Publics Services and Procurement Canada

Timiskaming Dam-Bridge of Quebec Replacement Project (Quebec)

Environmental Impact Statement
PART E – Other effects
Chapter 17 Cumulative effects

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)

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February 2023

Revision 02

REVISIONS

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

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PART E - OTHER EFFECTS

17 CUMULATIVE EFFECTS

Cumulative effects are changes to the environment caused by the Project, combined with the existence of other past, current and reasonably foreseeable physical activities in the future. Cumulative effects can occur if:

- The implementation of the Project under consideration may cause direct residual adverse effects on the recovered components, taking into account the application of technically and economically feasible mitigation measures;
- The same valued components may be affected by other past, present and future physical activities.

The standards and guidelines used to address cumulative effects are presented in Section 17.1.

Section 17.2 details the approach used in this regard by AOPFN and the AOO.

Section 17.3 present the general methodology used to assess cumulative effects.

Finally, Section 17.4 is the core of the analysis itself and in this sense, it describes and analyzes the cumulative effects on the selected valued components (VCs), presents the mitigation measures, determines the significance of these effects and describes the required follow-up, if any.

17.1 STANDARDS AND GUIDELINES

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)"* [1].

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"* [2].

The methods used to conduct the cumulative effects assessment are also based on consultation activities held with Indigenous communities (see Chapter 8), as well as the First Nation's Major Projects Coalition's (FNMPC) *First Nation Major Project Assessment.* The FNMPC *First Nation Major Project Assessment Standard* (principle 8) notes that cumulative effects should be assessed:

- At a large landscape level;
- Using an account of the implications of the sum total of cumulative impacts from the past, present and future activities;
- Using significance determinations that are compared to pre-disturbance/lesser disturbed conditions, not to the current or accumulated state of the current environment;
- With an understanding of the total cumulative effects loading that has been established prior to assessment of Project effects to determine resilience and vulnerability to further change.

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

[2] 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

17.2 INDIGENOUS GROUPS CUMULATIVE EFFECTS STUDIES

PSPC funded AOPFN to conduct a cumulative effects study (CES) to evaluate the loading on key Algonquin VCs within the Ottawa River (Kichi Zibi) watershed and Kipawa River sub-watershed (AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project, 2022; "AOPFN CES"). This study noted that it was based on a framework informed by Algonquin knowledge using the following principles:

- Algonquin values that focus on sufficiency of resources available for practicing rights;
- VCs are the basis for understanding cumulative effects;
- All impacts causing agents or stressors (not just project activities) were identified and considered;
- Spatial scales for ecological and cultural VCs were identified by Knowledge Keepers;
- Temporal scales were identified by Knowledge Keepers;
- That the existing conditions of VCs could be used for context in the assessment of Project impacts.

The findings of this study are that the VCs studied (plants and trees, wildlife and wildlife habitat, water, fish and aquatic habitat, cultural continuity, sense of place and knowledge sharing, cultural heritage resources) were relatively intact prior to dam construction on the Ottawa River when compared with current conditions. Several anthropogenic stressors from mainly colonial settlement, policies, and infrastructure development that occurred in the period between 1909 and 2021 have constrained and/or have negatively impacted these VCs. The study provides several mitigation or management measures to address these cumulative impacts. These will be included in the assessment of the significance of residual cumulative impacts.

In addition, the AOPFN CES used the following thresholds in evaluating significance of the cumulative effects on each VC:

- The stock and/or health/ status trend for that VC within the AOPFN referred unceded Algonquin Traditional Territory and/or the Kipawa River subwatershed has noticeably declined between 1909 and today; or
- The stock or health status is below a threshold identified as adequate to sustain the associated AOPFN Algonquin rights; or
- Those declines have created heightened vulnerability for that VC and related AOPFN values, Algonquin rights and activities; or
- AOPFN members report that these declines have already adversely impacted on their ability to meaningfully practice their Algonquin rights (before even considering the project).

They note that, consistent with approach to assessing cumulative effects outlined in the First Nation's Major Projects Coalition's (FNMPC) *First Nation Major Project Assessment Standard* (principle 8), the total cumulative effects loading on the VC in the context of past/pre-disturbance conditions is critical to the determination of significance. Generally, and for the assessment of effects on Indigenous VCs, these thresholds have been used and considered with the quantitative data presented in their report to derive the significance ratings.

In October 2021, the AOO provided a memo containing their thoughts on PSPC's proposed approach to the cumulative effects assessment and recommendations for strengthening it (See Appendix 17.1). They supported the use of the First Nations Major Project Assessment Standard which uses a total effects loading on Indigenous VCs from historical influences (rather than starting from a current baseline). They also support avoidance of the 'project contribution' approach to the assessment and focus the assessment on VCs.

The AOO supported the temporal boundaries proposed by PSPC and shown in Table 17.3 and recommended that:

- For Period 1 as much historical information should be collected in their AKLUS and that additional interviews may be necessary to reflect historical conditions;
- For Periods 2-4 that the influences of industrialization and river/tributary control structures are the focus of the assessment in this period;
- For Periods 4 to take a seven-generation approach to reflect Algonquin perspectives and objectives for environmental jurisdiction and stewardship;
- For all Periods to consider seasonal changes on biological VCs;
- For all Periods to consider the information related to climate change that may be shared in the AKLUS - particularly how climate change related impacts may intersect with the project and influence the fish community in the Project area of the Ottawa River.

The AOO recommended using regional boundaries for each of the AOO's preliminary VCs and provided specific guidance for each. They note the AOO hold rights and jurisdiction within the AOO settlement area, and that their key areas of interest related to the Project are: Lake Temiskaming, the Kichi-Sìbì (entire width including river banks) and the portion of the Kichi-Sìbì watershed within the AOO referred to unceded AOO settlement area boundary. They requested that the assessment consider the presence, distribution of species within these spatial boundaries and that parameters such as relative abundance and health are considered as these parameters influence the Algonquin's ability to exercise their rights to fish, hunt, trap and gather.

17.3 RIGHTS ASSESSMENT

Assessments of effects on Aboriginal and Treaty Rights are contained in Chapter 13 for those Indigenous groups that chose to conduct the assessment during the preparation of the EIS. Other groups have decided to conduct the assessment in collaboration with the Agency. The Agency provides guidance[3] for assessing rights which includes an understanding of the context in which the rights are practiced. This context "*entails reviewing information about the conditions necessary to allow a community to exercise its rights and how historical and current cumulative effects may already impact those conditions, or how future foreseeable projects may have an impact*" (IAAC, 2022). Following this guidance, the rights assessments are inherently cumulative and are not re-assessed in this chapter. This chapter may provide helpful information that may support any future dialogue between the Agency and Indigenous groups as they conduct the assessment of Project effects on Aboriginal and Treaty Rights.

17.4 GENERAL METHODOLOGY

This section outlines the methods used to assess cumulative impacts on Project VCs within established spatial and temporal boundaries, considering past, present and future foreseeable projects that are reasonably certain to occur. In doing so, the cumulative effects assessment aims to provide a picture of the current influenced baseline and how that may change with the Project and future foreseeable projects and activities.

The five steps to follow to assess cumulative effects, which are described in more detail in the following sections, are:

- Step 1: Scoping;
- Step 2: Analysis;
- Step 3: Mitigation;
- Step 4: Significance;
- Step 5: Follow-up.

[3] IAAC, Assessment of Potential Impacts on the Rights of Indigenous Peoples

17.4.1 Step 1 – Scoping

Step 1 defines the scope of the assessment. This includes identifying VCs for which residual environmental effects are predicted, determining spatial and temporal boundaries to capture potential cumulative effects on these VCs, and examining the relationship of the residual environmental effects of the designated Project with those of other past, present or future foreseeable physical activities. Scoping helps determine which VCs should be carried forward to Step 2 analysis. Figure 17.1, taken from the Technical Guidance document, illustrates how to determine the scope of the cumulative effects assessment.

17.4.1.1 Selected Valued Components (VCs)

To identify the VCs to be used for the cumulative effects analysis, it is first necessary to consider whether the Project has residual effects on these components. Thus, and in accordance with the Guidelines, VCs that would not be affected by the Project or that would be positively affected by the Project are omitted from the cumulative effects assessment.

In addition, the Guidelines ask to consider, among other things, the following components likely to be affected by the Project:

- Fish and fish habitat;
- Migratory birds;
- Each of the species at risk and assessed by COSEWIC;
- Indigenous Peoples;
- Any valued component associated with Subsection 5(2) of the Canadian Environmental Assessment Act, 2012 as:
    - Changes to the environment on Health, socio-economic conditions;
    - Physical and cultural heritage;
    - Current use of lands and resources for traditional purposes;
    - Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance;
    - Effects that cross provincial boundaries;
    - Effects on federal lands.

Figure 17.1 Generic Approach to Scoping for Cumulative Effects Assessment

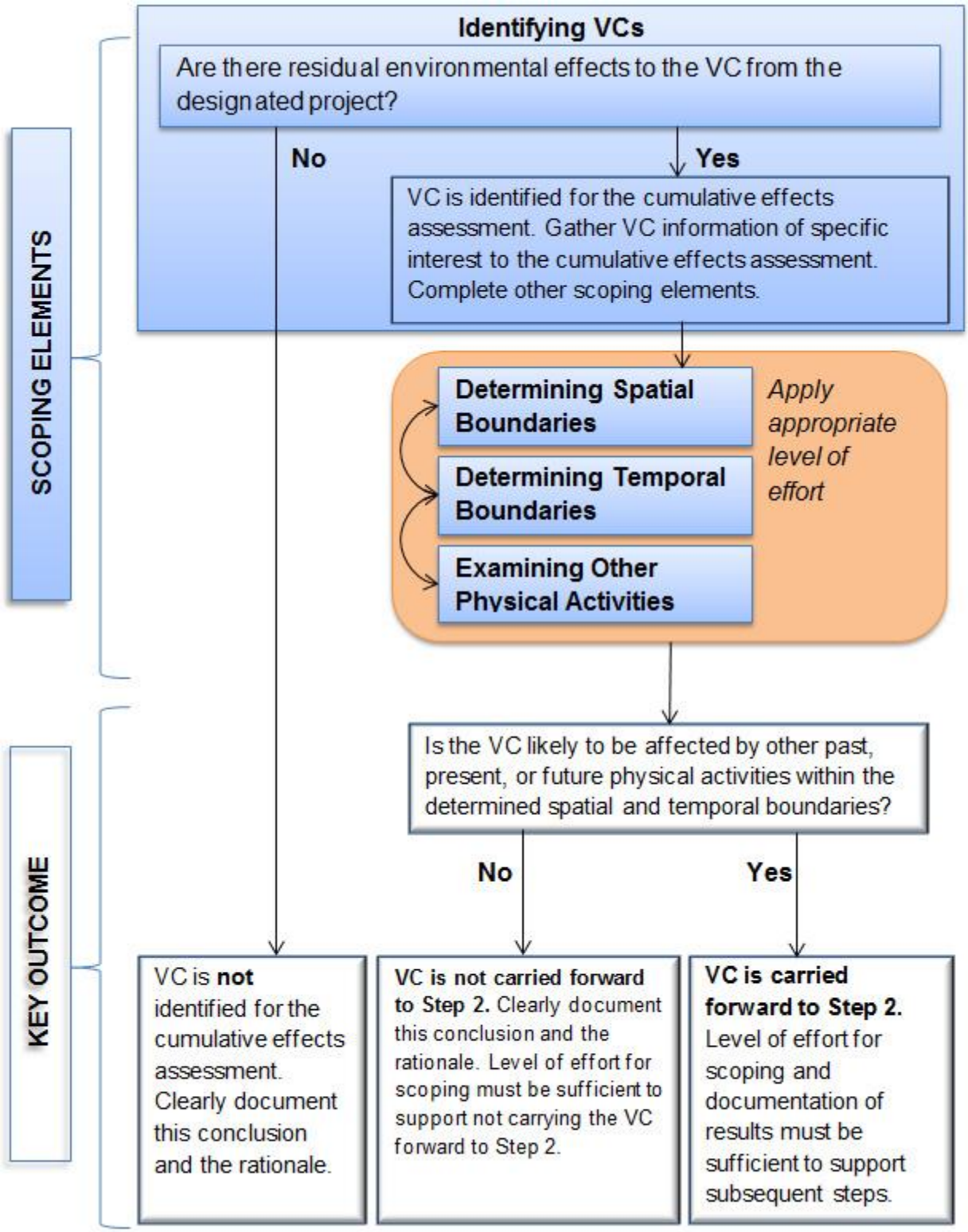


Table 17.1 presents the VCs analyzed in Chapters 11 to 14 and justifies whether to take them into consideration for the cumulative effects analysis. The cumulative effect analysis is not necessary for every VC that was discussed in Chapters 11 to 14 and that had a non-significant effect, but has to focus on VCs that are important to the public, the Indigenous Peoples and the ecosystems (key concerns). Only those VCs that were important to Indigenous groups or the public, were brought forward into the analysis.

Several assessments conducted on non-Indigenous socio-economic VCs (e.g., disruption of community life, increased demand for health care facilities and services), resulted in residual negative Project effects. These were considered non-significant primarily due to the limited size of the workforce during construction that would cause the impact. With the emphasis on assessing effects on health and socio-economic conditions that result from changes to the environment (and not from employment), these were not brought forward into the cumulative effects assessment.

The VCs that are considered for this assessment are those that are predicted to have adverse residual Project effects and are of importance to Indigenous groups or the public or based on the professional judgement of the assessors. No significant residual Project effects are anticipated. Most of the residual effects were considered non-significant while some were negligible, meaning that the residual effect is zero or near zero. Components with negligible residual effects are therefore not considered in the cumulative effects analysis.

\Indigenous groups have consistently expressed concerns about the contamination of fish by mercury. However, the Project will not impact the water quality in terms of mercury (see Chapters 11 and 12). However, given the concerns expressed by these groups, a portrait of the possible evolution (past and future) of mercury in fish flesh is nevertheless discussed in this chapter, at the request of certain Indigenous groups, and in relation to the consumption of these fish species and the health and well-being of the communities.

Other VCs of importance to Indigenous groups for inclusion in the cumulative effects analysis (see Appendices 8.1 and 8.2) include:

- Hunting that is impacted by development and increased tourism;
- Impacts to lake sturgeon, northern pike and musky;
- Aboriginal fisheries and spawning habitat;
- Change in plants and wildlife habitats due to industry impacts on landscape;
- Travel and use of the Ottawa River due to dams;
- Fish populations, which have been gradually affected by the creation of water bodies between dams;
- American eel (and other species like lake surgeon) not being able to migrate up the river due to the dam;
- Contamination of air, land and water.

