migratory birds and nesting sites, and of the measures that must be taken to avoid negative effects.
12) Install signage indicating the potential presence of the migratory bird nest on the construction site at the edge of the habitats.
Construction
13) Same as above.
14) Revegetation of banks (measures included in the revegetation plan).
Emergencies
15) Develop an emergency response procedures
16) Decontamination and remediation of site in the event of a spill
Overall Assessment of the Residual effect: Non-significant

6.14 HEALTH AND SOCIO-ECONOMIC CONDITIONS

Description of the baseline

Indigenous and non-Indigenous communities (primary study communities' or 'PSCs') likely to be impacted by the Project include:

Indigenous PSCs/Groups	Non-Indigenous PSCs
Kebaowek First Nation, Wolf Lake First Nation, and Timiskaming First Nation[3]	Témiscaming, QC
Antoine Nation	Kipawa, QC
Algonquins of Ontario (representing North Bay / Mattawa First Nation)	Thorne, ON
Algonquins of Pikwakangan First Nation	Nipissing Unorganized (North) District, ON
Metis Nation of Ontario, Region 5 (representing Mattawa, North Bay and Sudbury[4] Community Councils)	Mattawa, ON
	North Bay, ON



[3] These three First Nations have chosen to be consulted as a collective. They have chosen to conduct all aspects of the EIS independently.
[4] MNO directed PSPC to involve these communities but not the Temiskaming Community Council as was outlined in the EIS Guidelines.

Non-Indigenous Communities

Temiscaming and Thorne are directly adjacent to the Project and are connected to each other via the provincial road located on the Timiskaming Dam Complex. Temiscaming is the larger of the two communities and provides goods, services and employment for those living in the smaller PSCs and rural residents in the region. Mattawa is located 76 km downstream and has a smaller population than Temiscaming and North Bay. North Bay is the largest PSC and is the regional service hub in Ontario.

The PSCs have higher Indigenous populations than the rest of Quebec and Ontario, with Temiscaming being the highest of the Quebec PSCs (22%) and Thorne being the highest of the Ontario PSCs (40%). The PSCs in Quebec are growing while those in Ontario are ageing and declining compared with the Provincial averages. Bilingualism is higher in those PSCs closest to the Project than in those farther away. Gender distribution is virtually equal in all PSCs.

Economic activities in the smaller PSCs are based in the natural resource sector and tourism. Rayonier in Temiscaming is the dominant regional employer. North Bay's economy is the most diversified of the PSCs. The region is served by transportation infrastructure.

Unemployment in PSCs is low compared with provincial averages and there are many employment opportunities in the region across many sectors. Median income in Quebec PSCs is higher than the Quebec median and lower in the Ontario PSCs than the Ontario median. Gender distribution in the workforce favours males in trades and construction while females dominate sales and services jobs.

Primary education is available in English, French and Catholic schools and post-secondary education is offered in North Bay. Educational completion is higher in the PSCs for apprenticeships, trades and college, CEGEP and non-University degrees when compared to Provincial completion rates.

The statuses of mental and physical health and quality of life indicators for the Abitibi-Témiscamingue and North Bay Perry Sound Health Regions were on par with provincial averages and were rated very good or excellent for perceived mental health and overall health. However, adult population in the two health regions were more likely than their provincial counterparts to have high blood pressure, arthritis and be overweight or obese. This correlates with data on activities affecting health where rates of physical activity are lower and smoking and heavy drinking are higher in these health regions than for provincial rates. A range of health care services are provided in the larger PSCs however, there is a shortage of health care providers. The Community Well Being Index for non-Indigenous PSCs are on par with provincial and Canadian scores while the Indigenous community scores are lower.

Drinking water for the non-Indigenous and Indigenous PSCs are not sourced from the Ottawa River or Lake Timiskaming, with the exception of for the PSPC dam operator who lives on Long Sault Island (source is Lake Timiskaming) and for Thorne (from McDougal Creek south of the dam).

Policing, fire and emergency services are provided regionally from stations located in Temiscaming, North Bay, Tilden Lake (fire only), Redbridge (fire only) and Mattawa.

Childcare services are offered only in the larger PSCs, but not in rural or smaller PSCs and could be a barrier for employment for lone-parent families.

Given the location of the PSCs to provincial parks, lakes and rivers, the region supports many outdoor recreation and tourism operators and facilities. Recreation and tourism are major contributors to the regional economy including fishing and boating. Other land and water uses include forestry, hydroelectric power generation, mining / mineral exploration, nuclear energy research (at Chalk River Labratories), and limited livestock farming.

Housing suitability is on par with the provincial rates, however housing conditions in both Ontario and Quebec PSCs were worse than provincial rates. Temporary accommodations (offered primarily for tourism) are plentiful in the PSCs nearest to the Project site. Most of the homes in Temiscaming are owned, and so rentals, while relatively affordable, are scarce.

Indigenous Communities

It is challenging to uncover specific health and socio-economic information for members of some First Nations and the MNO due to their populations living off-reserve and therefore not all demographic information is collected in census data, and not gathered by and available from the Indigenous groups themselves.

Indigenous communities engaged in the project range in population size and geographic distribution. The population of Antoine Nation is estimated at 450 people mainly located in Mattawa and North Bay; the AOPFN number 3,334 with the majority living off-reserve; the Algonquins represented by the AOO are estimated to number 7,000 - 10,000 (including AOPFN and Antoine Nation) and are distributed throughout the Algonquin settlement region. Métis citizens living in the PSCs are estimated to be 2,435.

Indigenous communities generally experience slightly poorer socio-economic and health outcomes than the provincial averages of Ontario or Quebec. Unemployment rates are substantially higher than the provincial averages, particularly in Mattawa, and are higher still for First Nation reserves in the area. The prevalence of non-communicable diseases such as hypertension, COPD, mood disorders, and arthritis are higher than provincial averages as well. Poorer health and socio-economic outcomes are linked to poverty, higher rates of unemployment, and ongoing displacement from land, water and the resources that are sustained by them.

While the Temiskaming region is valued for its relatively un-disturbed natural state compared with other more populated areas of the provinces, colonization has disconnected many Indigenous people from their lands and culture. Most groups link their overall health and well-being to this connection and therefore any degradation of the environment (real or perceived), and reduced access to lands and resources has detrimental effects on health, well-being and cultural continuity.

Fixed incomes for those on social assistance and seniors are linked to vulnerabilities with respect to housing and food security. Food security issues are partially addressed by the sharing and distribution of country foods from harvesters to meet needs within community and family networks. The ability of harvesters to have time, equipment and reasonable access to health and abundant populations of fish, wildlife and plants (country/Algonquin foods) in the Ottawa and Kipawa River watersheds is particularly important to health and wellbeing of Indigenous communities.

Housing quality, availability, and affordability are of concern in some PSCs with low rental availability inflating housing costs. This results in Indigenous people living in sub-standard housing or moving away to find more affordable and higher quality housing elsewhere. This in turn reduces social and cultural connections that also impact wellbeing and create gaps in cultural continuity.

Some Indigenous groups, notably AOPFN, have access to a range of cultural, health and social services offered on reserve. Many of the other groups who are not recognized by the government and do not have reserves and so access health, education, social, policing and emergency services from the non-Indigenous communities in which they reside.

Most Indigenous groups have expressed a need for recognition of their inherent responsibilities for land and water stewardship, which has been eroded by colonialism and contribute to lower levels of well-being.