Table 17.1 Rationale behind the selection of VCs

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
Air quality	Yes	No	No	The residual effects of the Project on air quality and noise would be temporary and limited to the construction period. These effects would not interact with any future foreseeable physical activities. The temporary effects of the Project on air quality will be combined with emissions from the Rayonier plant which started in 1917. Before that, we can assume that air quality was better (pre-1909 temporal boundaries – period 1). However, this cumulative effect has already been accounted for in the other periods – periods 2, 3 and 4 - of the temporal boundaries because Rayoniers' emissions are included in the baseline conditions as they contribute to local air quality. No cumulative effect is anticipated on the noise level, the noise generated during construction fades within a short distance from the project, and no other past or future foreseeable projects are contemplated with a significant impact in this area. For GHG emissions, a comparison was presented in Section 11.2.1.1.3.6 for Quebec, Ontario and Canada which provides the cumulative effects for that component.
Soil and water (erosion and sediments in water - SS)	Yes	No	No	Residual effects will be limited to the construction period and no other physical activities are planned for the same period of time and same location that could affect soil and groundwater and consequently result in the release of suspended solids. There will be no residual effect after construction. Suspended solids from other sources are considered in the fish habitat assessment.
Water contaminants (mercury)	No	Yes	Yes	Although the Project itself has no impact on mercury levels in water, this component is of interest to Indigenous groups and is therefore addressed in the cumulative effects study.
Water quantity (flows, velocities)	Yes	Yes	Yes	The residual impact for the modifications of flows and velocities is limited to the construction period. Given that other past projects (dams) have impacted the flow regime of the Ottawa River, and Indigenous groups, this component has been selected for the cumulative effects.
Fish and fish habitat (including water quality modifications - SS)	Yes	Yes	Yes	The Project will result in temporary and permanent effects on fish and fish habitat. Considering that the residual effects of the Project could be cumulative with other physical activities and that this component is of interest to Indigenous groups, this component has been retained in the cumulative effects study. The Project's impact on water quality, primarily suspended sediments, combined with the impacts from other past, present or future foreseeable projects on water quality in general, may influence fish and fish habitat. However, the Project impacts will be offset by the restoration of the fish habitat. Spawning areas below the dams in Ontario and Quebec are important whitewater spawning areas for many species.

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
Migratory birds (terrestrial and waterfowl)	Yes	No	No	Non-significant residual Project effects on migratory birds are expected. The temporary effects of the Project on the terrestrial species are limited to Long Sault Island which will be revegetated at the end of the construction. The revegetation program will be done in collaboration with the Indigenous groups. At the end, this could even result in a positive effect depending on the chosen vegetation. Waterfowl may be affected negatively due to noise in the work area, but a positive impact can be associated with providing calm water areas downstream of the cofferdam. Past experience has demonstrated that birds will adjust quickly to construction noise and use the construction area despite the nuisance. Given the very specific impact and the short term duration, and that there will be no overlap of other projects and that in some cases the impact may even be positive, the component has not been selected for the cumulative effects.
Species at risk (sturgeon, eel, turtles, hickorynut mussels, bats)	Yes	Yes	Yes	Residual effects are expected on sturgeon and turtles. Cumulative effects on turtles have not been addressed here given that the impacts are limited to the work area and are temporary, and no other physical activities that could have an impact on turtles are being planned at the same time in the same spatial area. Hickorynut mussels are not recorded in the area due to the absence of sandy substrate, so it has not been selected for the cumulative effect assessment. This species is indirectly considered in the cumulative effects assessment due to its close relationship with the sturgeon at certain stages of its life cycle. No eels are present in the area. However, the fishway could have a positive long-term effect (but still unknown for now), in combination with other upcoming fishway projects on downstream dams and they are therefore considered in the cumulative effects assessment. Sturgeon has been selected for the cumulative effects assessment as sturgeon spawning has been confirmed downstream of the Timiskaming Dam Complex. The Project will have direct impact on those spawning grounds and on fish life cycles, which will be compensated for by the offsetting program. Spawning areas below the dams in Ontario and Quebec are probably the only whitewater spawning areas for sturgeon. However, other future foreseeable projects could have cumulative effects on this species. Even if some bat species at risk (little brown bat, tricolor bat and Northern long eared myotis bats) are present and feed on insects in the project area, other physical activities are not expected to affect insects in this area, so no cumulative effects on bats are anticipated.
Vegetation	Yes	No	No	Part of the vegetation (mainly grass with some native vegetation near the shore) on Long Sault Island will be impacted by the Project during construction, but those effects will be reversed following construction by implementing a revegetation plan, in collaboration with

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
				the Indigenous groups. The residual Project effect is limited to the construction period and in a limited area that is not expected to be impacted by other future foreseeable projects, and the impact on vegetation will be positive due to the implementation of the revegetation plan. For that reason, vegetation has not been selected for the cumulative effect assessment.
Wildlife	Yes	No	No	The vegetation within the construction area will be disturbed and/or cut. These changes could impact the wildlife around the work area. The work area is a small area, already disturbed by human presence and industries, but is home to observed mustelids which have homes in the rocks around the dam replacement area and feed on the local fisheries. This area will be restored after closure of the work site, aiming for an improvement in the available habitat compared to the pre-work condition. To our knowledge, no other future foreseeable project or physical activity in the vicinity will cause wildlife habitat loss. Noise could also disturb wildlife, but simulations indicate that this has only localized effects (distance less than 500 meters). Given the localized and short duration of noise impacts on wildlife, and considering that natural noise from water circulation is already high, this VC has not been selected for the cumulative effects assessment.
Physical and Cultural Heritage	Yes	Yes	Yes	Residual Project effects are predicted for the physical and cultural heritage values of Long Sault Island, the Ottawa River and any archaeological resources found on or in them. due to alteration of these natural heritage landscape features and to potential artifact destruction during construction. The altered natural aesthetic of these features has impacted their value and use for the purposes of practicing Indigenous culture which in turn could impact the health and wellbeing of Indigenous groups. Although no artifacts were found in the 2017 survey, to prevent irreversible impacts to artifacts that could be found in the riverbed, an archeological assessment will occur in collaboration with Indigenous groups before construction. Dam and bridge construction (and re-construction), roads, linear infrastructure such as pipelines, human settlement, natural resource development (forestry, mining) have and will continue to impact the physical and cultural heritage values of the Ottawa River and Long Sault Island. Therefore, this VC will be scoped into the cumulative effects assessment.
Fish and Fish Harvesting	Yes	Yes	Yes	Residual Project effects to fish and fish harvesting include impacts from water contamination, destruction of fish habitat and bridge lights which impact fish abundance and availability for harvesting; fencing and signage limiting fishing access. All of the effects have the potential to lead to decreased fish abundance and therefore availability for fishing. Reduced fish could impact fish consumption and cultural continuity which affects Indigenous health and well-being. To increase native fish species a fishway is proposed to be installed during the construction of the dam. While the fish ladder is anticipated to have positive effects, there remains the possibility that providing a fishway to a wide variety of fish species may degrade fish populations, by connecting water bodies that were previously separated

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
				by the dam and allowing predation by introduced fish species or migration out of certain areas of the Ottawa River. These effects may also alter fish abundance and fishing. The combined effect of the fishway at the Timiskaming Dams with other fish passages constructed on downstream dams could result in cumulative impacts on fishing in the future. Contaminants from other past, present and future foreseeable physical activities may create real or perceived barriers to fishing because of concern about fish health and possible risks of consuming those fish. Past, present and future foreseeable urban and resource developments adjacent to the Ottawa River cumulatively impacts access to the river for fishing. Fishing is therefore brought forward into the cumulative effects assessment.
Wildlife and Wildlife Harvesting	Yes	Yes	Yes	Anticipated residual Project effects on wildlife and wildlife harvesting include wildlife mortality and habitat loss due to Project activities impacting harvested species abundance and therefore their availability for harvesting. Wildlife mortality from Project activities may include direct casualties, or indirect, for example, impacts to fish abundance may impact wildlife populations that rely on them. Any negative impact to wildlife could result in a negative impact to harvesting and therefore could impact diet, health and wellbeing and cultural continuity. Project disturbance to wildlife and hunting is anticipated during Project construction and will act in combination with human settlement, traffic, roads, and industrial developments to perpetuate impacts on wildlife abundance and harvesting in this area well into the future. Therefore, wildlife harvesting is brought forward into the cumulative effects assessment.
Harvesting of Plants and Natural Materials	Yes	Yes	Yes	Indigenous people who harvest riparian plants and natural materials in the vicinity of the Project have been and will continue to be impacted by the loss of plants and natural materials on Long Sault Island and the banks of the Ottawa River during construction and, in the immediate footprint of the Project throughout the operation phase. Avoidance of the Project area for plant/natural material harvesting because of real or perceived contamination of plants and natural materials from dust, chemicals, spills and roadway runoff has likely contributed to the avoidance of the Project area for harvesting. These effects are primarily from the (past and presently proposed) Project construction, traffic using the roadway, and nearby industrial influences (Rayonier) which will interact and have interacted with Project effects in the past, present and future. Reductions in plant harvesting and use could limit the opportunity for Indigenous groups to teach about cultural plants thereby disrupting cultural continuity and negatively affecting health and wellbeing that may have been supported through the consumption and use of plants for food or medicines. A re-vegetation plan for Long Sault Island is planned in collaboration with Indigenous groups to mitigate some of the past effects on plant harvesting and provides an opportunity for renewed Indigenous stewardship of the plants and natural materials on Long Sault Island.

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
				Therefore harvesting of plants and natural materials is considered in the cumulative effects assessment.
Health and Socio-Economics	Yes	No	No	Anticipated but non-significant negative residual Project effects on health and socio-economic conditions are expected on: • barriers to employment from potential racism, sexism, or bullying. • decreased participation in cultural events, • increases in non-indigenous land and resource uses • disruption of community life (non-Indigenous) • demands on health care facilities (non-indigenous). These effects result from limited Project employment opportunities during construction and not from changes to the environment from the Project. Under CEAA 2012, the changes to health and socio-economic conditions were focused on those that are caused by change to the environment. Furthermore, there are many employment opportunities available regionally, it is challenging to predict how individual employer policies and corporate cultures could impact employee behaviours and choices. For these reasons this VC is not brought forward into the cumulative effects assessment.
Water Use	Yes	Yes	Yes	Some Indigenous people have reported that they avoid the use of the Ottawa River for drinking, swimming, and bathing, and will do so- particularly during Project construction - because of real or perceived contaminants in sediment and dam construction materials. The Project effects are combined with the effects on river water quality from human settlement (municipal storm and wastewater outfalls), other dam construction, roadway run-off, agricultural run-off, natural resource development (mining, forestry), and nuclear research facilities that introduce sediments, metals and other contaminants to the river. These have and will continue to contribute to impacts on water quality and therefore its use. It is for these reasons that water use is brought forward into the cumulative effects assessment.
Access and Travel Throughout Algonquin Lands and Waters	No	No	No	Indigenous groups' access to travel through the Ottawa River has been impacted since the construction of the dams located throughout the watershed. While many other travel routes within the Ottawa River watershed have been altered or made inaccessible, the construction of the original Timiskaming dam did not impede travel routes as the Long-Sault rapids impeded river navigation and portage routes were necessary to traverse this part of the Ottawa River (Archéotec, 2017, 2017a). The construction of the dam with bridge has increased interprovincial access which has a number of socio-economic benefits.

Valued Component	Residual effect from the project?	Is the VC likely to be affected by other past, present, and future projects in the spatial and temporal boundaries?	Selected	Rationale
				Furthermore, no negative residual Project effects to navigation on the Ottawa River or Algonquin Lands are expected. Nearby boat launches are not expected to change and the existing dam will remain open for travel until the construction of the replacement dam is complete.

17.4.1.2 Determination of Spatial and Temporal Boundaries

17.4.1.2.1 Spatial Boundaries

The area considered for the cumulative effects analysis related to biophysical VCs should be large enough to allow for assessment, while taking into account ecological ecosystems. This area may be larger than the Project study area and may differ between components.

Since the selected VCs are primarily aquatic, the spatial boundaries selected are related to the Ottawa River ecosystems that may be affected by the Project and other past, present and future projects.

Thus, the spatial boundaries for the biophysical components cover the two aquatic ecosystems present, upstream (Lake Timiskaming to the Première-Chute Generating Station at Notre-Dame-du-Nord) and downstream (Ottawa River to the Otto Holden dam), as well as the watersheds of these two areas.

In the specific case of the fish passage analysis, since the first barrier is the Carillon Generating Station, located at the junction of the Ottawa River with the St-Lawrence River, the spatial boundary extends to this station, focusing on the mainstem of the Ottawa River. Table 17.2 presents these boundaries while Map 17.1 illustrate them.

Table 17.2 Spatial Boundaries for Biophysical VCs

VCs	Spatial boundary	Rationale
Water contaminants (mercury)	Lake Temiscaming upstream (up the Notre-Dame-du-Nord dam – centrale de la Première-Chute) to Ottawa River downstream up to Otto Holden Dam.	The Project has no impact on mercury levels. An increase in mercury levels in the water upstream occurred as a result of flooding caused by the construction of the two dams in 1909 and was observed for some distance downstream. Mercury levels downstream would have also been caused by the construction of the Otto Holden Dam and the flooding of the reservoir area. The spatial boundary for this VC is therefore the Timiskaming reservoir upstream of the Timiskaming Dams (up to Notre-Dame-du-Nord dam) and the Otto Holden reservoir downstream of the Timiskaming Dams up to the Otto Holden dam.
Water quantity (flows, velocities)	Lake Temiscaming upstream (up the Notre-Dame-du-Nord dam – centrale de la Première-Chute) to Ottawa River downstream up to Otto Holden Dam.	The operation of the Timiskaming Dam impacted the management of the water flows and levels in the reservoir upstream of the Timiskaming Dams (Lake Temiscaming) and the water flow discharged downstream of the Timiskaming Dam in the Ottawa River (Otto Holden reservoir downstream of the Timiskaming dam). The flow from the Otto Holden Dam is not directly influenced by the Timiskaming Dam since it's managed for hydroelectricity production. The same is true for the flow downstream of the Notre-Dame-du-Nord dam. Therefore, the spatial boundaries for this VC is the Timiskaming reservoir upstream of the Timiskaming Dams (up to Notre-Dame-du-Nord dam) and the Otto Holden reservoir downstream of the Timiskaming Dams up to the Otto Holden dam.
Fish and fish habitat (including water quality modifications - MES)	Lake Temiscaming upstream (up the Notre-Dame-du-Nord dam – centrale de la Première-Chute) to Ottawa River downstream up to Otto Holden Dam.	The Project will temporarily impact the fish species and the fish habitat over a few hundred meters downstream (100-200 m) and upstream (less than 50 m). from the dam. However, the