Most Indigenous groups have interests in business and commercial activities that include First Nation and member-owned businesses as well as partnerships with other business entities in the tourism, land development, forestry, and retail sectors. Some groups are developing skills and business directories to support economic development and use of Indigenous-owned businesses. Some Indigenous groups noted the importance of the trade/Indigenous/traditional economy for sustaining culture and for sharing food, goods and services amongst family and community members.

Anticipated changes to the health and socio-economic environment

The Project is expected in increase employment and business opportunities since construction of the Project will generate demands for goods, services, and workers, some of which may be sourced from the local area. While there are local trades businesses in the region, particularly in Mattawa and North Bay, currently there are high demands for them and for all other job types in this region. These demands may or may not be sustained to 2026 when construction is planned to start. The number of workers expected at any time during construction is not expected to exceed 50 which may not exceed local capacity.

The Project is also expected to increase skills and capacity development from training programs primarily in construction and to a lesser extent during operations. These skills can be transferable to other jobs and thereby increase employability, income levels, and overall well-being.

Employment barriers are of concern and therefore assessed, for example, certain Indigenous people may face constraints related to seasonal harvesting commitments, levels of education and/or skills, unionized workforce or other federal contracting requirements, racism or sexism in the workforce that deter job seekers, or lack of services that support someone accepting a job away from his/her family and community (e.g., transportation, day care, counselling).

Project employment can decrease participation of Indigenous people in cultural events which can disrupt cultural continuity and health and well-being, especially if individuals are relied on to provide Algonquin/country foods to extended family and other community members.

An influx of non-local, non-Indigenous workers during construction could result in an increase in land and recreation uses by non-Indigenous workers. This increase could put pressure on local natural resources, tourism operators, recreation facilities and limit access to or availability of resources for hunting and fishing. The Project construction workforce and activities may also disrupt community life by displacing tourists from available accommodations, by using income for drugs, alcohol, or gambling, creating health and safety issues that can strain local police and emergency services.

If the direct Project and indirect labour needs cannot be sourced within the region, population growth may result. Population growth is desirable to sustain the economy, especially in this region, where populations have declined in the 2011 - 2016 inter-census period.

Increased use of local businesses by the construction workforce will result in the desired spin-off demand for local goods, services in local communities and sustain the employment and income and well-being for those employed in those businesses. Temporary construction workers tend to disproportionately increase demand on hospital emergency departments which may strain capacities of hospital or health care facilities during construction.

Mitigation and Enhancement measures and Significance of the Residual Effect

Socio-economic effects, unlike those for physical and biological environmental effects can be positive or negative, or bi-directional depending on the perspectives of the people and communities experiencing them. For positive socio-economic effects such as increased employment and business opportunities, enhancement measures are provided to optimize the effect and mitigation measures are provided to reduce negative effects. Overall, the negative effects are judged non-significative.

Enhancement measures for Employment and Business Opportunities
1) Prioritize local and Indigenous service providers and workers to optimize direct and indirect employment in the region. 2) Encourage joint ventures when local capacity does not exist to create benefits for local and Indigenous communities. 3) Ensure equal pay and employment opportunities. 4) Encourage contractor to use qualified local and Indigenous-owned services.
Overall Assessment of the Residual effect: N/A as the effect is considered positive

Enhancement measures for Skills and Capacity Development
1) Develop Indigenous Participation Plan (IPP) to support economic benefits, and to encourage contractors to provide training and apprenticeship opportunities. 2) Support environmental monitoring training to local, impacted Indigenous groups. 3) Support creation and long-term sustained use of local Indigenous guardianship initiatives. 4) Share monitoring results with Indigenous and non-Indigenous communities. 5) Implement measures through IPP to ensure opportunities for local Indigenous groups to benefit.
Overall Assessment of the Residual effect: N/A as the effect is considered positive

Mitigation measures for Employment Barriers
1) Institute a zero-tolerance policy for racism and sexism. 2) Provide cultural awareness and sensitivity training. 3) Monitor Indigenous women and marginalized worker concerns and respond to issues as they arise. 4) Institute confidential whistle-blower / grievance system for the workplace. 5) Encourage implementation of workplace diversity measures and incentives. 6) Discuss and address barriers to employment during development of IPP.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Participation in Cultural Events
1) Provide cultural awareness and sensitivity training. 2) Discuss cultural leave, and flex scheduling with Indigenous employees. 3) Encourage wellness and family leave policies. 4) Implement measures through IPP.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Availability of Natural Resources for Indigenous Harvesting and for other land and recreation uses
1) Give preference to local and Indigenous workers to minimize changes to harvesting. 2) Provide cultural awareness and sensitivity training. 3) Ensure all workers are aware of, and follow, provincial rules and regulations regarding hunting and fishing; work with provincial conservation officers to monitor/enforce rules.
Overall Assessment of the Residual effect: Non-significant

Enhancement measures for Increased Use of Local Businesses
1) Encourage non-local workers to stay in local accommodations and use local businesses and services. 2) Discuss workforce needs with local business organizations (Chambers of Commerce, etc.) so that they may provide goods and services that are needed / wanted by the workers and encourages them to obtain them locally.
Overall Assessment of the Residual effect: N/A as the effect is considered positive

Mitigation measures for Disruption of Community Life
1) Provide information about peak season availabilities to contractor to ensure best use of local temporary accommodations. 2) Encourage renting local housing rather than using hotels and local campgrounds and other tourism-based accommodations. 3) Request listing of local accommodation establishments, number of rooms and that are willing to provide long-term rentals. 4) Liaise with hotel owners in advance of construction to secure the needed Project accommodation, if required. 5) Create short-term accommodations (work camp / trailers) on vacant lands rented from willing local municipal, Indigenous or private property hosts, if required. 6) Provide community orientation to workers and contractors stressing requirement for respectful behaviour and use of community facilities. 7) Ensure adherence to contractor health, safety, and environmental policies. 8) Institute zero-tolerance policy for inappropriate behaviour on the job and in communities, where appropriate. 9) Communicate early and regularly with contractor, local police, social services, and municipalities to establish working relationships and ongoing exchange of information, incident tracking, corrective actions, and other strategies, as required.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Changes in Population and Demographics
None proposed
Overall Assessment of the Residual effect: N/A as the effect is considered positive

Mitigation measures for Increased Demands on Health Care Services
1) Ensure contractors have excellent safety records. 2) Recommend employees access regular medical care in their own communities. 3) Hire locally to avoid pressure on existing medical services by increasing the population. 4) Enforce worksite best practices to reduce spread of contagious disease, as required. 5) Implement testing or vaccination requirements, as required. 6) Deliver a health and safety program for all workers before and during construction employment so that the industry's excellent safety record is maintained. 7) Provide first-aid facilities on site and having first aid responders on site at all times.
Overall Assessment of the Residual effect: Non-significant