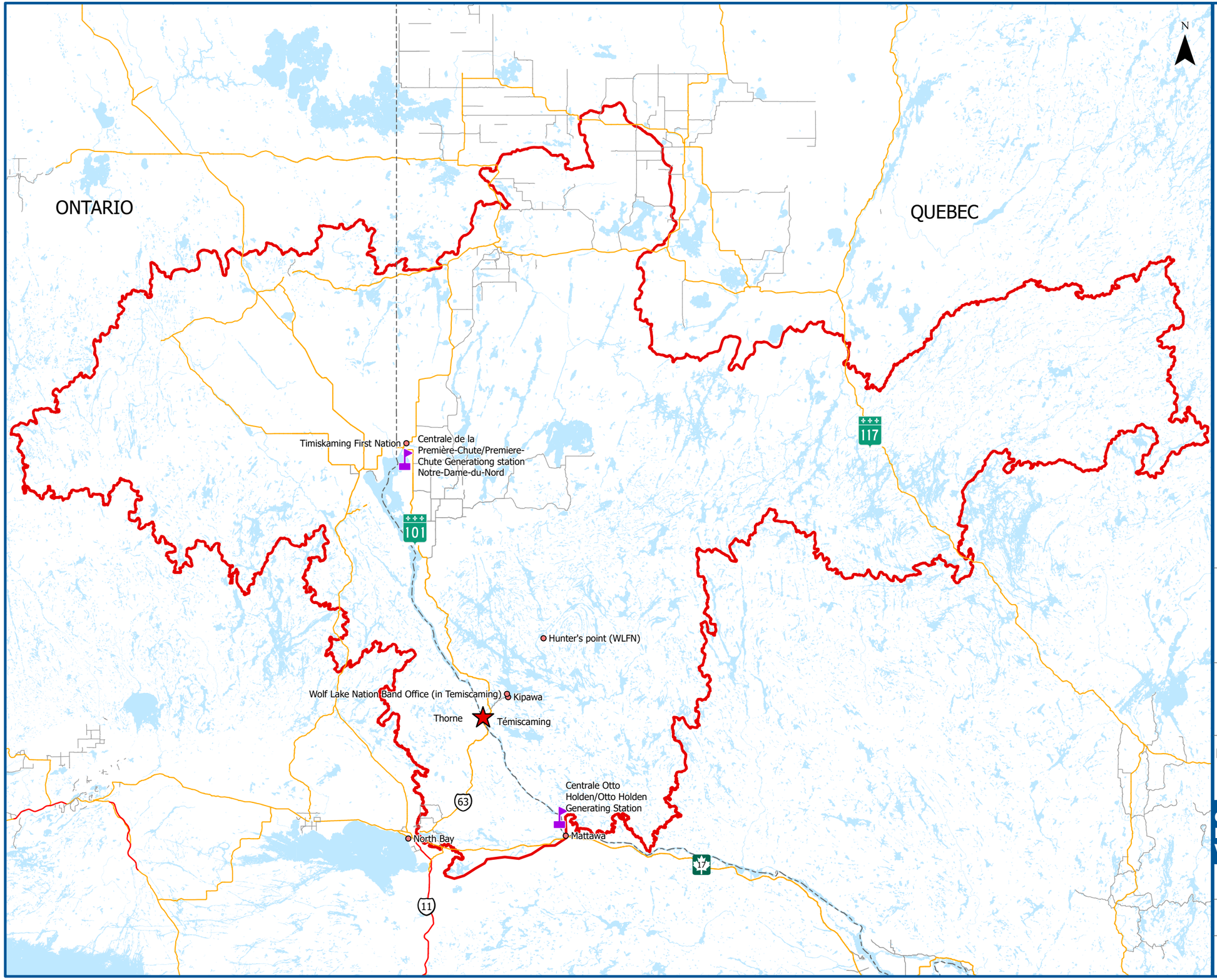
VCs	Spatial boundary	Rationale
		impacts on these fish species might be extended throughout the upstream and downstream water bodies at different stages of the fish life cycle. Therefore, the spatial boundaries for the cumulative effects assessment will be extended from Lake Témiscaming (up to Notre-Dame-du-Nord Dam) and to the Otto Holden Dam.
Species at risk (sturgeon, eel)	Lake Temiscaming upstream (up the Notre-Dame-du-Nord dam – centrale de la Première-Chute) to Ottawa River downstream up to Otto Holden Dam. For the migration barriers, the spatial boundary extends up to Carillon dam since it is the first dam in the downstream part of the Ottawa River that blocks the eel migration (main course of the river).	For the same reasons as for fish and fish habitat in general, the spatial boundaries extend from the Lake Témiscaming (up to Notre-Dame-du-Nord Dam) to the Otto Holden Dam. For these two migratory species, the presence of dams further downstream must be considered in the cumulative effects study. With the addition of fishways incorporated into these dams, these species would be allowed to migrate to upstream sections, and could potentially reach the Timiskaming Dams and further upstream.

Guidance in establishing the spatial boundary for the cumulative effects assessment on Indigenous VCs was taken from FNMPC's *First Nation Major Project Assessment Standard,* which sets out that mobility of values (VCs) and Indigenous traditional territories be considered. Feedback received through consultation with Indigenous communities was also considered to finalize the spatial boundaries. Based on feedback from Indigenous groups and the FNMPC's guidelines, the spatial boundaries used to assess the cumulative impacts on the VCs is confined to those occurring within the Regional Study Area (RSA) shown in May 4.3 in Chapter 4, being the Ottawa River Watershed with a focus on the VCs that occur within the Ottawa River mainstem and the lands in Ontario and Quebec directly influenced by it.

The AOPFN CES (AOPFN, 2022a) also included the Kipawa River sub-watershed which will be used to assess the cumulative effects on Indigenous valued components. Cumulative effects will be assessed for those communities (Indigenous and non-Indigenous) that were included in the Project impact assessment and will not consider effects on all Indigenous and non-Indigenous communities within the established RSA.

17.4.1.2.2 Temporal boundaries

The temporal boundaries selected for the assessment are broken down into four periods, which include the pre-dam era, the colonization period, the Project construction phase, and the Project operations phase. The temporal boundaries extend historically to pre-dam construction in the Ottawa River to account for in the assessment the altered state of the physical, biological or human environment conditions from stressors influencing the RSA. These timescales were informed by consultation with Indigenous groups, the AOPFN Cumulative Effects Study (AOPFN, 2022a) and the AOO Cumulative Effects Assessment (CEA) Memo (Appendix 17.1). A breakdown of each of the four periods can be found in Table 17.3.



LÉGENDE / LEGEND

- Localisation du projet/Project location
- Centrale / Generating Station
- Barrage / Dam
- Hydrographie / Hydrography
- Limites spatiales pour les CV biophysiques/ Spatial boundary for biophysical VCs
- Limite provinciale / Provincial border

Routes / Roads:

- Autoroute / Highway
- Route nationale / National road
- Route secondaire / Secondary road

TETRA TECH

Services publics et Approvisionnement Canada

Public Services and Procurement Canada

Projet de remplacement du barrage Témiscamingue du côté du Québec / Timiskaming Quebec Dam Replacement Project

Carte/Map 17.1: Limites spatiales pour les CV biophysiques/ Spatial boundary for biophysical VCs

CARTOGRAPHIE/CARTOGRAPHY	DATE
C. HOULE	2022-08-24
NO. PROJET/PROJECT NO.	FICHIER/FILE
32760TT	32760TT_CV_biophysiques

ÉCHELLE/SCALE

0 50 100 km

Table 17.3 Temporal Boundary Periods

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.

17.4.1.3 Selected Projects

The projects selected for analysis must be concrete projects, having already taken place or having a reasonable probability of materializing. Those have been grouped by categories or sector of activity to facilitate the analysis. Given the limited information available on these projects, their description and the analysis are qualitative.

17.4.1.3.1 Past Projects

The past projects were divided into two categories: those in pre-disturbance (i.e. before the construction of the Timiskaming dams) and those in the period of colonization (1909 to the present).

For past projects, a historical search about the development of the Abitibi-Témiscamingue region and the main projects that took place during these periods made it possible to identify certain projects, including the establishment of populations, agriculture, the use of resources including logging and log drives on the river, the construction of a railway and roads, and the progressive construction of dams on the Ottawa River. Studies were found on the MELCC, BAPE, Ontario and CEAA registries helped to improve the list of studies. The projects listed in AOPFN and the AOO documents are also included.

17.4.1.3.2 Present and Future Projects

The present projects are those that will take place around the same time as the construction of the new dam. On the basis of the reports and studies consulted, it is not always easy to determine the timetable for these projects. In these cases, the table (Table 17.4) indicates both present and future projects.

For future projects, and to establish the "most likely future scenario", the projects that have been selected, in accordance with the Guidelines, are therefore:

- Certain: the physical activity will proceed or there is a high probability that the physical activity will proceed, e.g., the proponent has received the necessary authorizations or is in the process of obtaining those authorizations;
- Reasonably Foreseeable: the physical activity is expected to proceed, e.g., the proponent has publicly disclosed its intention to seek the necessary environmental assessment or other authorizations to proceed;
- Hypothetical projects, if any: there is a high uncertainty as to the possible realization of this action, hypothetical based on the information currently available.

Thus, in order to identify the projects constituting the "most likely future scenario", several sources were consulted, including the MELCC registry of environmental assessments underway in Quebec, the Environmental Registry of Ontario, the CEAA federal registry, projects known to PSPC, information identified online and information provided by Indigenous communities.

17.4.1.4 Scope Summary for Cumulative Effects Analysis

Table 17.4 summarizes the elements used for the assessment of effects in Section 17.4. It is based on the example given in the CEAA orientation document[4].

17.4.2 Steps 2, 3, 4 and 5 – Cumulative Effects Analysis, Mitigation, Significance and Follow-up

Step 2 considers how the physical activities (projects) examined in Step 1 may affect the VCs identified for further analysis in Step 1. Step 2 addresses these VCs within the spatial and temporal boundaries established for the cumulative effects assessment.

Step 3 aims to identify technically and economically feasible measures that would mitigate adverse cumulative effects. Mitigation may include elimination, reduction or control or, where this is not possible, restitution measures such as replacement, restoration or compensation should be considered.

Step 4 is concerned with determining the significance of any adverse cumulative environmental effects that are likely to result from a designated project in combination with other physical activities, taking into account the implementation of mitigation measures. The significance is determined with the methodology described in Chapter 10.

Step 5 involves the development of a follow-up program that addresses both project-specific environmental effects and cumulative effects. A follow-up program verifies the accuracy of the EA and determines the effectiveness of any mitigation measures that have been implemented.

[4] Évaluation des effets environnementaux cumulatifs en vertu de la Loi canadienne sur l'évaluation environnementale (2012) - Canada.ca. Figure 4.

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Forestry	Lumber, dredging, sawdust	√	√	√	√	√		√	√	√	√	√	√	√	The clearing of forest plots for timber harvesting results in the loss of vegetation, but also in erosion related to bare soil and access roads. Log driving on the Ottawa River has had repercussions on the river, which are still perceptible in some places (logs on the river bottom, accumulation of organic matter, which can generate methylmercury by bacterial decomposition), thus degrading fish habitat. Logging activities began in the late 18th century in the area and continue to this day.
Pulp and paper	Pulp and Paper sector of Activity Rayonier plant operational changes over time Ex: J. MacLaren, Resolute, Cellulose, Whitebirch, Kruger, EB Eddy Paper and manufactures industrials, and others	√	√	√	√	√	√	√	√	√	√	√	√	√	The first sawmill was opened around 1880, on Gordon Creek, which was also used for log driving. In 1917, the pulp and paper mill began its activities. Rayonier's operations have had, and continue to have, an impact on water quality due to the release of certain contaminants (including mercury) into the river. Accumulations of organic material are present on the banks, degrading fish habitat and water quality at these locations and downstream.
Dams – hydroelectric, reservoirs, other dams	All dams and structures that are influencing flows in the Ottawa River watershed (including on all tributaries) Including the potential Onimiki project on the Gordon Creek.		√	√	√	√	√	√	√	√	√	√	√	√	The construction of dams along the Ottawa River, which took place from the beginning of the last century until the 1960s, modified natural flows according to the specific needs of each dam (flood control, power generation, etc.). The construction also modified the ecosystems which were transformed into reservoirs instead of natural watercourses. This has altered the annual distribution of flows as well as fish habitats. The creation of reservoirs also results in flooding of terrestrial land, loss of vegetation and habitat, and the production of methylmercury in the early years, which is bioaccumulated in fish, increasing the concentration of mercury in fish flesh, which also affects the quantity of fish that can be consumed without health risk. In turn, this leads to changes in traditional activities and real or perceived potential effects on human health. Most of those effects (loss of lands, change in water management) will be perpetuated for the life of those dams. A new project still at the development stage (Quebec provincial process underway – Project notice is not public yet on the MELCCFP Registry as of December 2022) consisting of two mini-power plants is planned on the Gordon Creek by the City of Temiscaming, Kebaowek First Nation and Wolf Lake First Nation. These projects would be classified as mini-hydroelectric and run-of-river hydroelectric plants. This project will take advantage of the existing facilities at Kipawa Lake (which is already a reservoir). Few technical data are currently available on the project but an ecological flow and an aesthetic flow are planned for the residual section of the Gordon Creek. A first plant would be built at the end of Lack Tee. A tunnel is planned downstream of the Lumsden dam with a second power plant just before the discharge of water into Lake Timiskaming, about 2 km upstream of the Timiskaming Quebec Dam (OBVT, 2017b; Description du projet Onimiki - OnimikiOnimiki).
Agricultural activities	Agricultural activities and fish farms.	√	√	√	√	√		√	√	√	√	√	√	√	Farming results in deforestation of plots and then the risk of water contamination from soil erosion (suspended solids) and fertilizer or other fertilizers. This can affect fish and fish habitats. Farming was one of the first means of subsistence for early settlers in the area, and remains an occupation for some today.

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
															In 2020, there were 897 registered farms in the Outaouais Region (MAPAQ, 2020). The agricultural area covers 316,068 hectares, or 10% of the Outaouais area (MAPAQ, 2020). Agriculture has led to the deforestation and appropriation of Indigenous traditional territory. Today, agricultural activities account for 5.36% (7 844 km^2) of land usage within the watershed (Ottawa Riverkeeper, 2022), making up an estimated 6,000 farms (ECCC, 2018). Agriculture is heavily reliant on potable water for crop and cattle irrigation; hence several farms are in close proximity to the watershed. Agriculture can lead to adverse impacts on the watershed due to nutrient, pesticide, and sediment runoff. Increased nutrients in the watershed can lead to algae bloom, which decreases dissolved oxygen and sunlight that are vital for aquatic species, and increased sediment or sediment accumulation can reduce the viability of fish spawning habitat.

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Mining activities	Mining activities (not exhaustive list) Mines exploiting among others phosphate, mica, brucite, iron, graphite, kaolin, magnesite, zinc, lead, gold, feldspar or silver Future projects (mainly near Rouyn-Noranda, outside of Ottawa River watershed). Upper Beaver Gold Project, Wasamac Gold Mining Project (Monarques Gold Corporation), Kipawa Rare Earth Project (Témiscaming region), Horne 5 projects: project to exploit a polymetallic gold deposit (Falco Resources) Bisset Creek Graphite Project Past and present projects Gallan, Mouska, Sigma, Beaufor, Croinor, stone-pits,		√	√	√	√	√	√	√	√	√	√	√	√	Water intakes, effluent discharges that may contain chemicals affecting water quality. These intakes and discharges are subject to laws and regulations, and water intake permits are required. Other mining related impacts include passive discharge from decommissioned pit lakes that have potentially contaminated sediments and water, runoff from mine rock storage piles carrying contaminants, potential acidic rock (PAG) leaching into the aquatic environment and siltation in the aquatic environment from stripping topsoil from land to excavate, and reduced flows due to overprinting headwater creeks and tributaries.
Commercial fishing	Commercial fishing	√	√	√				√	√	√	√				Commercial fishing is one of the main cause of fish decline (mainly sturgeon), according to COSEWIC. It stopped a few decades ago.