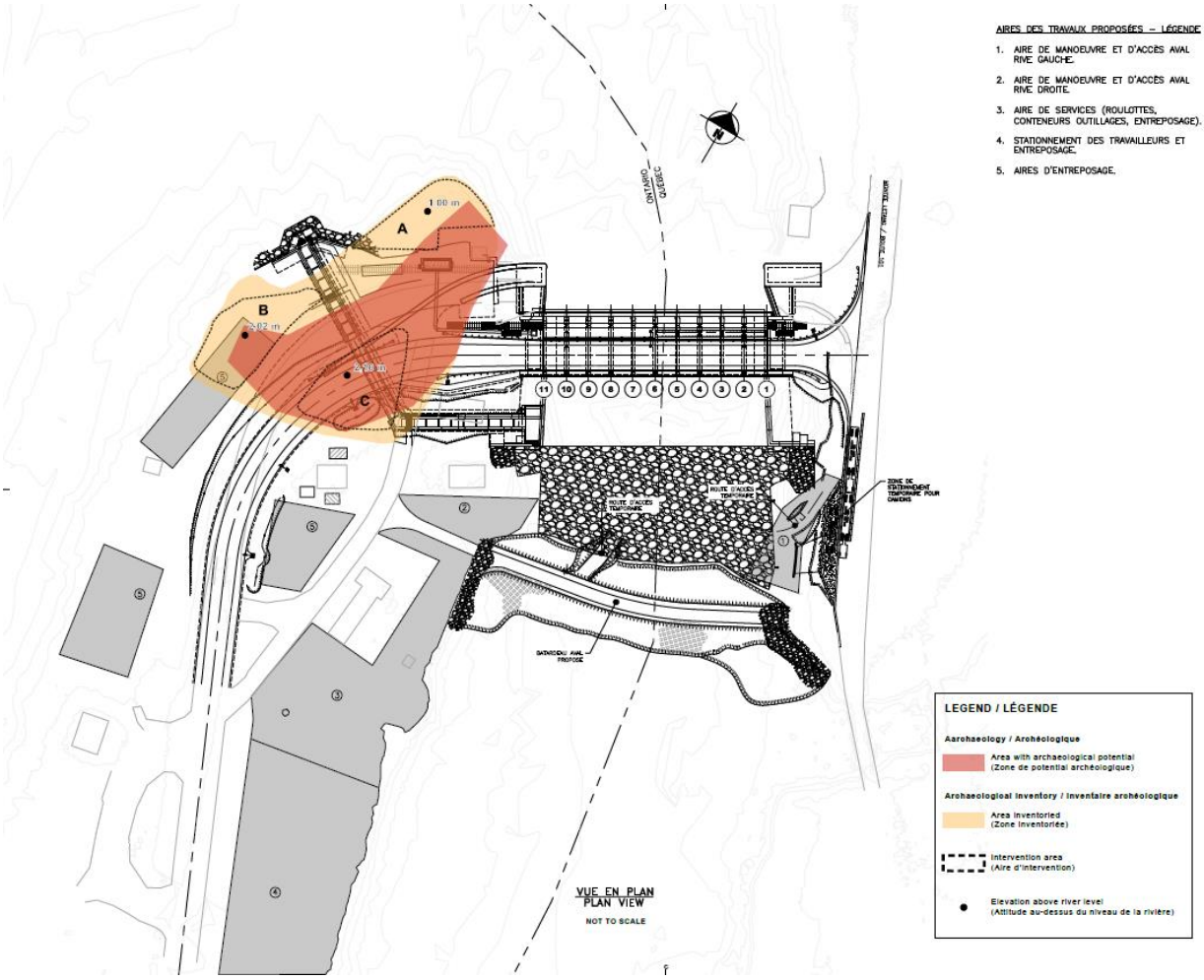
6.15 PHYSICAL AND CULTURAL HERITAGE

Description of the baseline

Physical and cultural heritage values and sites of archaeological, paleontological or architectural interest include primarily the Ottawa River (Kichi Sibi) and Long Sault Island. The Ottawa River is an important travel corridor that was used historically for trade amongst Indigenous groups and later with Europeans during the fur trade. Its cultural heritage value is evidenced in its Ontario portion being designated as a Canadian Heritage River in 2016. Due to its importance as a travel corridor, all Indigenous groups identified cultural or physical heritage sites along the banks of the river including historic and contemporary habitation sites, burials, ceremonies, and plant, natural material and wildlife harvesting. The Ottawa River is also used contemporarily for travel, swimming, waterfowl hunting and fishing.

Long Sault Island is similarly important for its intrinsic physical and cultural heritage features and values. This island was used historically and contemporarily for portaging, and is used by Indigenous groups to access fishing in the Ottawa River and Lake Timiskaming.

An archaeological study of the Project site was conducted in 2017. No archaeological resources were found, primarily due to the disturbances sustained to the site for nearly a century. An archaeological investigation will occur on the bed of the Ottawa River during construction once the cofferdam has been installed to confirm or refute the presence of archaeological resources in the river.



Anticipated changes to the environment

The potential project impacts on physical and cultural heritage features and values associated with the Ottawa River, Long Sault Island, and potential archaeological resources in the project area are:

- Potential destruction of artefacts on Long Sault Island, shoreline and bed of the Ottawa River downstream of the dam from construction activities;
- Perpetuation of changes from construction and operation activities to the natural state and ecological, and cultural heritage integrity of Long Sault Island and of the Ottawa River that is important to the preservation of cultural and physical heritage features, practicing rights, and well-being.

Mitigation measures and Significance of the Residual Effect

The residual is considered either neutral or non-significant, given the application of the mitigation measures.

Based on Parks Canada's recommendations for marine archaeology, PSPC will proceed with four phases as presented below. Given that the contracting process for professional services can take as long as 2 months and given that the marine archaeological survey cannot be conducted during winter and spring seasons due to cold weather and extreme hydrological conditions, the timeframe to complete these four phases could take 6 to 8 months with an expected completion date in September 2023. Consequently, the results of the underwater archaeological assessment are not included in this EIS and will be submitted to the Agency once completed. These four phases will be carried out by an underwater archaeologist licensed in Ontario and the assessment will follow the protocols outlined by the Ministry of Tourism and Culture of Ontario. The four phases are:

- Phase 1– Underwater Archaeological Potential Assessment (Stage 1)
- Phase 2 – Underwater Archaeological Surveys (Stage 2)
- Phase 3 – Underwater Archaeological Impact Assessment
- Phase 4 – Archaeological Intervention Plan

Mitigation measures for potential destruction of archaeological resources (on Long Sault Island)
1) Halt activities if any archaeological resources are discovered, protect the site, notify Indigenous groups and relevant authorities (provincial archaeological authorities).
2) Comply with the Ontario Heritage Act.
3) Involve interested Indigenous groups in archeological studies.
4) PSPC will work with Indigenous groups prior to construction to prepare a protocol for the protection and management of any recovered artefacts based on the archaeological intervention plan (Phase 4)
5) If artefacts are found, they will be held in trust by PSPC until the protocol can be implemented.
Overall Assessment of the Residual effect: N/A as the effect is considered neutral

Mitigation measures for potential destruction of marine archaeological artefacts
1) Conduct an underwater archaeological potential assessment (Phase 1), underwater archaeological surveys (Phase 2, if recommended and deemed feasible), an underwater archaeological impact assessment (Phase 3) and develop an archaeological intervention plan (Phase 4)
2) Comply with the Ontario and/or Quebec Standards and Guidelines for Consultant Archaeologists
3) Conduct archaeological investigation based on the archaeological intervention plan in the dewatered area once cofferdam installed, document and recover any archaeological resources, if discovered, to prevent destruction
4) Involve interested Indigenous groups in archeological studies
5) PSPC will work with Indigenous groups prior to construction to prepare a protocol for the protection and management of any recovered artefacts based on the archaeological intervention plan
6) If artefacts are found, they will be held in trust by PSPC until the protocol can be implemented
Overall Assessment of the Residual effect: N/A as the effect is considered neutral

Mitigation measures for changes to physical and cultural heritage value of Long Sault Island
1) Discuss opportunities with Indigenous groups for re-establishing natural vegetation on Long Sault Island 2) Invite Indigenous groups to harvest any trees and plants with cultural value prior to the construction of the new dam. 3) Involve Indigenous groups in the planning, design, siting, installation and maintenance of a plaque or other permanent structure that provides the history of the Ottawa River and Long Sault Island 4) Respect and allow space for Indigenous groups to conduct cultural ceremonies prior to the construction of the new dam to bring recognition and awareness to the historical alteration of the island and Ottawa River which may subsequently help to heal these historical impacts and build reconciliation with the impacted Indigenous groups.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for changes to physical and cultural heritage value of the Ottawa River
None proposed
Overall Assessment of the Residual effect: Non-significant

6.16 Fish, Fishing and Harvesting Valued Aquatic Species

Description of the baseline

All Indigenous groups use the Ottawa River and other waterbodies in their territories for fishing which is a right. Indigenous groups noted the importance of having abundant and healthy populations of fish for sustenance and, for sharing to sustain culture and maintain well-being. Pickerel/walleye, whitefish and pike are still targeted, while American eel is no longer available for harvesting as was practiced historically. Lake sturgeons are avoided due to the decline in population. American eel and lake sturgeon population changes have been directly attributed to dam construction in the Ottawa River. Fishing occurs in all seasons by rod and reel and also some people use traditional methods such as net, spears and torch lighting at night.

There is concern about the introduction of less desirable or non-native fish and aquatic species from construction of the fish ladder and about re-connecting the Ottawa River to the St. Lawrence River. If fish ladders are created along the length of the Ottawa River there is potential for invasive aquatic species migrating up the Ottawa River and endangering other native and/or desired fish that are harvested. Furthermore, harvesting (especially) larger fish is avoided due to real or perceived contamination in fish which could impact health.

Indigenous groups expect (and have the right) to be involved in monitoring fish and aquatic habitat as well as be an active participant in management decisions about the Ottawa River in the future.

Anticipated changes to the environment

The use of lights during construction could impact fish close to the dam, by influencing their behaviour. This impact on fish could change the abundance of species that are harvested, which could in turn impact the success of harvesting activities close to the dam.

The Project construction may introduce contaminants into the aquatic environment, and consequently impact fish in the area, and downstream, as well as the suitability and desirability of fish for harvesting. The concern for the direct source of contaminants from the Project focused on the material (concrete) used for the new structure potentially leaching into the water, while the indirect source was focused on the potential for the Project activities to disturb and release contaminated sediment and mats of organic material from Rayonier's operations in Temiscaming.

Fishing access is affected by fencing off certain areas close to the dam during construction and operation and maintenance periods to reduce safety risks from construction activities. This is necessary to avoid

injury or death from accidentally falling into the river below the dam. Areas that will be fenced during construction will be more extensive and result in access limitations that cannot be mitigated.

Boulders or concrete blocks were placed on the apron of the Ontario dam to replace fish habitat and were indicated as being problematic for fishing activities, with some harvesters snagging and losing their equipment on them. This could dissuade fishing activities in this area, as the loss of fishing equipment could cause frustration and financial costs to anglers.

Project activities will reduce fish habitat and spawning areas, particularly within the Project footprint where the dam is constructed (permanent loss) and also due to the installation of the cofferdam, and the dewatering of the area (temporary loss). This effect could reduce the local abundance of fish, which would in turn reduce the suitability of the local fishing area and abundance of fish.

Fish abundance and diversity have been noted as concerns by some Indigenous groups related to the potential construction of a fish ladder. The concern is that it is unknown whether the fish ladder will cause certain species to migrate into Lake Timiskaming and not migrate back into the Ottawa River through the dam. The result could be a decline in the abundance and species diversity in the Ottawa River between the Timiskaming Dam and the Otto Holden Dam where some Indigenous groups fish. Further there is concern that some predatory fish, such as catfish, may enter Lake Timiskaming and predate on valued fish species such as walleye/pickerel causing a decline in their abundance. Any declining abundance and diversity can result in furthering the negative effects on fishing rights, cultural continuity, and health and well-being.

Mitigation measures and Significance of the Residual Effect

Given the application of the mitigation measures, the residual effects vary from none to non-significant.

Mitigation measures for potential effects on fishing – For light impacts on fishing
1) Direct lights toward the working area during construction
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for potential effects on fishing – For contamination impacts on fishing
1) Install turbidity curtain and remove sediments from behind it.
2) Inspect turbidity curtain after it is installed.
3) Monitor for organic mats downstream of the dam construction site within the project area and remove if observed.
4) Share information on water/fish quality.
5) Share information on construction/demolition material composition/risks to health.
6) Involve Indigenous groups in monitoring fish and fish habitat during construction and post-construction Project phases.
7) Improve fish habitats through offsets approved by DFO
8) Include Indigenous knowledge in fish monitoring and species restoration or recovery activities, as appropriate.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for potential effects on fishing – For changes to access to fishing areas
1) Provide cultural awareness and sensitivity training to construction workers to communicate effectively with Indigenous people about fishing hazards if necessary.
2) Communicate early and regularly with communities about access to fishing areas close to the dam
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for potential effects on fishing – For loss of fishing equipment on fishing
1) Investigate alternatives to habitat creation for the Quebec apron, such as boulders rather than blocks. 2) Use blocks of a different design that are less likely to snag.
Overall Assessment of the Residual effect: N/A as impact is considered neutral

Mitigation measures for potential effects on fishing – For loss of habitat and spawning grounds on fishing
1) Improve fish habitat through offsets approved by DFO. 2) Collaborate with Indigenous groups to develop a fish habitat compensation and monitoring plan that includes Indigenous knowledge.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for potential effects on fishing – For changes in fish abundance and diversity due to fish passage on fishing.
None proposed. Delay the fish passage until further assessment is done (option 4).
Overall Assessment of the Residual effect: N/A as impact is considered neutral (options 1 and 2); Unknown impacts, not sufficient information (option 3); N/A as resulting impact from informed decisions is considered negligible or potentially positive (option 4)

6.17 WILDLIFE AND HARVESTING

Description of the baseline

Most Indigenous groups hunt large and small game throughout the Temiskaming region but hunting in the immediate vicinity of the Project was not noted in Indigenous knowledge and land use studies. Furthermore, hunting within municipal limits of Thorne and Temiscaming and on Long Sault Island is forbidden for public safety. Large wildlife species generally avoid this area due to lack of suitable habitat. Large wildlife species are not desirable on roadways and municipal areas due to potential conflicts with traffic and people. Wildlife mortality has not been observed on Long Sault Island by the dam operator who has resided on the island for more than 50 years.

Waterfowl is hunted downstream of the Project by some Indigenous groups. Hunting not only provides nutritious and healthy food to individuals and families, it is also an important cultural activity that supports the mental, emotional, and spiritual health. Large game species that are harvested include moose, deer, and bear, and small game species include rabbit, squirrel, partridge, geese, and several duck species.

Areas used for hunting include activities such as scouting, following signs, reading the weather, and enjoying and taking their time when outside in the bush. Hunting for some is conducted by foot, since the noise of motorized vehicles can disturb wildlife. Motorized vehicles are only used for retrieving large game from the bush or when used for mobility.