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Human settlement	Human settlement (population increase) Petawawa (Canadian Forces Base) Past and present activities Future activities Mixed maintenance facility for vehicle modernization Ground Vehicle Crew Training System New server building Algonquin Trail Rehabilitation (TOV) Pikwakanagan (reserve) Water supply and treatment system Timiskaming Building project (PSPC)	√	√	√	√		√	√	√	√	√	√	√	√	The first families settled in the region during the 19th century, in connection with trapping, fur trade, logging and log drives notably in the Hull area and then further north, in Témiscaming in 1880. Since then, several towns and municipalities have sprung up, with a rapidly growing population in their early days, then fairly stable thereafter. These residents, in addition to working in the forest, also farmed during the summer. In the 20th century, hunting and fishing and recreational tourism activities appeared gradually and in a more sustained manner; the Canadian Forces Base at Petawawa was also established. The municipal water intakes are susceptible to affect the water quantity whereas the sewage systems could modify the water quality (but this is a positive effect compared to non treated water discharge directly into the environment). Those have the potential to affect fish and fish habitat. As of 2018, over 2 million people resided within the Ottawa River Watershed territory. While population growth has declined compared to historic levels, trends still indicate an increase within the watershed boundary. For example, it is predicted that by 2040, population will increase by a combined total of 349,000 people in the Ontario districts of Ottawa, Lanark, Renfrew, Nipissing, and Timiskaming, and 40,900 people in the Quebec districts of Abitibi-Témiscamingue and Outaouais. This growth indicates that future development, such as housing, expansions of municipal potable and wastewater supply, health care facilities, road infrastructure, and more, will be required to accommodate the population influx. PSPC is exploring options for the repair or replacement of the buildings on the Long Sault Island. Buildings include the workshop, the office, the old garage, the oil shed and potentially the generator shed. This project is still at pre-planning phase and no schedule has been developed to date.
	Parks and protected area designations and their activities (fishing, hunting, snowmobile, etc.) National parks, provincial parks, wildlife reserve, ZEC, other		√	√	√			√	√	√	√	√	√	√	There are 18 provincial parks on the Ontario side of the RSA. In Quebec, there are five provincial parks, four ZECs (controlled harvesting zones), and three wildlife reserves. Some biodiversity reserves (actual or future) are also present on the Quebec side). While these parks do have environmental benefits, there are associated consequences of establishing parks. For example, several Indigenous Peoples were displaced from their homes and traditional territories to establish these parks. Parks also attract visitors, tourists, and subsequent development, all of which impacts the natural environment.

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Legislation	Government policy including Indian Act policies, residential schools, and other policies that have influenced the practicing of rights, and health and socio-economic conditions over time.	√	√	√	√					√	√	√	√	√	The enactment of the Indian Act in 1876 was designed to dispossess Indigenous peoples of their land, culture, and identity. Since 1876, there have been several amendments to the Act that reduced discriminatory laws, for example, laws including residential schools, gathering in groups of more than three, leaving their reserve without a pass, hiring a lawyer, owning property, practicing their culture, and laws that were sexist towards women are no longer in effect. Despite these changes, Indigenous people are still subjugated to discrimination and prejudice as a result of government policies. For example, the Act upholds the use of the term “Indian” which to many people is considered offensive and derogatory. Furthermore, Indigenous hunters, gatherers, and fishers are often harassed by conservation officers who enforce laws and policies that do not apply to them. In an effort to reconcile the injustices Indigenous Peoples have been facing since colonization, the Canadian government have enacted new laws and policies including the UNDRIP Act and the Impact Assessment Act, to protect their rights, health, and socio-economic conditions. While these new policies are a step in the right direction, further policy changes are still required to achieve reconciliation.

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Chemicals and Nuclear	Chalk River Nuclear Laboratories (CRNL) Started in 1945.but now Atomic Energy of Canada Limited (AECL). Research and development to support and advance nuclear technology. Nuclear power plant. Incidents in 1950s with radioactive material released in water. National Research Universal (NRU) reactor, incident 1958 and shutdown in 2018 and decommissioning since. Zero-power nuclear research reactor still active. Material Pit Expansion. Future plans: Near Surface Disposal Facility (Perch Creek and Lake, 1.1 km away from Ottawa River), Micro Modular Reactor,		√	√	√		√	√	√	√	√	√	√	√	Wastewater treated to remove radiological and chemical contaminants to meet the standards. Release of contamination (radioactive decay), or non-reactive like nitrite, nitrate and sulphate, suspended solids. Water withdrawal to operate the plant.
Industrial and manufacturing	25 establishment in the Outaouais Region		√	√	√			√	√	√	√	√	√	√	25 facilities whose wastewater discharges are likely to directly or indirectly cause harm to the environment[5].

[5] Portrait régional de l'eau - Outaouais - MENV (gouv.qc.ca)

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
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		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
Transportation	Steam-driven paddleboat (1820-1920). Steamboats (1920-1960).	√	√					√	√	√	√			√	Boats had a role in the river deterioration. This transportation was using wood as a source of energy, dozens of steamboats ended on the bottom of the river. Canals and steamboating accelerated the settlement and economic development of communities along the waterway.
	Ministry of Transportation projects (roads) and other roads and bridges projects including rehabilitation or maintenance works (examples: Route 117 bypassing the city of Rouyn-Noranda (MTQ), Labelle and Rivière-Rouge; Deviation from Route 117 (MTQ); Gatineau; La Vérendrye Boulevard Widening Project (City of Gatineau) Alexandra and Chaudière Bridge Replacement projects Mansfield-et-Pontefract Stabilization of Thomas-Lefebvre Road (MTQ) Other bridges projects (Alexandra and Chaudière Bridges, future crossing, Macdonald-Cartier and Portage bridge) Other linear projects like Algonguin Trail Rehabilitation		√	√	√			√	√	√	√	√	√	√	Culverts and bridges can affect fish passage, result in point losses of habitat and generate suspended sediments during construction. Loss of vegetation is also an impact of new road construction. Rehabilitation or maintenance works on linear infrastructures (spreading of aggregates, repairing bridges or culverts, clearing brushing, etc.) can cause erosion and generate suspended sediments, which can affect fish and fish habitat.
	Railroad track (1880s)	√	√	√	√			√	√	√	√	√	√	√	The first railroad reached Mattawa in 1881 and Témiscaming in 1895. In 1903, it was extended to reach the Tembec factory. In addition to the direct impacts related to the construction of a railroad (deforestation, erosion, suspended sediments, etc.), there are indirect impacts related to easier access to the hinterland in these early days of colonization. Culverts and bridges that can affect fish passage, result in point losses of habitat and generate suspended sediments during construction or repairs.

Table 17.4 Scope Summary for Cumulative Effects Assessment

Sector of activity	Concrete activities and influences	Past projects		Present projects	Future projects	Valued Components									Description of anticipated effects
						Biophysical VCs				Indigenous Peoples VCs					
		Occurs pre-disturbance (Period 1)	Occurs colonization period (period 2)	Occurs during construction (period 3a)	Occurs post-construction (period 3b)	Water quality (mercury)	Water quantity(flows)	Fish and fish habitat	Species at Risk (eel and sturgeon)	Physical and cultural Heritage	Fish and fish harvesting	Wildlife and wildlife harvesting	Plants and Natural Materials	Water Use	
	Near Mont-Laurier Expansion of the Mont-Laurier technical landfield (Régie intermunicipale des déchets de la Lièvre)				√			√	√	√	√	√	√	√	The expansion project will require deforestation and a leachate management system. The discharge of treated water must meet the standards of the REIMR and the MELCC for several parameters so as not to deteriorate the water quality of the receiving environment. The effects are limited on water quality and fish.
Transports	Electric line		√	√	√			√			√	√	√		The construction of culverts at some places in the right-of-way can affect fish passage, result in point losses of habitat and generate suspended sediments during construction. Deforestation can also cause erosion. Maintenance of electrical rights-of-way can also introduce certain contaminants into the aquatic environment, affecting fish and fish habitat as well as fish harvesting. No major future power line construction projects have been identified but maintenance of existing lines will continue in the future.
Climate Change	Climatic changes			√	√	√	√	√	√		√	√	√		Climate change impacts have been and continue to occur over the past few decades. Climate change results in more intense and frequent rainfall, colder winters, and increased temperatures. These anticipated changes may affect water quantity and fish and fish habitat and therefore fishing, hunting and plant/natural material harvesting

17.5 CUMULATIVE EFFECTS ANALYSIS (STEPS 2 TO 5)

17.5.1 Water Quality – Mercury

Although the Project will not affect mercury levels in water or fish, this component is of concern to Indigenous groups because of the potential impact on fish health, fishing and the health of Indigenous populations. It was therefore agreed to retain this VC for the cumulative effects analysis to provide a picture of this component over time.

17.5.1.1 Analysis

17.5.1.1.1 Historic Trends, Past Projects

As described in Section 12.1.6.4, methylmercury is produced by the decomposition of flooded organic matter. It then attaches to sediments and suspended particles and can be taken up by zooplankton and fish. Methylmercury is bioaccumulative. According to studies conducted by Hydro-Quebec, concentrations in fish following the creation of a reservoir peak 4 to 11 years after flooding and decline to background 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 initial impoundment occurred over 100 years ago for the Timiscaming dams and 70 years ago for the Otto Holden dam. Therefore, mercury levels in fish, due to reservoirs creation only, should have long since returned to a level close to their initial state (which are unknown) and comparable to that found in fish from nearby lakes. This seems to be confirmed by the fish consumption guidelines of Ontario and Quebec.

The creation of reservoirs following the construction of dams between the early 1900's and the 1960's, as well as the operation of the Tembec (now Rayonier) pulp and paper mill and logging (log driving on the river) are past, present and future activities that can affect the concentration of mercury in the water (as well as in sediments and aquatic wildlife). Climate change, primarily increases in water temperature, can also affect mercury levels.

The lumber industry had cut down 75% of the Ottawa Valley by the 1880s. In Ottawa in May 1882, the Irish author Oscar Wilde even referred to the pollution of the Ottawa River as a scandal (Canadian Encyclopedia, 2021). The log drive on the river was subsequently reduced, the forests were reclaimed, and over time, the mercury was reabsorbed by the sediments. Nevertheless, there are still a lot of logs on the bottom of the river.

Then the pulp and paper industry took off. Resolute had already been operating sawmills since 1820 and E.B. Eddy at Chaudière falls in 1880s (now Domtar in 2007), but several others were installed in the early 1900s, including J.MacLaren (1910), Rayonier (Riordon Pulp and Paper Company in 1918, later bought by Canadian International paper (CIP) in 1925). The wastewater from Rayonier, which contained mercury among other things, was for a long time discharged without treatment. This water also contained organic matter that was deposited along the eastern bank of the river, downstream. The organic matter and sediment adsorbed mercury, are still present in significant amounts in some locations in the sediment and organic matter layer (Arbour, 2020) (see Section 11.1.9). The construction of a water treatment plant has reduced the quantity of contaminants discharged to the river, particularly mercury (Arbour, 2020). However, significant concentrations may still be adsorbed to fine sediments downstream of the Rayonier effluent.

The forestry industry discharged a lot of sawdust and logs (wood that floated in the river and settled to the bottom); the bacterial decomposition of this organic matter can lead to an increase in methylmercury in the water. C.I.P. (Canadian International Paper) continued to float and transport logs to Lake Temiscaming until 1978[6].

[6] Partie_2_Portrait_PDE_OBVT_FINAL2.pdf

Some mining project that began during the past century also discharged mercury in the environment, since it was use for ore extraction.

17.5.1.1.2 Present and Future Projects

Mercury releases to water from facilities in Canada have decreased since 2003 (-75%) according to the National Pollutant Release Inventory[7]. Rayonier cut its mercury releases to water in half in 2017, from about 3 kg to 1.5 kg, and no releases were reported in 2020 (no data for 2021). Resolute, located in Gatineau, releases between 0 and just over 1.2 kg per year[8]. The nuclear laboratory in Chalk River does not release mercury, while the City of Ottawa's effluent is around 4 kg but reaches 10.2 kg in 2020. Most mercury releases to water come from wastewater treatment facility effluents, not from the treatment facilities themselves.

Methylmercury production is largely governed by the amount and nature of organic material flooded and by biological and physical factors, such as bacterial activity, water temperature, pH, oxygen content, etc. It is therefore likely that climate change, which will induce an increase in air and water temperatures, could have an effect on the production of methylmercury and, in turn, on the concentration of mercury in the flesh of fish.

According to a recent article from the University of Toronto [9], “which looked at trends in mercury levels found in Ontario Walleye, Northern Pike and Lake Trout over the past 15 years while projecting where levels will be in 2050”, “mercury levels in Ontario fish are on the rise and if that trend continues it will have considerable health and economic consequences in the upcoming decades. Northern Ontario lakes in particular are showing trends of increasing fish mercury levels. If the levels continue to increase at this pace, Walleye (pickerel) at almost all monitored Northern Ontario lakes will suffer sublethal effects including an inability to reproduce”. According to this study: “Fish mercury levels actually declined during the 1970s and 1980s, but mercury levels in Walleye and Pike increased between 1995 and 2011”.

The author states that "….. there may be natural variability within a system and that may show a temporary increase in fish mercury concentrations - they may either remain unchanged or even decline over a long-term period. We can hope that Lake Nipissing fish mercury levels will trend towards the lower levels observed during the 1990s. Important to notice though, is that the strength of our study lies in the above-mentioned findings for tens of locations for two key fish species: Walleye and Northern Pike."

“The study is unique because of the richness of data obtained through the Province’s long-running Fish Contaminant Monitoring Program. Not only did it cover a large geographical area but more than 200,000 measurements of fish mercury levels were taken across the province, even including remote locations only accessible by plane.”

"It is a common misperception that northern Ontario waterbodies would have less mercury in fish,". "This misunderstanding originates mainly from our common knowledge that environmental pollution primarily occurs due to human activities, and as such, urbanized areas would be more polluted and remote locations would be more or less free of contamination. We tend to extend this common belief for fish mercury levels as well. …..However, mercury is a natural element and although it can be enhanced in the environment due to human activities such as coal burning, a large portion can be due to natural events such as forest fires, volcanos etc. Further, accumulation of mercury in fish also depends on a variety of factors including characteristics of the surrounding environment, such as acidity of water. For example, the Canadian Shield region has certain features such as increased tendency for acidification, which likely results in higher fish mercury levels in the region compared to off-Shield locations. Since the majority of northern Ontario is on the Canadian Shield, it could be a major reason behind observed higher mercury levels in northern Ontario fish."

[7] Fichiers de données normalisées pour toutes les années – Rejets, éliminations, transferts et emplacement des installations - Portail du gouvernement ouvert (canada.ca)
[8] Indicateurs canadiens de durabilité l'environnement - Canada.ca
[9] Northern Ontario fish showing increasing mercury levels says U of T study - North Bay News (baytoday.ca)

17.5.1.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

Since a new area will not be flooded by the Project, there will be no new sources of organic material that could produce methylmercury. Increased mercury levels in water can also result from the resuspension of material and desorption of mercury, but because of the small amount of fine sediments in the Project area, the fact that mercury is strongly bound to particles (adsorbed) and no significant mixing of the sediments is expected, once again, no mercury is expected to be released. Lastly, the possibility of increased mercury levels due to higher water temperatures (due to climatic changes) is not considered as none of the Project phases will result in a change in water temperature. During the operation phase, we do not anticipate any significant change in water temperature that could affect mercury, due to the large volume of water in the reservoir and its depth that mitigate the temperature increase, the presence of a thermocline in the summer that mitigates temperature changes at the reservoir bed, and the mixing associated with the passage of water through the dam. Therefore, no change in mercury levels in the water or in fish resulting from the Project is anticipated and no additional attenuation measure is required.

17.5.1.2 Mitigation

Mitigation measures already proposed to minimize suspended sediments during construction will reduce the potential impact of mercury desorption on sediments, if any. No other measures appear necessary.

17.5.1.3 Significance

Dam installation likely contributed to the increased water mercury levels and affected fish flesh in the past, but mercury levels have returned to pre-disturbance levels and the effect on fish flesh has faded. None of the Project phases will result in changes to mercury levels in the water or fish flesh, so no cumulative effects are expected and no additional measures need to be applied to the current Project.

17.5.1.4 Follow-up

Contaminant releases to water and mercury levels in fish are already being monitored by both provincial governments. Discharges from the pulp and paper industry are subject to regulations and conditions that must be met. These regulations were developed under the Fisheries Act to manage threats to fish, fish habitat, and to human health from fish consumption. There is also the National Pollutant Release Inventory (NPRI) which is Canada's public inventory of releases, disposals, and transfers. Facility owners and operators may need to report if they meet some specific conditions. Moreover, Government departments regularly monitor mercury levels in fish and revise consumption recommendations, depending on species, size and water body such as the *Guide de consommation du poisson de pêche sportive en eau douce* or *Eating Ontario Fish*.

Therefore, PSPC does not intend to conduct long-term monitoring in this regard. Also, this is already being done by the provincial governments. However, in order to ensure that the few fine sediments present in the work area do not have an effect on the concentration of mercury in the work phases that are likely to return fine sediments into suspension, water samples will be collected regularly and analyzed, among other things for mercury (total mercury, inorganic mercury and methylmercury), and the results will be transmitted to the Indigenous communities (see Chapter 22). As stated in Chapter 22, in the event that mercury monitoring reveals unanticipated impacts on water quality, additional measures (adaptative mitigation) will be put in place.

17.5.2 Water Quantity – Flows

17.5.2.1 Analysis

17.5.2.1.1 Historic Trends, Past Projects

The Ottawa River is one of the most regulated rivers in Canada. On the river itself and its tributaries, there are over 50 major dams, some of which are used for hydroelectric power generation. Including smaller structures, there are several hundred dams throughout the watershed. In the Ottawa River watershed, dams serve three functions: they can be used to manage water levels, generate electricity, or provide a water

body for navigation. In the latter case, it will favour those who use motorboats and sailboats. Many dams have more than one function.

Private and public owners (PSPC, OPG, Hydro-Québec, MELCC, municipalities, etc.) operate these dams. Map 11.1 shows the location of the main dams directly on the Ottawa River. Smaller dams were also built by the forest industry in the early 1900 to facilitate logging. Water intake from municipalities, industries and mines also affect the quantity of water.

The Timiskaming Dam on the Ontario side was one of the first to be built on the Ottawa River itself and was completed in 1911. The Quebec dam was built between 1909 and 1913. The construction of this complex changed the hydraulic regime of the river and transformed the upstream portion into a reservoir, the Lake Temiscaming. The Quebec dam was damaged in 1927, forcing its reconstruction in 1934, 70 m upstream at the present location.

Other dams were built later downstream :

- Otto Holden dam built in 1952;
- Des Joachims dam built in 1950;
- Bryson dam built in 1925;
- Chenaux dam built in 1950;
- Chat Falls dam built in 1931;
- Hull 2 dam built in 1920;
- Hull 1 dam built in 1909 but closed in 1969;
- Carillon dam built in 1962.

Each of these dams has flooded upstream areas and their operation has otherwise modulated the distribution of flows on an annual basis. Thus, in general, the accumulated water is gradually released during the winter period to create storage capacity and control the spring flood. Thereafter, the water level is generally kept fairly constant in the summer, among other things to allow navigation. The fall freshet is then stored, causing the water level to rise at that time, and the cycle continues with the winter discharge. Figures 11.17 and 11.18 show the variation in water levels specifically for the Timiskaming Dam Complex.

The Otto Holden hydroelectric dam, managed by OPG, was built in 1952 at a height of 40 m. The water level rose 22.9 m just upstream of the dam (Lac La Cave Falls) and flooded 13.7 km^2 up to the Timiskaming Dam but the water level has risen and fallen since then.

The management of the dams is handled by a few private sector companies and government agencies. In order to ensure the coordination of this management, the governments of Canada, Ontario and Quebec established the Ottawa River Regulation Planning Board in 1983. The Board's mandate is to prevent flooding along the river and its tributaries, while looking after the needs of river users, particularly power producers. It must also ensure that communities downstream of the river, such as Montreal, have sufficient water to compensate for periods of drought. This form of interprovincial management is the only one of its kind in the watershed.

17.5.2.1.2 Present and Future Projects

There do not appear to be any plans for new dams, but maintenance and rehabilitation work will be required in the near future on the various structures to ensure the long-term operability of the dams. In order to ensure continuity of operations at the Bryson Generating Station, Hydro-Quebec is working on the partial rehabilitation of the three generating units as well as some improvements to the generating station building which should continue until 2023. The water intake from municipalities, industries and mines will continue in the future. Climate change will increase annual total liquid precipitation from 674 to between 760 and 822 mm depending on the emission scenario in the 2071-2100 horizon. This could influence the water

management on an annual basis yearly flow management, in order to respect the maximum water levels in the upstream reservoir.

The potential Onimiki project planned on the Kipawa River will affect the flow rates in the Gordon Creek (increase of the flow rates at certain periods of the year, and implementation of an ecological flow) and also increase flow at the new project outlet in Lake Temiskaming, approximately 2 km upstream of the Quebec dam. This will affect flows upstream and downstream of the Quebec dam.

17.5.2.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

The upstream portion of the dam was flooded during construction of the dams, no new areas will be flooded or dewatered during construction. The water passing on the Quebec side will be partially or totally diverted on the Ontario side at certain phases of construction, before returning to the same management as before the work.

Gordon Creek empties into the Ottawa River just over 100 m downstream of the Quebec dam. The flow of this stream is controlled by the Lumsden Dam, owned by the Rayonier Company, whose reservoir has a storage capacity of 1,600,000 m^3. The impact of variations in the flow of the creek could be added to that of the Timiskaming dams during the work. However, changes in reservoir water discharges during construction will be controlled by the Otto Holden Dam, approximately 50 km downstream.

The potential residual effect of increased water levels upstream of the dam during construction does not interact with other projects during construction and therefore no cumulative effects are anticipated. The water management during the operation period will adapt to the climatic changes, in order to respect the maximum water levels in the upstream reservoir. This could also mean that more flow will pass through the dam at certain periods of time during the year, but the amounts are difficult to predict. The water is managed based on real time and climatic forecasts, in order to respect the established water levels. The operation of the dam will be similar to the current operation. The design of the new dam will consider the climate change and potential increase of the flow.

17.5.2.2 Mitigation

No additional measures than those already presented are necessary. However, if the Onimiki project is constructed, the new repartition of the flow rates will have to be taken into account for the operation of the Quebec dam.

17.5.2.3 Significance

Presence of dams alters water flow relative to pre-disturbance conditions, but flow is regulated and monitored to avoid flooding or dewatering of sections. Considering that the residual effects of the present Project are not in addition to the existing or foreseeable impacts of other projects (except the potential Onimiki project for which few technical details are available), cumulative effects are not expected and therefore are not significant. Given the absence of cumulative effects of the Project with other projects, no mitigation or follow-up measures appear necessary, beyond those already included in the Project.

17.5.2.4 Follow-up

The Ottawa River Regulation Planning Board was established to ensure integrated management of the principal reservoirs of the Ottawa River Basin and to reduce flood and drought impacts along the Ottawa River and its tributaries, while maintaining the beneficial uses of water in the basin. The Board will continue to do so and manage the river in accordance with its objectives. AN mentioned his interest in participating and being a member of this Board. Steps have been taken to this effect by the community.

17.5.3 Fish and Fish Habitat

17.5.3.1 Analysis

17.5.3.1.1 Historic Trends, Past Projects

The Ottawa River watershed is home to many fish species and habitats. The Algonquins Peoples' have fished and cared for these sites for generations. Species include lake sturgeon, walleye, bass, brook trout, lake trout, lake whitefish, northern pike, white sucker, walleye and yellow perch, among others. Muskellunge, walleye and sturgeon are the main fish in this area. Smaller fish are also found.

There is little information on the health of fish populations prior to human disturbances such as dam construction or the timber industry. Some Indigenous groups such as the AOO, report that fish abundance and size have declined, at least over the past 30 years (cumulative effects of the NWPA - Appendix 17.1). Haxton and Chubbuck (2002) note that the diversity and distribution of fish species has indeed been affected by the development of the Ottawa River, particularly during hydroelectric development. Several potential causes are reported: dams block the migration of migratory species, fragment habitats, cause mortality by passing individuals through turbines, alter habitat by flooding the land, and consequently increase temperatures.

Fish population abundance appears to have been disrupted prior to dam construction, as the quantity of fish caught declined in the latter half of the nineteenth century, but fishing remained a successful activity even after the construction of dams (Haxton and Chubbuck, 2002). In fact, Hydro-Quebec monitoring programs have shown that fish productivity in a reservoir was higher in the years following the installation of the dam and returned to pre-project levels after about 10 years. Downstream of a dam, increased nutrient inputs have positively affected fisheries yields (WSP, 2020).

The placement of river dams can directly or indirectly affect fish populations. Habitat fragmentation due to the installation of human infrastructure is a major threat to fish populations. First, the imposition of a physical barrier to fish movement results in the confinement of individuals by section. This isolation limits population mixing and restricts genetic diversity, which can have long-term impacts on the species (WWF Canada, 2014). No data on the genetics of Ottawa River fish from the pre-alteration environment are available. Second, habitat fragmentation may indirectly impact fish diet. Changes in flow conditions and water level elevation may alter the type of food available. Some areas that are suitable for prey may become inaccessible to a portion of the population confined to another area. New dams also modify the thermal regime of the new reservoir compared to the thermal regime of the river.

Studies of dams on the Quebec North Shore (Côte-Nord du Québec) have shown that fish species biodiversity is not affected by dam construction, but that species replacement has been observed. Native species, such as catostomids, have been replaced by generalist species, including piscivores such as bass and walleye. This transition appears to stem from dam construction transforming lotic systems into lentic systems, favoring generalist species (Turgeon *et al.,* 2017).

Population changes may differ between reaches; in the Ottawa River basin, species richness increased between 1999 and 2011 in the middle reach but decreased in the lower reach from 1999 to 2010, only to increase again in 2011 (WWF Canada, 2014).

Changes in water levels caused by anthropogenic control of dam flows, can have negative effects on species, particularly those that use the nearshore environment as a breeding ground. Lake trout (*Salvelinus namaycush*) breed in the fall and lay their eggs in shallow water along the shores of reservoirs such as Kipawa (Lycke, 2014). A drop in water level in the fall can expose eggs to the air which dry out and die while affecting the reproductive rate of the population. This impact can be minimized or eliminated by coordinating the water level drop with the breeding season of species using nearshore habitats for reproduction.

Dams can result in mortality of fish passing through water turbines; they can be injured or killed by moving parts of the turbine or by fixed parts such as guide vanes and impeller blades. The proportion of fish entrained is very small and the loss of biomass is minimal (WSP, 2020).

A dam can also influence water temperature, with surface water temperatures warmer in summer and cooler in winter (on the order of 1-6°C) after reservoir impoundment than before dam installation. These changes do not appear to affect fish diversity and productivity but may impact the reproductive timing of some species (WSP, 2020).

For over a century, the water quality of the Ottawa River has been threatened by a number of human activities. The lumber and pulp and paper industries have contributed significantly to the pollution of the water through the accumulation of organic matter in the river. This industry has also greatly contributed to the settlement of populations along the river. Workers settled near logging sites and wood processing plants. Transportation systems developed, such as steamboats, railroads and roads, which also influenced the water quality of the Ottawa River and its tributaries.

Urbanization is an important source of pollutants, including wastewater effluents, agri-food industries and factories. Agriculture is an important sector of activity in the Outaouais region. Phosphorus inputs have altered primary production and impacted the health of waterways. Industrial sites and urban facilities located near watercourses are considered a potential pressure on water quality through runoff and sedimentation, or pollution and contamination (e.g. effluent discharge, deposition of airborne pollutants). Legislation and best practices, combined with the construction of municipal and industrial wastewater treatment plants starting in the years 1970-1980, contributed to the water quality upgrade observed. Suspended sediments may have increase over the years due to erosion related to past projects; however, data shows that the sediment concentrations are quite low, with a peak in spring, similar to other rivers (see Chapter 11).

17.5.3.1.2 Present and Future Projects

Current population growth will only increase human pressures on the Ottawa River. Urban development, resort activities, fishing pressure and agricultural activities will only increase over time. These activities introduce certain contaminants (SS, fertilizers, phosphates, etc.) into the waters of the river. Urbanization and farming activities are more prevalent in the downstream section of the river and the residual impacts of the Project would not be noticeable at such a distance. Other projects such as mining projects, mainly located east of Rouyn-Noranda, are planned and will have an impact on the situation of fish and their habitat.

The Rayonier mill is located in close proximity to the Project and the quality of its effluent is of concern to the public. The mill consists of three main plants that produce the following products: high purity cellulose, high yield pulp and coated board. Several chemicals are used in the manufacture of these products. The mill may release ammonia, cadmium, chromium, cobalt, formaldehyde, manganese, methanol, lead and selenium into the river[10]. Effluents are always controlled, and the Rayonier site has an ISO 14001 certified environmental management system (Rayonier, 2021a).

The potential Onimiki project could modify the flow rates at the mouth of Gordon Creek, where spawning occurs. An ecological flow will be determined to ensure that ecological functions are maintained. The impacts of this project on fish and fish habitat have not been evaluated yet.

Climatic changes will increase air temperature and precipitation. These changes may in turn affect water temperature and the water management on a yearly basis, but the maximum reservoir levels will remain similar. Spill flows at certain times of the year could be slightly higher, affecting current velocities at the spawning grounds downstream of the dam. An increase in water temperature could result in a shift in the start of the spawning period for fish, which is often dictated by water temperature. However, considering the large volume of water in the reservoir and the mixing of water as it passes through the dam, the overall change in water temperature should be low.

[10] Recherche en ligne des données de l'Inventaire national des rejets de polluants - Canada.ca

17.5.3.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

The need for portaging on both sides of the river and on Long Sault Island (Archéotec, 2017, 2017a; Haxton and Chubbuck, 2002) indicates that the rapids that existed on both sides of the island prior to dam construction had too strong a current to be crossed by boat. This barrier may also have been impassable to fish, to some species with poor swimming or jumping ability at least. The term "Long Sault" probably refers to the large rapid that existed at this location before the dam was built.

The potential for fish migration will be the same with the new dam as with the old one and even better with the installation of a fish passage, if this option is chosen. Despite the lack of negative residual effects of the Project on fish migration, this is a public concern that has often been heard. Overtime, the dams have affected the distribution of fish by blocking or reducing potential of the migratory species passage. However, there were already some natural obstacles to migration before the construction of the dams on the Ottawa River.