Anticipated changes to the environment

Wildlife mortality from increased traffic during construction and regular volumes of traffic could reduce wildlife abundance and impact hunting success. Mortality from traffic is a possible impact on wildlife and wildlife harvesting during construction and operations phases. Low level noise increases are expected during construction which may deter wildlife and impact behaviours (particularly for bats, which are not hunted).

The health and abundance of wildlife that rely on fish was noted as a concern due to increased contaminants or due to noise that may deter them from the Project area. These animals may be deterred from the Project site due to noise temporarily during construction. This is not expected to impact trapping

since there is no active trapping or other harvesting of furbearers or other wildlife in the area immediate to the Project due to municipal and industrial development. The Project will not increase water contaminants that would impact fish and in turn impact wildlife that eat fish.

Mitigation measures and Significance of the Residual Effect

Residual effects are considered non-significant or neutral, given the application of the mitigation measures.

Mitigation measures for Wildlife Harvesting – Mortality from traffic
1) Implement traffic control measures at the Project site, for example, speed limits. 2) Monitor wildlife mortality during the Project activities and address issues if mortality rate is high.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Wildlife Harvesting – Change in health and abundance of wildlife who rely on fish
None proposed.
Overall Assessment of the Residual effect: N/A as impact is considered neutral

6.18 Use of Plants and Natural Materials

Description of the baseline

Many Indigenous groups documented plant, and natural materials harvesting in the Temiskaming region and in their broader traditional territories. A wide range of plants (roots, berries, leaves, bark) and natural materials are harvested for food, medicines, building materials, and arts and crafts. Plant and natural materials harvesting typically occurs as an ancillary activity to other harvesting activity such as hunting, fishing, camping and overnighting.

Plants used for food and medicines are important for health and harvesting plants contributes to cultural continuity, strengthens social ties and is thereby important for well-being. There was concern expressed by some Indigenous groups that plant harvesting sites near the Project site on the banks of the Ottawa River could be flooded or destroyed due to the Project. MNO, Antoine Nation and AOPFN did not document any plant or natural material harvesting sites in areas that will be impacted by the Project.

There was specific concern expressed by the Algonquins represented by the AOO for loss of wolf willow, which has ceremonial significance and was documented by an interviewee to only occur on Long Sault Island. The presence of wolf willow on Long Sault Island was not found in the AOO vegetation survey conducted in September 2021 of the Ottawa River shorelines nor on Long Sault Island.

Anticipated changes to the environment

Plants and natural materials will be removed during construction (and therefore unavailable for harvesting) if they occur in the Project footprint. Plants and therefore plant harvesting could be impacted from accidental spills or runoff of road salts, dust and other contaminants from the roadway.

Mitigation measures and Significance of the Residual Effect

Considering the application of the mitigation measures, the residual effects are non-significant.

Mitigation measures for Plant and Natural Material Harvesting – For reduced plant abundance and access
1) Invite Indigenous groups to harvest any trees and plants of cultural value prior to the construction of the new dam 2) Discuss opportunities with Indigenous groups to re-establishing natural vegetation on Long Sault Island which could include the following: a. Plant new pioneer species in disturbed areas, including thistle, asters, goldenrod, mugwort, dandelion, nettles, sumac, etc., to restore disturbed sites; b. Discuss a species restoration plan with interested Indigenous communities which could include a plant re-introduction strategy for all stages of restoration; c. Make efforts to re-establish the Wolf Willow away from the construction activities on Long Sault Island, so that Algonquins represented by the AOO can continue to harvest it for medicinal and ceremonial use; d. Invite Indigenous communities to apply Indigenous knowledge to decision-making to determine which plants to seed, manage, and monitor in the Project footprint; e. Communicate restoration activities through signage other appropriate communication methods; f. Restrict access to planting sites while vulnerable to human disturbance; g. Monitor growth rates of vegetation planted to support restoration and the development of habitat. 3) Include Indigenous groups in monitoring restored plants.
Overall Assessment of the Residual effect: Non-significant

Mitigation measures for Plant and Natural Material Harvesting – For plant contamination reducing plant harvesting
1) Manage dust during construction with water 2) Restore any areas that do become contaminated by spills 3) Discuss a vegetation restoration plan with Indigenous groups for the Project footprint/construction areas and/or other parts of Long Sault Island 4) Consider the SART recommendations for the revegetation plan 5) Install silt fence during construction to capture contaminants from running into the Ottawa River 6) Design roadway to include ditching and sedimentation ponds to capture run-off of contaminants 7) Explore the creation of other areas that are accessible for harvesting medicinal plants so the need to harvest on this shoreline is reduced
Overall Assessment of the Residual effect: Non-significant

6.19 ACCESS AND TRAVEL

Description of the baseline

The Ottawa River has historically and is contemporarily used for travel and access in the region for fishing, hunting and plant harvesting. Dams on the Ottawa River have hindered access via the Ottawa River.

Road access on the bridge allows travel between Ontario to Quebec to access important services, such as schools, health care, and a variety of employment opportunities. With the reconstruction of the new dam, this positive effect is sustained and made safer for the long-term benefit of local residents and businesses.

Dispersed land use sites throughout the region are accessed by a complex network of trails, roads, transmission line clearings, and waterways, some of which were Algonquin transportation routes that had been in use since time immemorial. These access routes were either transmitted down through inter-generational knowledge or were learned through experience. Transportation modes include by foot, snowshoe, car, truck, ATV, snowmobile, boat, and canoe.

Anticipated changes to the environment

In general, the Project will have no new impacts on travel routes. During construction, the old dam will remain open, thereby allowing traffic to pass normally and without any hinderance. Once the dam

replacement is completed, the old dam will be closed, and the new dam, located 25 m downstream of the original dam, will be opened.

The Project has the possibility to positively affect pedestrian and snow machine travel across the bridge as a result of the widening of sidewalks. While this may be considered a positive, there could be negative effects if there are conflicts between pedestrian and motorized recreational traffic on the walkways.

No changes are expected to navigation on the Ottawa River. Portage routes and boat launches will remain unchanged, as they are on the Ontario side and will not be affected by construction.

Mitigation measures and Significance of the Residual Effect

The potential for conflicts between pedestrian and recreational vehicle traffic was considered non-significant. Other potential effects were not assessed as no effects are expected.

Mitigation measures - For access and travel
1) Install appropriate fencing and signage to limit pedestrian-recreational vehicle conflicts on the dam walkway.
Overall Assessment of the Residual effect: Non-significant

6.20 WATER USE

Description of the baseline

When practising land use activities within their traditional territory, many Indigenous groups obtain their drinking water from springs, creeks, rivers, and lakes. There was concern that the quality and safety of water sources have declined over time due to pollution. The Ottawa River in particular was singled out as having once been a trusted water source but is generally now avoided as a source of drinking water due to actual and perceived contamination from point sources like the Rayonier mill in Temiscaming, and from a variety of non-point sources. The concern for the direct source of contaminants from the Project focused on the material used for the new structure potentially leaching into the water, while the indirect source was focused on the potential for the Project activities to disturb and release contaminated sediment and mats of organic material from Rayonier's operations.

Water is an important component of well-being as it supports aquatic and terrestrial resources that are a foundation for supporting a range of land use activities that are crucial for the well-being of individuals and communities. Waterbodies that are unmodified and free of real or perceived contamination and barriers contribute to confidence that land use activities like swimming, bathing, and drinking water do not pose health risks and contribute to feelings of well-being.

Drinking water supply for buildings on Long Sault Island is supplied from a water intake installed on the Ontario side of the island, upstream of the island. There is no other municipal water intake in the Ottawa river in the local and regional study areas.

Anticipated changes to the environment

The avoidance of the Ottawa River for drinking, swimming, and bathing due to actual or perceived contamination from sediment and dam construction materials is a possible effect of the Project. Perceived water contamination from the Project activities could impact water quality, and Indigenous rights to water use.

Mitigation measures and Significance of the Residual Effect

Given the application of the mitigation measures, the residual effect is non-significant.

Mitigation measures for Water Use
1) Involve Indigenous groups in monitoring water quality during construction Project phases. 2) Provide water quality data to communities. 3) Other water quality mitigation measures noted in Chapter 12 of the EIS.
Overall Assessment of the Residual effect: Non-significant

6.21 RIGHTS ASSESSMENT

All of the Indigenous VCs are also important to exercising an Indigenous right. Aboriginal and Treaty rights have been recognized and affirmed by Section 35 of the *Constitution Act (1982)*. Specific rights continue to be further defined through various court decisions.

The inherent rights of Indigenous groups in Canada are outlined in the various articles of the United Nations Declaration on the Rights of Indigenous People (UNDRIP) which was endorsed by Canada in 2016 and brought into law in 2021. In the absence of completed Treaty agreements for many of the Indigenous groups involved in the Project, UNDRIP is useful and was suggested by PSPC to Indigenous groups as a foundation to the assessment of potential impacts on Indigenous rights.

The Principles Respecting the Government of Canada's Relationship with Indigenous Peoples also guided the rights assessment approach. The principles include the need to secure free, prior, and informed consent when rights impacts are proposed and that any rights infringements must by law meet a high threshold of justification.

PSPC engaged Indigenous groups to propose and determine an appropriate approach to assessing impacts on rights. Possible approaches included conducting and presenting the rights assessment in the EIS, using proposed methods or Indigenous-led methods, or conducting the assessment with the Agency.

KFN, TFN, WLFN, MNO and the Algonquins represented by the AOO are determining internally the most appropriate approach to the rights assessment and will likely complete the assessment with the Agency. This is due to the relative unfamiliarity and newness of rights assessment methods and concern that once a rights assessment is made public it could be considered by others out of context and used inappropriately. The legal ramifications of the rights assessment are being considered carefully by these groups. AOPFN has told PSPC that they intend to conduct the rights assessment with the Agency. Antoine Nation worked with PSPC to conduct the rights assessment which appears in the EIS.

Results of the Rights Assessment: Antoine Nation

There were low-medium effects (no changes from impacted baseline) or potential positive changes on AN rights associated with health and socio-economic conditions. Rights associated with physical and cultural heritage were not possible to assess (for equality in decision-making authority), low to medium effects (no change from impacted baseline) to ecological integrity of the Ottawa River and Long Sault Island and negligible if artefacts are found during construction.

Rights associated with fishing were low-medium (no change from impacted baseline) if the dam is constructed without the fish passage or constructed with the only the American eel passage. Effects on right were not possible to assess for the option where the dam is constructed with a multi-fish species passage due to lack of information about the effects of introducing fish into new reaches of the Ottawa River. Effects on AN rights were considered negligible or potentially positive if the construction of the fish passage is delayed until further study is completed. This option holds the possibility of more informed decision-making based in science and traditional knowledge.

AN rights wildlife harvesting impacts were low-medium (no change from impacted baseline); rights associated with water - perceived and real effects on water quality were high during construction, low during operations and low-medium (no change from impacted baseline) related to water flow.

AN acknowledged that they understand that the proposed reconstruction of the Timiskaming dam will likely not have any significant lasting incremental impact since the Project involves replacing an existing dam and not adding an additional one. The only exception to this general assessment of the Project potential impact on AN rights is the proposed fish passage that could have a significant and lasting negative impact on AN fishing rights. Due to the potential for these adverse rights effects, AN opposes the fish passage until there is enough information available to conduct and informed environmental assessment and there is satisfactory consultation with AN about this matter as is their right as enshrined in various UNDRIP articles.

6.22 Potential Risks to Human Health (Human Health Risk Assessment – HHRA)

The effects of the Project in the construction and operation phases will not result in elevated concentrations of chemicals or other disturbances that could negatively impact individuals living or working near the Project site. A detailed quantitative human health risk assessment was therefore deemed unnecessary.

The most likely pathways of risk to human health are during construction when there is an increase in construction equipment and vehicle transportation that may emit air contaminants, dust, noise, or accidental releases of fuels or other fluid contaminants into the environment. These have the potential to impact air quality, noise, soils and sediments, as well as surface and ground waters. Significant effects on these environmental components could in-turn impact human health through bioaccumulation in fish, plants, and wildlife that are ingested by humans. However, with the mitigation measures, the monitoring plan and the Environmental Management Plans that will be prepared to control those impacts, the risks are low.

7 EFFECTS OF POTENTIAL ACCIDENTS OR MALFUNCTION

The failure of certain infrastructures caused by human error or exceptional natural events (e.g. flooding, earthquake, fire) could cause major environmental effects. To address this, the risks of accidents and malfunctions have been identified to determine their potential magnitude (considering the worst-case credible scenario). The protective and mitigation measures to be put in place to limit the magnitude and effects of these risks were then identified. Certain design measures to limit these failures were also incorporated into the Project. In the event that these measures are insufficient, an emergency response plan is implemented.

Emergency Response Plan – Mitigation Measures

Preparation of emergency response plan for General chemical spills, fire/explosion, transportation accidents, terrorism/civil disturbance, vandalism, dam failure (reviewed annually with all stakeholders with simulations of each emergency scenario – field or desktop exercises

The sensitive environmental features are the aquatic environment and its shorelines, where wildlife habitats are found. As well, the health and safety of populations along the banks of the river must be protected. Man-made elements (i.e. the dam and various related components, including roads) are also sensitive features, since they are necessary for the proper regulation of water levels and flows or for the safe movement of people.

Various failures may occur during the construction phase. Organizational failures could disrupt the planned work schedule, which could change the duration of the temporary encroachment on the Ottawa River.

Organizational Failures during Construction – Mitigation Measures

- Close monitoring of the construction schedule to avoid those situations.
- Suspension of in-water activities for a certain period to avoid in-water work during sensitive periods.
- Preparation of emergency response plan for exceptional events with monitoring of hydrological forecasts.

At the construction site, errors in the construction of the temporary downstream cofferdams, designed to dewater the work site, could result in water infiltration. This could produce a large amount of pumped water that must be managed, which would increase the possibility of discharging water containing suspended solids into the Ottawa River.

Errors in the Construction of Cofferdam – Mitigation Measures

- Provide sufficient space at the construction site to treat additional amount of pumped water.
- Environmental monitoring during construction.

During construction of the new dam, accidents may occur due to the risk of equipment failures, potentially resulting in hydraulic oil or fuel spills. The accidents or malfunctions that could occur during demolition of the dam are mainly related to discharges of SS into the river as a result of improper handling of demolition materials, particularly concrete, or an accidental spill.

The risks associated with the operational phase are related to a failure of the gate lift system used to regulate water levels and flows, as well as events such as fire, earthquake, flooding or accidental spills.