Table 17.5 presents the fish species that are present upstream and downstream the Timiskaming Dam (OMNRF and MFFPQ, 2018). The only species present downstream that is not currently present upstream is the Hornyhead Chub, a small species of minnow in the Cyprinideae family. The Hornyhead Chub is found in rocky pools and runs of creeks and small to medium-sized rivers. Smallmouth Bass, Northern Pike, and Rock Cass are thought to prey on the Hornyhead Chub. A variety of plant and animal food items are commonly reported for Hornyhead Chubs. Typical adult size is 100-150 mm, with a maximum of 225 mm. Additional research at a later stage of fish passage design will determine whether this species is likely to use the fish passage based on its swimming abilities. Remember that the fish passage is not specifically designed for this species.

Table 17.5 Fish species upstream and downstream the dam

	Upstream (Lake Temiskaming)	Downstream (Lake La Cave)
Number of species	25	20
Shannon index	2.15	1.73
Fish Spp/Proportions		
Sturgeon	0.002	0.001
Lake Whitefish	0.003	0.007
Cisco	0.056	0.002
Northern Pike	0.009	0.004
Goldeye	0.003	0.000
Mooneye	0.048	0.006
Longnose Sucker	0.018	0.030
White Sucker	0..027	0.015
Shorthead Redhorse	0.006	0.008
River Redhorse	0.001	0.000
Hornyhead Chub	**0.000**	0.003
Emerald Shiner	0.177	0.028
Common Shiner	0.003	0.000
Spottail Shiner	0.016	0.026
Creek Chub	0.001	0.000
Fallfish	0.002	0.003
Brown Bullhead	0.003	0.000
Burbot	0.013	0.008
Trout-Perch	0.008	0.005

	Upstream (Lake Temiskaming)	Downstream (Lake La Cave)
Number of species	25	20
Shannon index	2.15	1.73
Fish Spp/Proportions		
Rock Bass	0.006	0.007
Smallmouth Bass	0.010	0.020
Yellow Perch	0.277	0.462
Sauger	0.137	0.106
Walleye	0.171	0.242
LogPerch	0.003	0.018
Freshwater Drum	0.002	0.000

Note: Benchmarks are derived from the 2008-2010 Broad-scale Monitoring Program.

Based on the information analyzed and the potential for future projects, no new permanent barriers to fish migration are anticipated. Rehabilitation or new bridge construction could periodically disrupt fish behavior, but no complete blockage is anticipated. Dam construction in tributaries where fish species, including sturgeon, previously spawned has virtually ceased (COSEWIC, 2017).

Public concerns included colonization and development near water bodies, contamination, runoff, sedimentation and aquatic invasive species. Urban sprawl, agriculture, and industrial activities occur on a very large scale and over time. No mitigation measures are possible for this Project. The dam replacement Project does not result in the generation of contaminants associated with these activities, furthermore, these activities are located further downstream of the dam and cumulative effects would be nil or negligible.

The Project includes the installation of a turbidity curtain that will avoid sediments from the work (construction and demolition of the cofferdam) from being transported downstream and will help avoid exceedances related to DFO's criteria for suspended solid.

Water management will continue to be required for the dam, and will include the effects of climatic changes. No change in water temperature is expected due to the operational change from using stop logs to sluice gates.

17.5.3.2 Mitigation

The temporary residual effects of the project imply the loss of fish habitat, punctual potential fish mortality and the reproduction potential. The residual effects of this project on fish and fish habitat will be short term, i.e., during construction until completion of the compensation plan, and will be approximately 1 km in extent. In the analysis of past, present and most likely future scenarios, no cumulative effects on fish habitat or mortality of individuals are considered.

Some mitigation measures that address those cumulative effects are already included in the Project:

- Adapted water flow management during spawning periods (to be defined with DFO). This adapted water flow management will take climatic change into account;
- Many measures to reduce to amount of SS (runoff, erosion and sedimentation) during the works and maintain the water quality and others to prevent introduction of contaminants;
- The analysis of the impacts of a possible fish passage and the decision to include that in the Project or not;
- The contribution of the Indigenous groups to the definition of the offsetting project, to include their knowledge in the conception.

No other mitigation measures are necessary for this cumulative effect.

17.5.3.3 Significance

With no doubt, fish populations have changed and been impacted since the construction of the Timiskaming Dam Complex, in 1909, and some of the past projects' effects, including the presence and the operation of the Timiskaming Dam Complex, will continue to affect those populations.

The initial installation of the dams has had multiple effects on fish and fish habitat. These effects have been negative by blocking the passage of migratory species and altering conditions, but also positive by creating new habitats. Some fish populations have adapted, but there has likely been an alteration of the species present, perhaps to the detriment of the abundance of populations of valued species.

Given the absence of cumulative effects of the reconstruction of the dam, which is different from the construction of the dam at the beginning of 1900s, to other projects on fish and fish habitat, no mitigation or follow-up measures appear to be necessary, beyond those already included in the Project.

17.5.3.4 Follow-up

Just as mentioned, no mitigation or follow-up measures are necessary, beyond those already included in the Project.

17.5.4 Lake Sturgeon – Species at Risk

17.5.4.1 Analysis

Most of the historical trend information comes from the COSEWIC status report (2017)[11]. Secondary sources contained in this report are not cited here.

17.5.4.1.1 Historic Trends, Past Projects

The lake sturgeon is of particular importance to the Indigenous Peoples who inhabit its range. It has been an important source of food for them for centuries, in addition to being intimately linked to their spirituality.

Lake sturgeon populations in the Ottawa River were once abundant but have declined due to anthropogenic factors. Currently, the lake sturgeon has disappeared from certain waterbodies, but it's known to be present and spawning in all major reaches of the Ottawa River, from Lake Témiscamingue to the Carillon Generating Station, with spawning reportedly occurring downstream of most generating stations. Threats to sustainability and/or barriers to recovery faced by lake sturgeon populations include: impacts from past harvest activities, current harvesting activities, habitat alteration (primarily caused by dams), barriers to migration (dams), entrainment losses in dams, invasive species and pollution.

Although historical commercial harvests undoubtedly initiated the decline of lake sturgeon in the Ottawa River, a review of current potential stressors suggested that the harvest that current commercial harvest is not limiting population recovery.

Lake sturgeon was of great economic importance in the 19th century to early settlers and Indigenous communities. By the 1860's, intensive commercial fisheries had been established to meet the growing demand for smoked meat and caviar. The commercial harvest in the Ottawa River peaked at 28,800 kg in 1898, but never reached such magnitude thereafter. It is not known when the commercial fishery actually began in the Ottawa River, but it was discontinued in 1978.

Commercial fishing is permitted in the Quebec portion of the Ottawa River between Quyon and Fort William (Haxton, 2002) and quotas have been set at 0.1 kg/ha/yr since the early 1990s. Despite strict harvest controls, there is little evidence of recovery throughout the Ottawa River basin.

[11] Lake Sturgeon (Acipenser fulvescens), four populations: COSEWIC assessment and status report 2017 - Canada.ca

Small-scale commercial fishing is also practiced in Lake Témiscamingue (286 individuals/year), whose population is considered stable. A spring harvest of 25 to 30 individuals was authorized for caviar for 50 years in the Abitibi-Témiscamingue district, but this was abolished in 2000. Fishing for lake sturgeon is only permitted from June 15 July 16 and September 15 to October 31. Lake sturgeon subsistence fishing is also practiced in Abitibi-Témiscamingue.

Past projects such as damming, diversion and flow modification, and the introduction of deleterious substances (e.g., wood fibre and sediment) have profoundly altered lake sturgeon habitat in North America. Ottawa River populations were fragmented by dams as early as the 1850s, the last (Carillon) dating from the early 1960s.

Lake sturgeon populations vary across river reaches and waterpower management has been implicated as the main cause of this variation[12]. The specific cause of this variation is unknown, but a synthesis of current data suggests that large lake sturgeon populations and the presence of dams are not necessarily incompatible. The most notable finding is the apparent recovery of populations in most Winnipeg River reservoirs following the closure of the fishery[13].

Until recently, little research has been conducted to establish the status and pattern of lake sturgeon populations in the different reaches of the Ottawa River (COSEWIC, 2017). Most of the populations are considered to have low abundance and declining curves, with the exception of three contiguous reaches in the middle reaches of the river, where populations are stable or increasing[8]. The capture of a few lake sturgeon eggs in June 2021 below the dam confirms spawning in this reach (see Appendix 12.1).

Spawning habitats are found in fast flowing water, usually below falls, rapids or dams, and on a substrate of hardened clay, sand, gravel, boulders or cobbles. In most rivers used for spawning, waterfalls limit upstream migrations, which may have also been the case at the rapids where the Timiskaming Dam Complex is located. However, the dam has somehow recreated the conditions of fast flowing areas immediately downstream, so that this area is still used for spawning today.

Dams can have direct effects on lake sturgeon by preventing movement at certain times of the year, particularly during spawning. Since the early 1960s, sturgeon movement between the St. Lawrence and Ottawa rivers has been almost completely blocked by the Carillon hydroelectric dam at the entrance to the Lac des Deux-Montagnes, resulting in a decline in the lake sturgeon population in the segment of the Ottawa River between Carillon and Gatineau.

Habitat fragmentation is a major concern for this long-lived migratory fish that frequents a variety of habitats during its lifetime. When hydroelectric dams are in operation, flows change according to demand, and these changes can be unpredictable. Such fluctuations in flow are detrimental to sturgeon movement.

In addition to fishing and dams, pollution is also a threat to lake sturgeon populations. In the past, wood fiber discharges and effluents associated with the pulp and paper industry were likely a major factor in the decline of lake sturgeon populations, and the effects of past pollution are still being felt. Indeed, the substrates of several streams in DU4 region, scoured by log driving activities between the 1920s and 1960s, have not yet returned to their natural state, and deposits of bark and woody fibers still cover large areas of the habitat.

Fortunately, the impact of pollution on lake sturgeon is decreasing, probably due to stricter environmental regulations (stricter discharge criteria for mining and industrial effluents, construction of treatment plants, cessation of floating, etc.).

[12] (PDF) A synoptic review of the history and our knowledge of lake sturgeon in the Ottawa River (researchgate.net)
[13] Esturgeon jaune, Acipenser fulvescens (canada.ca)

17.5.4.1.2 Present and Future Projects

Current and future projects that will impact lake sturgeon are the same as those for fish in general, discussed in the previous section. Current and future projects include agriculture and forestry, as well as various road construction projects, discharges from various industries and the effects of climatic changes.

17.5.4.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

The Project will not result in any new habitat fragmentation considering the dam is already present. This barrier to sturgeon migration will remain in place but a fishway will be installed, if deemed positive, and potentially allow sturgeon to move from downstream to upstream. With respect to the effects of potential exotic invasive species on lake sturgeon, this aspect will have to be taken into consideration when analyzing the appropriateness of the construction of a fishway.

Modulation of flow management during the spring spawning period by opening or closing certain gates, as is done on both dams, would promote lake sturgeon spawning and avoid water overloads that tend to disperse the eggs to less favorable substrates.

The Project itself has no effect on contaminants that could reach the river during construction (other than SS, which will be retained by the cofferdam and turbidity curtain). No contaminants are likely to be released during operation and therefore no cumulative effects are expected.

The residual effects of this Project on lake sturgeon will be short term, i.e., during construction until completion of the compensation plan, and will be approximately 1 km in extent. In the analysis of the most likely future scenarios, no cumulative effects on sturgeon spawning habitat or mortality of individuals are considered.

17.5.4.2 Mitigation

Flow management can be modulated during the spring spawning period to promote lake sturgeon spawning and avoid water overloads that could disperse eggs to less favorable substrates and lower quality habitats. There are plans to adjust the management of dam flows during spawning periods, as is the case now for both dams. These modalities will be defined in conjunction with DFO.

The suitability and eventual implementation of a fishway will be discussed with DFO, taking into account the latest knowledge on the biology of the species, and the potential effects on upstream and downstream populations.

17.5.4.3 Significance

As mentioned in the previous section, even if there were impacts from the original dam construction, the reconstruction of the dam does not create an effect that is in addition to other existing effects. The reconstruction of the dam would not alter fish passage compared to the current dam; on the contrary, the installation of a fish pass, if this option is chosen, could facilitate the upstream migration of the species.

17.5.4.4 Follow-up

Monitoring conditions will be determined in consultation with DFO, with respect to flow management and the effectiveness and effects of a fishway, if this option is selected.

17.5.5 American Eel – Species at Risk

17.5.5.1 Analysis

17.5.5.1.1 Historic Trends – Past Projects

The eel is a fish species highly valued by Indigenous groups. At the beginning of the century, before the construction of the various dams on the Ottawa River, it went up the course of the river to feed and grow (the eel breeds in the Sargasso Sea). For Indigenous communities, the eel fishery was a major seasonal activity. In addition to being a first-rate food resource to survive the winter famine, the eel was a species prized for its medicinal virtues and several parts of the fish were used in the manufacture of basic necessities. It was, and still is, considered a sacred animal for many nations and several clans identify with the eel ("eel clan"). This fishery also allowed the first settlers to also take advantage of the abundance of this energy species in order to build up food reserves allowing them to survive the winter. In the 1940s to 1960s, up to 600 commercial eel fishermen were added to the many farmers who fished with fishing gear at the end of their land.[14]

The construction of dams in the historic eel range, and thus on the Ottawa River, has fragmented habitats that have become difficult to cross or impassable for eels as they move upstream.

In 2004, Hydro-Québec installed a permanent eel pass at the Beauharnois Dam. Tracking demonstrates the use of this pass by eels. Other pass developments have taken place on other Hydro-Québec sites, demonstrating that this measure is effective in improving the accessibility of upstream habitats.

In addition, between 2014 and 2019, the MNRF-Ontario, the MFFP, Hydro-Québec, the Ottawa Riverkeeper and the Canadian Wildlife Federation transferred eels into the Ottawa riverbed between the Carillon Dam and the Chaudière Falls Dam (Gatineau). This was taken to ensure the presence of an eel population in the downstream section of the Ottawa River. Despite these efforts, none of the other dams upstream have a fishway.

17.5.5.1.2 Present and Future Projects

PSPC has approached OPG and Hydro-Québec to find out if such developments were planned and in what horizon.

According to OPG, their facilities (Chats Falls, Chenaux, Des Joachims and Otto Holden) do not currently have fish passage and their current Work Program Catalogue does not include projects to install this type of infrastructure at those facilities (Dennis Aultman, site Environmental Advisor, OPG, email April 26, 2022).

Regarding the Hydro-Quebec facilities, there are currently no fish passage at Bryson, Rocher-Fendu and Carillon dams. With regard to future projects, Hydro-Quebec notes that it is too early to make a statement on future developments (Pierre-Marc Rondeau, Engineer., email June 7, 2022). According to this information, there are no current (or near future) plans to build new fishways on downstream dams. However, it is possible, and even probable in the next 75 years (temporal extent of cumulative effects) that future projects by the operators of downstream dams (Hydro-Québec, OPG) aim at adding fishways on their dams, or that projects for the upstream transport of eels will see the light of day in certain sectors.

17.5.5.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

The reconstruction Project maintains the status quo for the barrier to migration at this time. Eels are not yet present downstream of the dam, due to the many other dams downstream that do not have fishways. However, if the option of building an eel-specific fish ladder is selected, when the other dams are also

[14] Status of the American eel (Anguilla) rostrata) in Quebec (gouv.qc.ca)

equipped with fishways, eels will again be able to move upstream in the watershed. Discussions with DFO and Indigenous communities must take place to make a decision on this issue.