Equipment Failure – Mitigation Measures

- Oil recovery kit on site.
- Decontamination plan.
- Turbidity curtain and containment boom downstream.

8 EFFECTS ON THE ENVIRONMENT ON THE PROJECT

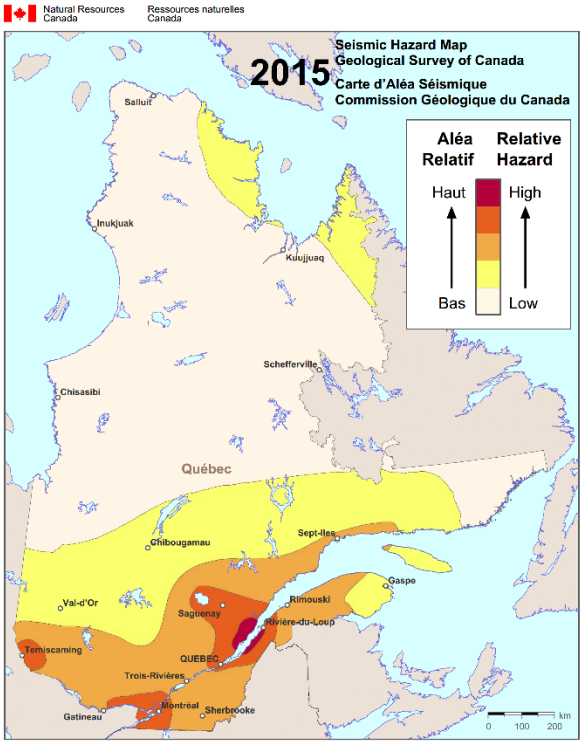
Local conditions, natural hazards and the effects of climate change could affect the Project and result in impacts on the environment. In general, these potential risks were taken into account in the dam design. Risks that could not be incorporated into the design are monitored over time, and an emergency plan is in place to address them.

In general, due to climate change over the next decades (2071-2100 period), total liquid precipitation will increase, particularly in springtime and, to a lesser degree, in summer. Solid precipitation (snow) remains fairly stable throughout the winter, but there is a slight decline in autumn and spring. The amount of annual snowfall is likely to be lower than at present. Winter, as well as autumn and spring, will be warmer.

The design of the dam is in accordance with the Canadian Dam Association Dam Safety Guidelines, which specify that the design flood used in design calculations must be 1,000 years plus 1/3 of the maximum probable flood (MPF). The dam design also takes into account climate change. The 1,000-year flood flow is 5,281.8 m^3/s, while the design flow is 6,532.5 m^3/s, which will help manage additional flows and intense rainfall events associated with climate change. The use of mechanized gates instead of wooden stop logs (the system currently in use) also provides a better responsiveness to particular events (30 minutes to reach a flow of 1,000 m^3/s instead of 5 hours).

Liquid precipitation in summer will remain fairly similar. This should allow summer water levels to be maintained at levels close to the current situation using essentially the same management approach—especially since liquid precipitation in spring will increase slightly, which makes it possible to store water during this time to mitigate potential summer droughts.

The area is not particularly prone to ice jams, landslides, avalanches, erosion, subsidence or forest fires. However, the dam is located in an area of high seismic activity. The design values outlined in the *National Building Code of Canada 2015* for earthquakes have been used to design the dam structures to ensure that the dam is able to withstand potential earthquakes in the region. The final design will be done with the most recent version of the Code.

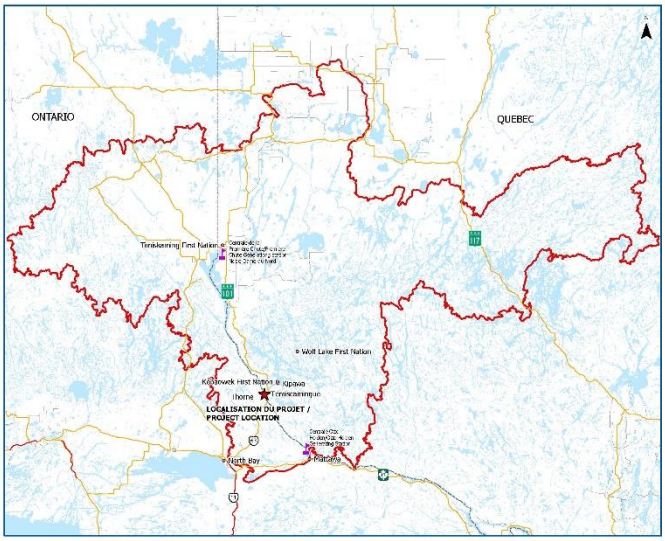


Should there be a seismic event greater than what is addressed by the code, a dam failure could occur. This would be similar to any other breach resulting in dam failure, producing a “wave of water” that could cause downstream flooding. An emergency response plan is currently in place for such situations. However, the small difference in water level between the upstream and downstream areas during most of the year minimizes the impact of such a situation.

9 CUMULATIVE EFFECTS

Cumulative effect assessment of the Project is conducted using the methodology described in the Agency's Operational Policy Statement entitled *"Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012"* and in the guide entitled "*Technical Guidance for the Assessment of Cumulative Environmental Effects under the Canadian Environmental Assessment Act (2012)"* [5]*.* The analysis also considers Indigenous traditional knowledge, drawing in particular on the Agency's reference guide to this effect: *"Considering Indigenous Traditional Knowledge in Environmental Assessments under the Canadian Environmental Assessment Act, 2012"* [6].

Biophysical and Indigenous Nations VCs were selected for the analysis. The spatial boundaries for the biophysical VCs extend from the Lake Timiscaming upstream (up the Notre-Dame-du-Nord dam – centrale de la Première-Chute) to Ottawa River downstream up to Otto Holden Dam. For the human VCs, the spatial boundaries are confined to the effects occurring within the Regional Study Area (RSA), being the Ottawa River Watershed with a focus on the Ottawa River mainstem with a focus on the physical and biological valued components within it and the lands in Ontario and Quebec directly influenced by it. The temporal boundaries selected are broken down into four periods. A search was done to identify projects within the spatial and temporal boundaries that could affect the selected VCs.



- Selected Biophysical VCs: Water quality (mercury), water quantity (flows), fish and fish habitat, lake sturgeon and eel.
- Selected Indigenous Nations VCs: Physical and cultural Heritage, Fish and Fish harvesting, Wildlife and wildlife harvesting and Plants and medicine

Project	Period	Dates	Description
Past projects	Period 1	Pre 1909	Pre-construction of dams in the Ottawa River Watershed.
	Period 2	1909 - To present	Colonization period – including influences of *Indian Act*, Residential Schools, Settlement, Industrialization and River / Tributary control structures.
Present projects	Period 3	2023- Construction end	Project construction and future foreseeable projects/activities and climate change.
Future projects	Period 4	Construction end – 2104	Project operations and future foreseeable projects/activities and climate change.

[5] https://www.canada.ca/en/impact-assessment-agency/services/policy-guidance/assessing-cumulative-environmental-effects-ceaa2012.html

[6] https://www.canada.ca/fr/agence-evaluation-impact/services/politiques-et-orientation/tenir-compte-savoir-traditionnel-autochtone-evaluations-environnementales-aux-termes-loi-canadienne-evaluation-environnementale-2012.html

Each of the major dams on the Ottawa River has flooded areas upstream and their operation has modulated the flow pattern on an annual basis. These dams will continue to operate in the future and some will require maintenance and rehabilitation. With respect to the proposed replacement of the Quebec Timiskaming Dam-Bridge, the Project will not change the management of current flows, but the changes from the pre-1909 period are significant. The flooding of the land, combined with the deforestation carried out for various past, present and future projects and the nuisances associated with these various projects and the human occupation of the territory have had and will continue to have effects on wildlife and the harvesting of certain species by Indigenous communities.

The initial flooding of the land resulted in the production of methylmercury due to the decomposition of flooded organic matter. Studies show that after a peak of 4 to 11 years after flooding, methylmercury returns to its original levels within 10 to 20 years. In the case of the Ottawa River, particularly the upstream and downstream portions of the Timiskaming Dam complex, the creation of the reservoir occurred over 100 years ago for the Timiskaming complex and 70 years ago for the Otto Holden Dam complex. Therefore, mercury concentrations in fish, due to the creation of these two reservoirs only, should have long since returned to a level close to their initial state (which is unknown) and comparable to that found in fish from nearby lakes. However, some industries still release mercury into the environment, so this effect may persist.

The dams have created barriers to the migration of fish such as the American eel, which is no longer found in the upstream and downstream basins of the Timiskaming Dam. Other species such as lake sturgeon have been partitioned to one basin between two dams and their abundance has decreased significantly. Changes in the abundance of some species were also noted. In addition to this effect, changes to the water quality of the river from various sources has also degraded the quality of fish habitat. All past, present and future projects have had and will have a significant effect on fish and fish habitat, as well as on the native fishery and consumption of water directly from the river due to actual and perceived contamination.

In general, all past, present and future projects have had and will have significant effects on the physical and cultural heritage of Indigenous communities. These projects have been carried out without community consent and their effects will continue into the future. At the time of construction of the original dam, legislation to protect Indigenous physical and cultural heritage and fishing and hunting rights was non-existent. Over time, laws and regulations to protect Indigenous rights have increased in number and effectiveness. In addition, there has been a change in Canadian legislation with the implementation of the UNDRIP and the increased opportunity to include and consider Indigenous knowledge. The increase in environmental legislation and the inclusion of Indigenous knowledge will continue to offset the negative effects.

The Project itself, however, is unlikely to generate cumulative effects, due to the mitigation measures that will be used to mitigate residual effects, and the nature of the Project itself, which generates effects over a limited area and generally over a short period associated with construction. Compensation measures will also help to limit longer term effects (revegetation of Long Sault Island, fish habitat compensation, fish ladder option). An Indigenous Participation Plan (IPP) will also be put in place for the Project to generate positive community effects.

PSPC will continue to meaningfully involve Indigenous perspectives and knowledge in future decisions related to their current and future physical activities in the Regional Study Area. This may include modifying project designs so that construction, operation and maintenance activities, and emergency response procedures do not pose further risks to the environment. It may also include implementing the highest national environmental protection standards for those infrastructure projects.

10 FOLLOW-UP AND MONITORING PROGRAMS PROPOSED

The objective of a monitoring program is to ensure that appropriate measures and controls are in place to reduce the potential for environmental degradation during all phases of the Project, and to provide defined action plans and emergency response procedures to protect human and environmental health and safety. The purpose of a follow-up program is to verify the accuracy of the effects assessment and to determine the effectiveness of the measures implemented to mitigate the adverse effects of the Project.

As a first step, these mitigation measures, as well as those from the DFO authorization, will be incorporated into the specifications so that the contractor can integrate them into work methods. The contractor is responsible for implementing the mitigation measures included in the specifications. The contractor is also responsible for selecting work methods on how they will achieve the results targeted by these measures. It should be noted that some mitigation measures are the PSPC's responsibility (e.g. archaeology) and therefore, will not be delegated to the contractor nor included in the contractual clauses. PSPC will prepare reports on these measures and will forward them to the Indigenous groups, DFO and the Agency.

All mitigation measures will be subject to environmental monitoring during construction. PSPC is the ultimate respondent for compliance with mitigation measures and commitments to Indigenous groups and stakeholders. To ensure compliance with mitigation measures during construction, PSPC will mandate Environmental site supervisors to carry out the monitoring of the construction activities. KFN, WLFN and TFN are interested in participating in the environmental monitoring activities. AN and AOPFN mentioned that they would like to be involved in the long-term monitoring of water quality, fish and fish habitats, and also to be involved in the development of the fish compensation program and its follow-up. In addition, several communities expressed their interest in participating in the development of the revegetation plan for the island and its shores following the construction and its follow-up. Also, the MNO requires involvement in the noise monitoring plan. The details of the involvement of each community will be clarified with them before the beginning of the construction.

The environmental supervisor(s) mandated by PSPC will be present at all times on the site to ensure compliance with these measures. Contractual clauses will allow the supervisors to intervene by issuing statements of deficiency or penalties when the measures are not adequately applied or when they prove insufficient to mitigate the effects. Site reports will be produced on a daily basis and an annual report will be submitted to PSPC, the Indigenous groups, DFO and the Agency. A partial report may also be submitted at the end of each of the four phases of work. In general, the follow-up reports will be prepared following each follow-up and will be transmitted to the Indigenous groups, DFO and the Agency and to any other organization/municipality that would like to see them. The Project website could be used for this dissemination.

A general Environmental Management Plan (or Project Environmental Protection Plan) for the construction period will be prepared by the contractor and submitted to PSPC environmental supervisor for comments and approval. This plan will also be shared by PSPC to Indigenous groups for their review.

Environmental Management Plan including plans for specific activities or works and for specific environmental components

General

- Communications with Indigenous groups and stakeholders
- Complaint management process
- Community benefits
- Health and safety plan

Specific activities

- Clearing and stripping
- In-water work
- Site reclamation
- Waste management
- Hazardous materials management
- Erosion and sediment control
- Waste water
- Waste management
- Spill prevention and response

Specific environmental components

- Air quality
- Greenhouse gas emissions
- Soundscape
- Surface water
- Groundwater
- Soil
- Sediments
- Protection and restoration of vegetation cover
- Invasive alien plant species (IAS)
- Fish and Fish habitat
- Wildlife-management
- Socioeconomic management

Monitoring

- GHG Monitoring Plan during Construction
- Noise monitoring Plan
- Water Quality Monitoring Plan, including SS, turbidity, temperature, pH, metals and mercury
- Sediment characterization program (at the beginning of phase 1, inside the cofferdam area, once it is dewatered)

Follow-up

- Use of existing spawning grounds during construction
- Fish and Fish habitat compensation project
- Revegetation on the banks and on the Island
- Use of the fishway
- Bat rousting site during the works
- Wildlife mortality

A socio-economic management plan will be prepared. Its objective is to summarize socio-economic mitigation and enhancement measures and to communicate, to Project personnel, contractors, Indigenous groups and stakeholders, in a clear and concise manner, PSPC policies, programs and measures. These policies, programs and measures are to be implemented during pre-construction and construction of the Project to avoid or reduce potential adverse socio-economic effects and to maximize Project-related economic and community opportunities or benefits. In addition to the socio-economic management plan, an Indigenous Participation Plan (IPP) will be included in the bid solicitation documents. The IPP details how a bidder proposes to generate socio-economic benefits for Indigenous groups and business communities. An IPP is separate from the socio-economic management plan and may address employment, training, skills development, equitability, and sub-contracting.