17.5.5.2 Mitigation

The Project provides for the installation of a fishway that can be used for eel (if this option is chosen). When all the other dams downstream, operated by OPG and Hydro-Québec (see Map 9.1), have been equipped with such a pass, the eel will then be able to restart its use of the upstream portion of the Ottawa River.

17.5.5.3 Significance

The construction of the dam has prevented eel passage in the past, but the installation of fish ladders could facilitate upstream migration of the species provided similar measures are implemented. No cumulative effects are anticipated specifically on eels; reconstruction of the dam would not modify fish passage relative to the existing dam and if fish ladders are built, the effect should be positive.

17.5.5.4 Follow-up

The Project already provides for the monitoring of the use of the fishway planned for the Project (if this option is chosen). The development of other fishways by OPG and Hydro-Québec and the monitoring of these developments are the responsibility of these organizations, and several monitoring committees are in place to monitor these future developments.

17.5.6 Indigenous Peoples' VCs

17.5.6.1 Physical and Cultural Heritage

17.5.6.1.1 Analysis

17.5.6.1.1.1 Historic Trends, Past Projects and Activities

Since colonization of Canada began over 4 centuries ago, the physical and culture heritage of Indigenous groups has been impacted. One of the main pieces of legislation that has impacted Indigenous physical and cultural heritage is the Indian Act, which was enacted in 1876 and remains in effect, with amendments, today. The Indian Act established residential schools, prohibited Indigenous people from hiring a lawyer, gathering in groups of more than three, leaving their reserve without a pass, owning property, and practicing their culture. While these specific policies were removed from the Act, there remains consequences and inter-generational trauma that have significantly reduced Indigenous Peoples ability to access cultural lands and resources.

Sense of place and knowledge sharing have been identified by Indigenous groups, including AOPFN, as vital aspects of their culture and connection to the land. Through colonization and changes to the natural landscape, the cultural continuity of Indigenous practices has been impacted. According to the AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project, 2022 (AOPFN, 2022a), major impacts to Algonquin Peoples physical and cultural heritage have derived from colonial settlements, land privatization, displacement from traditional territories, reserve confinement, residential schools, and other efforts that have infringed upon Algonquin’s rights including unjust policies and efforts to suppress Indigenous culture. The CES also notes that changes over time include reduced access to physical and cultural heritage sites and landscapes, loss of site due to dam development and flooding, vandalism, and the reduced ability to enjoy sense of place and connect with these values. Quantitative data presented in their report note that 74.5% of the AOPFN referenced unceded territory and 41.5% of the Kipawa subwatershed is alienated for AOPFN member use due to access and freedom of use barriers.

Past projects and physical activities such as mining, agriculture, dams, human settlements, road and rail building, forestry, pulp and paper mills, industrial facilities, establishment of parks and protected areas, and non-Indigenous and commercial hunting and fishing have displaced Indigenous groups from their lands,

and access to natural resources. In the past, these projects and activities occurred without receiving the free, prior, and informed consent of Indigenous groups and thereby has impacted their physical and cultural heritage.

Specifically, dams have had an impact on Algonquin travel routes, areas of cultural significance, archaeological resources, and fish, wildlife, plant and medicinal species of cultural significance. Pre 1909, there were no human made dams in the Ottawa River watershed. Since the colonization of the region, 43 dams and 30 reservoirs have been constructed in the watershed, all of which were built without consultation or consent from Indigenous Peoples. The construction of these dams has led to the alteration of traditional travel routes and access to, and availability of plants, natural materials, and wildlife used for cultural purposes, and important lands.

17.5.6.1.1.2 Present and Future Projects and Activities

Population growth, urban development, and industrial development, such as mining, forestry, agriculture, and future dam construction (such as the Onimiki Project on Gordon Creek) are currently impacting and will impact Indigenous people physical and cultural heritage. Impacts from these activities mainly include the occupation and privatization of Algonquin territory, the destruction and disturbance of cultural heritage sites, and non-Indigenous harvesting and removal of wildlife and plant species of cultural importance.

According to the AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project, 2022 (AOPFN, 2022a), present day impacts to physical and cultural heritage from local projects and development include the displacement from cultural sites due to land privatisation; reduced access to lands and resources for harvesting and other cultural purposes; reduced availability of culturally-important species; reduced confidence in the quality of water and culturally significant plants, animals, and fish; and disturbances in and around sacred Algonquin sites.

Cumulative effects from present and future projects and physical activities on the physical and cultural heritage features of the Ottawa River and Long Sault Island as well as any archaeological resources on or in them, are likely given the projected increase in population and subsequent developments that accompany it. Climate change also impacts physical and cultural heritage practices and features by changing the physical landscapes and conditions needed to sustain and use them.

In 2016, Canada endorsed the United Nations Declaration on the Rights of Indigenous People (UNDRIP) and further brought it into legislation in 2021 through the adoption of the *United Nations Declaration on the Rights of Indigenous People Act (2021*). With the enactment of the UNIDRIP Act, changes to the *Impact Assessment Act* (2019), and ongoing case law that helps define and protect the rights of Indigenous Peoples that were enshrined in Section 35 of the *Constitution Act*, stronger legislation now exists to protect Indigenous Peoples' rights that may be impacted through government decisions. Furthermore, Indigenous groups are increasingly seeking self government agreements and over their reserve lands as is possible through the Framework Agreement on First Nation Land Management and the *First Nation Land Management Act*. Increasing efforts on self-government and rights determinations are likely to protect physical and cultural heritage features and landscapes that are important to Indigenous groups and improve decisions that impact them.

17.5.6.1.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

Potential residual Project effects include the perpetuation of changes to the natural state, sensory environment, ecology, and cultural heritage integrity of Long Sault Island and of the Ottawa River. Project activities that pose a risk to the physical and cultural heritage of Long Sault Island and the Ottawa River include further vegetation clearing, excavation, and alteration of the physical and sensory environment.

Other project impacts include the potential destruction of artefacts on Long Sault Island and the shoreline and bed of the Ottawa River downstream of the dam. These effects could be caused from vegetation clearing and earth works for construction preparation, construction of the cofferdam, operation of machinery, construction of the new dam, construction of the fish passage, relocation of the roadway, re-routing of existing utilities, demolition of the old dam. The Project residual effects on physical and cultural heritage was non-significant with the application of mitigation measures.

17.5.6.1.2 Mitigation

To mitigate the effects to archaeological resources, archaeological investigations will be conducted in partnership with Indigenous communities. The AOPFN CES recommends the following additional mitigations:

- Land acknowledgements in all Project information,
- Use of Algonquin placenames, language, art, signage and interpretation at the Project site to recognize and promote Algonquin culture, heritage and ongoing presence and stewardship,
- Financial support for development of cultural education materials,
- Indigenous monitoring,
- Land compensation;
- Economic benefits.

Many of these suggested recommendations were integrated into mitigations provided in Chapter 13 and will be addressed through the negotiation of an Indigenous Participation Plan.

No further mitigation measures are envisioned to ensure the protection of physical and cultural heritage than are outlined in Chapter 13.

17.5.6.1.3 Significance

Considering the past, present and future foreseeable influences on the Ottawa River and Long Sault Island, the effect on it is considered significant. The cumulative effect on any archaeological resources from the Project, is not possible to assess since there have been no resources recovered to date. Additional projects and activities will increase these effects - especially if they are approved without Indigenous consultation or their free prior and informed consent. At the time of construction of the original dam, legislation aimed at protecting Indigenous physical and cultural heritage was non-existent. Over time, legislation, and Indigenous-led initiatives and regulations aimed at protecting Indigenous rights have increased. Improvements in environmental legislation to co-consider Indigenous knowledge alongside western science and to provide opportunities for Indigenous-led assessments and decision-making processes may work to lessen future negative effects to physical and cultural heritage values and features.

Even if the Project will perpetuate effects caused by the original dam, its implementation will only marginally increase these cumulative effects, taking into account the mitigation measures and increased recognition of Indigenous rights into consideration.

The intensity of the cumulative effect related to the project itself is considered low (little change since some of physical and cultural features and values remain intact in the RSA, but impacts are expected to increase even with implementation of changes to legislation) but are irreversible. The extent is considered local because the changes will only be felt over a short distance, cumulating with the effects of other projects in a small area. The frequency is considered continuous. Overall, the cumulative effect associated with the project is considered non-significant.

17.5.6.1.4 Follow-Up

No additional monitoring/follow-up is necessary beyond those outlined in Chapter 13.

17.5.6.2 Fish and Fish Harvesting

17.5.6.2.1 Analysis

17.5.6.2.1.1 Historic Trends and Past Projects

As presented in Section 17.5.3, Fish and Fish Habitat, the Ottawa River watershed is home to multiple fish habitats and species, including muskellunge, lake sturgeon, walleye, bass, lake trout, late whitefish, and yellow perch. Information on fish health prior to human disturbance is sparce. Given the absence of dams at that time, aquatic habitat and fish movement would have been unimpeded, and water quantity and flows would have followed more natural hydrologic processes. Water quality would likely have been facing some pressure from early settlement, including agriculture and industry, but overall, it would have been more pristine than current day.

According to the AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project, 2022 (AOPFN, 2022a), a diversity of fish species were abundant in the area in 1909 including species that are now considered at risk, such as the American eel and the lake sturgeon. The data presented in the CES show that the number of current fish consumption advisories is 201 in the AOPFN referred unceded Territory and 34 in the Kipawa subwatershed.

Some Indigenous groups, such as the AOO, report that fish abundance and size of fish has declined over the last 30 years. For additional details on historic trends and past projects related to fish and fish habitat, see Section 17.5.3, Fish and Fish Habitat. The construction of dams in the Ottawa River and its tributaries have changed migration patterns, which have changed fishing practices. The key example is the extirpation of the American eel and therefore its consumption and the cultural practice of spearing eels by Algonquin people.

The decline in fish species and fish abundance has impacted Indigenous communities' ability to harvest for nutritional and cultural purposes. It has changed where, the methods used, and what species are fished.

17.5.6.2.1.2 Present and Future Projects and Activities

Population growth, urban development, fishing pressure, agricultural activities and future dams (such as the Onimiki Project on Gordon Creek, a tributary to the Ottawa River) are expected to increase over time, putting more pressure on the Ottawa River, its fish populations, access to fishing areas, and therefore fishing practices. Population growth could result in more individuals using the Ottawa River for fishing therefore decreasing the availability of fish. These activities could also result in an increase in contaminants entering the Ottawa River, reducing its desirability for fishing. As stated in Section 17.4.3, urbanization and farming activities are more prevalent in the downstream section of the Ottawa River and the residual impacts of the Project on fish would not be noticeable at such a distance. Other projects such as mining projects, mainly located east of Rouyn-Noranda, are planned, and could have an impact on fish and fish habitat. Climate change could affect the management of the flow passing through the dam, affecting the conditions on the spawning grounds downstream of the dam. Water temperature should not be significantly modified downstream of the dam (see Section 17.5.3).

Concern has been raised related to the Rayonier mill, located close to the Project, and the quality of effluent released from the mill. The mill may release contaminants into the Ottawa River, including ammonia, cadmium, chromium and cobalt (See Section 17.4.3 for additional details). Increases in contaminants in the Ottawa River could increase fish mortality and therefore negatively impact fish harvesting.

While present and future projects may change fish and therefore fishing on the Ottawa River, there now exists more legislation (IAA 2019, UNDRIP Act 2021) and Indigenous self-determination and environmental stewardship initiatives (such as the AOO's Kitchi Sìbì Guardians) that are expected to improve environmental and Indigenous rights protections. The following are relevant UNDRIP articles that if enshrined in future legislation will improve future decisions that may impact Indigenous rights in the future,

but may not reverse impacts from past projects or activities. The UNDRIP states that Indigenous Peoples have the right to:

- Any action which has the aim or effect of dispossessing them of their lands, territories or **resources** (Article 8).
- Maintain and develop their political, economic and social systems or institutions, to be secure in the enjoyment of their own means of **subsistence** and development, and to engage freely in all their **traditional** and other economic activities. Indigenous peoples deprived of their means of **subsistence** and development are entitled to just and fair redress (Article 20).
- Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired (Article 26).
- Indigenous peoples have the right to own, use, develop and control the lands, territories and resources that they possess by reason of traditional ownership or other traditional occupation or use, as well as those which they have otherwise acquired (Article 26).
- States shall give legal recognition and protection to these lands, territories and resources. Such recognition shall be conducted with due respect to the customs, traditions and land tenure systems of the indigenous peoples concerned (Article 26).
- Indigenous peoples have the right to the conservation and protection of the environment and the productive capacity of their lands or territories and resources. States shall establish and implement assistance programmes for indigenous peoples for such conservation and protection, without discrimination (Article 29).
- States shall take effective measures to ensure that no storage or disposal of hazardous materials shall take place in the lands or territories of indigenous peoples without their free, prior and informed consent (Article 29).
- States shall also take effective measures to ensure, as needed, that programmes for monitoring, maintaining and restoring the health of indigenous peoples, as developed and implemented by the peoples affected by such materials, are duly implemented (Article 29).
- States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources (Article 32).
- States shall provide effective mechanisms for just and fair redress for any such activities, and appropriate measures shall be taken to mitigate adverse environmental, economic, social, cultural or spiritual impact (Article 32).

17.5.6.2.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

As identified in Chapter 13, potential residual effects from the Project on fish and fish harvesting include impacts from water contamination, destruction of fish habitat, reduced access to fishing areas from fencing, and bridge lights. Fish habitat loss and changes in abundance is expected to impact fishing in the vicinity of the Project. Reduced fish and freshwater mussel species populations could impact Indigenous rights to harvesting and diet and cultural continuity which affects Indigenous health and well-being. To increase native fish species a fish ladder is proposed (if this option is chosen). While the fish ladder is anticipated to have positive effects, there remains the possibility that providing passage to a wide variety of fish species may degrade fish populations (through predation of introduced species or through changes in migration patterns), by connecting water bodies that were previously separated by the dam since its original construction.

The AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project indicated that the Project could negatively interact with fish by potentially impacting water quality. This

interaction could occur through an increase in turbidity and from accidental spills runoff during construction and operations. This runoff could lead to the introduction of contaminants such as road salts, motor vehicle pollutants and hydrocarbons.

Based on the information analyzed and the potential for future projects, no new permanent sources of contaminants have been identified. Project construction could directly or indirectly introduce contaminants into the aquatic environment and therefore impact fish, as well as the desirability of fish for harvesting. The Project residual effects on fishing was non-significant with the application of mitigation measures.

17.5.6.2.2 Mitigation

As previously mentioned, to increase native fish species a fish ladder could be implemented in the construction of the dam. The fish ladder may have positive effects if implemented as part of a watershed wide plan that has been well researched and planned in collaboration with Indigenous groups. However, there is a possibility that this passage could have negative impacts on fish populations and therefore negative effects on fish and fish harvesting. The flow management during the spawning period will be defined with DFO, in consultation with Indigenous groups.

Mitigation measures that address fish and fish harvesting are included in Chapter 13. The AOPFN CES notes that there should be Indigenous monitoring, involvement in baseline studies, increased aquatic study areas, avoidance of fish spawning periods during construction, species-specific protection measures, and capacity building support for Indigenous guardian/stewardship initiatives. PSPC has either included these suggestions as mitigations in Chapters 12 and 13, or has provided responses to other recommendations.

No additional mitigation measures, beyond those identified in Chapter 13, are deemed necessary.

17.5.6.2.3 Significance

The perceived and actual cumulative effects of past, present and future projects on fish and fish harvesting in the RSA are considered significant, as all of these projects have significantly altered the presence of some fish like American eel (that have been extirpated) and Lake sturgeon (that are now a species at risk), limit upstream travel due to the presence of dams and have degraded or modified the quality of the habitat for several species of interest such as pickerel, whitefish and pike that are still fished, but less abundant in the Ottawa River.

However, the implementation of the Project will only contribute to this lost minimally and will be reversible with the offsetting program. Depending on the option chosen, the fish passage could also have a positive effect. The intensity of the cumulative effect related to the project itself is considered low (little change or improvement of the characteristics) and will resolve following the end of the construction period with the realization of the offsetting program (reversible - long duration). The extent is considered project footprint to local because the changes will only be felt over a limited area (project footprint and downstream), cumulating with the effects of other projects in the downstream area. The frequency is considered cyclic because the effects of the project will overlap with the effects of other projects at the beginning and through the construction period. Overall, the cumulative effect associated with the project is considered non-significant.

17.5.6.2.4 Follow-Up

No additional monitoring/follow-up is necessary, beyond water and fish monitoring (see Chapter 22 and 23 for details) and communication with Indigenous PSCs, as previously identified in Chapter 13. PSPC is also supportive of planning and implementation of a watershed-wide research plan to determine the effects of fishways that could be installed for re-introduction of American eel and allow for fish migration.

17.5.6.3 Wildlife and Wildlife Harvesting

17.5.6.3.1 Analysis

17.5.6.3.1.1 Historic Trends and Past Projects

According to the AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project, 2022 (AOPFN, 2022a), in 1909 large and relatively intact landscapes supported sustainable wildlife populations. Although pressure on wildlife and wildlife harvesting was increasing from expanding settlement, agriculture, forestry and other developments, in Period 1 (pre-dam construction) it was still considered to be relatively low. At this time, the use of Algonquin park was already restricted, and Indian Act policies resulted in an important impact on access to lands used for wildlife harvesting (hunting, trapping) amongst other uses, in this part of the RSA.

Causes for the change in wildlife and wildlife harvesting in Period 2 (colonization, between 1909 and 2021) includes the continued restrictive policies related to harvesting necessary for cultural continuity put in place through Indian Act and residential schools (which, although now closed, created inter-generational trauma that is felt to this day). In this period there was sustained conversion of wildlife habitat and hunting areas to settlement and agricultural uses, managed forests and other industrial sites and landscapes; dam construction and operation affecting Kichi-Sìbì in-stream, riparian and wetland habitat destruction; expanding road and other linear feature development; increased use of pesticides and other environmental contamination; increasing numbers of settlers and recreational land users. Some of the outcomes of these changes over time include habitat loss and fragmentation; increased hunting competition and pressure on wildlife species; declines in wildlife populations and reduced availability of animals for hunting; and real and perceived contamination leading to reduced confidence in quality and safety of animals for consumption (AOPFN, 2022a).

17.5.6.3.1.2 Present and Future Projects and Activities

The present and future projects and activities acting in combination with the Project construction and operation will result in increased and sustained pressure on wildlife and wildlife harvesting. Projects with the potential to increase or change traffic patterns, could increase the potential for wildlife mortality. Anticipated future population growth and associated urban expansion and its associated municipal infrastructure, will result in decreased wildlife habitat and in limiting access to and availability of hunting areas for Indigenous people.

While it is true that some wildlife species become habituated to urban settlement areas, in the RSA, wildlife populations have been impacted in the past and will continue to be impacted in the future from population growth and associated urban developments. These wildlife effects are exacerbated by other development in the RSA that is expected to continue into the future such as mining, forestry, road and linear infrastructure projects, non-indigenous hunting, and industrialization.

Climate change is likely to increase air temperature, resulting in an earlier breeding season for wildlife. Similarly, this increase in temperature could alter vegetation (and habitats), with the development of plants that were previously only found south of the project area, and the loss of other species that would no longer be able to tolerate these temperature changes. The extent of these habitat changes, however, is very difficult to predict. These changes could in turn affect the distribution and biodiversity of wildlife, and affect the Indigenous wildlife harvesting patterns.

Overall these present and future projects and activities contribute to changes wildlife distributions, decrease their abundance and impact their health. In addition to the direct impacts on wildlife populations, these are expected to sustain limited access to, availability and desirability of wildlife for Indigenous harvesting.

To counter the negative effects on wildlife harvesting is the introduction of legislation (UNDRIP Act 2021) that emphasizes the protection of Indigenous Peoples' rights, including to wildlife resources and wildlife harvesting. Relevant articles were outlined in the previous section and not repeated here. Federal

environmental assessments under the IAA (2019) now provide better opportunities for Indigenous participation including co-consideration of Indigenous knowledge in decision-making. In addition, there are increasing Indigenous environmental stewardship initiatives that will continue to improve protections for wildlife and therefore Indigenous wildlife harvesting.

17.5.6.3.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

As identified in Chapter 13, residual effects from the Project on wildlife and wildlife harvesting include a very low potential for wildlife mortality and limited habitat loss during Project construction and to a lesser extent will be sustained through the operations phase. Any negative impact to wildlife could impact the Indigenous groups harvesting of these wildlife species.

The AOPFN Cumulative Effects Study for the Timiskaming Quebec Dam Bridge Replacement Project (AOPFN, 2022a) indicated that the Project could prolong harvesting impacts associated with dam and habitat loss on Long Sault Island. In addition, the Project could prolong and exacerbate existing impacts on wildlife and wildlife habitat associated with the original construction of the Timiskaming Dams and habitat loss along the Kichi-Sìbì at Timiskaming and on Long Sault Island. Their quantitative data show that the density of linear disturbance (roads, rail lines, utility lines and cutlines) is 1.13 km/km^2 in the AOPFN referred unceded Territory and 0.56 km/km^2 in the Kipawa subwatershed - primarily in the Ontario portion of the subwatershed with 84% of that disturbance attributed to roads.

The Project residual effects on wildlife and wildlife harvesting was non-significant with the application of mitigation measures.

17.5.6.3.2 Mitigation

Mitigation measures that address wildlife and wildlife harvesting are included in the various sections of Chapter 12 and 13.

The AOPFN CES recommends mitigations such as wildlife habitat inventories and restoration plans that will consider Algonquin knowledge. Traffic control measures and monitoring were also recommended as was scheduling project activities to avoid sensitive nesting and breeding periods of vulnerable species based on Indigenous knowledge. These measures have been accounted for in the Project specific mitigations noted in Chapters 12 and 13. Additional mitigation measures that PSPC will support include continuing to meaningfully involve Indigenous perspectives and knowledge in future decisions related to their current and future physical activities in the RSA. This may include modifying project designs to minimize footprints and to facilitate access to areas that are important for harvesting. It may also include implementing the highest national environmental protection standards for those infrastructure projects.

17.5.6.3.3 Significance

The perceived and actual cumulative effects of past, present and future projects on wildlife and wildlife harvesting in the RSA are considered significant, as the loss of wildlife habitats, changes in their distribution and populations, changes in availability and desirability of wildlife for harvesting and access to wildlife harvesting areas is negative and quantifiable in the RSA particularly in the more southern, urbanized portions of it. However, increasingly environmental legislation and regulations and Indigenous and non-Indigenous environmental stewardship initiatives have lessened (but not totally reversed) impacts on wildlife and wildlife habitats in the RSA. Environmental legislation that respects the duty to consult Indigenous groups, as well as future implementation of the UNDRIP Act will improve future decisions by co-considering Indigenous knowledge alongside western science and by protecting Indigenous rights. The revegetation plan that will be developed with Indigenous groups for the island is a good opportunity to create or recreate good habitats for some wildlife species on the island. However, this will not return all the habitats destroyed or modified by the initial dam in 1909. These improvements will help to minimize future impacts on wildlife and wildlife harvesting.

However, the implementation of the Project will only contribute to this lost minimally, and possibly reverse some of this effect on Long Sault Island through the planned revegetation initiative implemented collaboratively with Indigenous groups. Future losses may be somewhat improved through the application

of improved environmental and Indigenous rights legislation. The intensity of the cumulative effect related to the project itself is considered low (little change or improvement of the characteristics) and will resolve following the end of the construction period with the realization of the revegetation plan (reversible - long duration). The extent is considered project footprint because the changes will only be felt over a small area, cumulating with the effects of other projects only on the island and the Ottawa river shores next to the Project. The frequency is considered cyclic because the effects of the project will overlap with the effects of other projects at the beginning and through the construction period. Overall, the cumulative effect associated with the project is considered non-significant.

17.5.6.3.4 Follow-Up

In addition to the monitoring/follow-up and mitigations outlined in Chapters 12, 13, 22 and 23, other mitigation measures that PSPC will support include continuing to meaningfully involve Indigenous perspectives and knowledge in future decisions related to their current and future physical activities in the RSA. This may include modifying project designs to minimize footprints and to facilitate access to areas that are important for wildlife harvesting. It may also include implementing the highest national environmental protection standards for those infrastructure projects.

17.5.6.4 Plants and Natural Materials Harvesting

17.5.6.4.1 Analysis

17.5.6.4.1.1 Historic Trends and Past Projects

Plants and natural materials harvesting is practiced currently and historically by Indigenous groups, including the Antoine Nation, the Algonquins represented by the AOO, Métis citizens, and AOPFN. Plants and natural materials are salient to local Indigenous culture, traditions, diet, and health. Native flora and fungi are used for various purposes including for nourishment, medicines, construction and crafting materials, and cultural ceremonies.

Located alongside of the Ottawa River are various riparian plants, natural materials, and medicines that were historically and continue to be used including staghorn sumac, chokecherry, red raspberry, wolf willow, sweetgrass, and a wide variety of native trees. While information regarding the state of vegetation prior to 1907 is scarce, Indigenous groups, including the AOPFN have reported in their Cumulative Effects Study that vegetation in the region was “relatively intact” with increasing disturbance from land use alterations (AOPFN, 2022a).

Over time with increasing development and settlement in the RSA, Indigenous people’s ability to harvest plants for nourishment, medicine, construction, and cultural purposes has declined. This decline can be attributed to logging and removal of natural habitat, loss of access to traditional harvesting areas due to land privatization, pollution and contamination of plants caused by industrial development, invasive species and non-native diseases transferred through colonization, and the alteration of riparian habitat caused by the construction of dams.

According to the AOPFN Cumulative Effects Study (AOPFN, 2022a), historic development projects that have altered the native ecosystem and their right to harvest plants and natural materials include “expanding settlement areas, agriculture, road and other linear feature development, nuclear facility development, industrial forestry, construction and operation of dams and associated flooding and inundation” (AOPFN, 2022a, page 78). The quantitative data presented shows that over 50% of wetland areas are within 500 m of disturbance, that 57.8% of riparian habitats are disturbed within 30 m of streams in the AOPFN referred unceded Territory and over 36% in the Kipawa subwatershed. Their data also show that 1.2% of the AOPFN referred unceded Territory was harvested between 1985 and 2015 and 6.6 of the Kipawa subwatershed.

17.5.6.4.1.2 Present and Future Projects and Activities

One of the driving pressures on the availability and distribution of native plants and natural materials is the expansion of human settlement which result in new and expanding road networks. These and other current

and future planned natural resource and industrial developments, dam building (such as the Onimiki dam project on Gordon Creek), as well as parks and protected area designations, result in the removal or limit access and availability to plants and natural materials. Declining availability of native plants also impacts wildlife that are important for Indigenous harvesting. As mentioned earlier, climate change could alter vegetation, including plant species of interest to Indigenous groups.

As noted in earlier sections there are improvements being made in environmental protection legislation and Indigenous rights recognition that are likely to improve, but not totally reverse these effects in the future. Specific rights that Indigenous people hold related to plants and natural materials, are the rights to:

- Their traditional medicines and natural materials and to maintain their health practices, including the conservation of their vital medicinal plants, animals and minerals. Indigenous individuals also have the right to access, without any discrimination, to all social and health services (Article 24).
- Maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions, as well as the manifestations of their sciences, technologies and cultures, including human and genetic resources, seeds, medicines, knowledge of the properties of fauna and flora (Article 31, emphasis added).

17.5.6.4.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

The Project is projected to remove 1 hectare of riparian vegetation (Chapter 12). As noted in Chapter 13, culturally important species found along the shoreline downstream of the Project (within 1 km range of Long Sault Island) which were harvested by some Indigenous groups include sweetgrass and wolf willow (or silverberry). The harvesting site was noted to be a high-quality area for picking sweetgrass due to the plants being good quality and the site having relatively easy access from the road. Other species of cultural importance found in the project area included pine, balm of gilead, poplar, horsetail, “butter and eggs”, yarrow, birch, mountain ash, and a variety of restoration species. Due to the high velocity of the Ottawa River through the dam there are no aquatic plants in the riverbed within the Project footprint so no impact is expected.

Potential residual effects to plant and natural materials include the physical removal and/or disturbance of shoreline plants during construction and reduced harvesting of plants for food and medicine due to actual or perceived contamination of plants, medicines, and natural materials from dust, or plant absorption of chemicals from road runoff, or construction spills.

Reductions in plant harvesting and use disrupt cultural continuity and negatively affect health, and wellbeing that may have been supported through the consumption, harvesting and use of plants for food, medicines, ceremonies, or art. The Projects residual effects on plant and natural material harvesting was considered non-significant with the application of mitigation measures.

17.5.6.4.2 Mitigation

Mitigation measures to protect plants and natural materials include planning, implementing and monitoring of a restoration plan in partnership with Indigenous groups and planting new pioneer species in disturbed areas (including such as thistle, asters, goldenrod, mugwort, dandelion, nettles, sumac, etc.) to restore disturbed sites back to a thriving ecosystem. Any areas that become contaminated due to Project activities will also be restored. These measures were suggested by most Indigenous groups and was recommended in the AOPFN CES (AOPFN, 2022a).

The AOPFN CES (AOPFN, 2022a) recommended that a full vegetation inventory of the Project be conducted in collaboration with Indigenous groups and pre-construction harvesting - which has been included as a Project mitigation. It was also suggested that no herbicides or pesticides be used, which will also be honoured and is not currently used on the island.

Mitigation measures that address native plants and natural materials impacts are outlined in Chapters 12 and 13. In addition to these PSPC will continue to meaningfully involve Indigenous perspectives and knowledge in future decisions related to their current and future physical activities in the RSA. This may

include modifying project designs to minimize footprints and to facilitate access to areas that are important for plant and natural material harvesting. It may also include implementing the highest national environmental protection standards for those infrastructure projects.

17.5.6.4.3 Significance

The perceived and actual cumulative effects of past, present and future projects on plants and natural material harvesting in the RSA are considered significant, as all of these projects have significantly altered access to plant and natural material harvesting, reduce the desirability of plants for harvesting (due to real or perceived pollutant) and remove plants and natural materials for activities such as settlement, forestry, mining, road expansion and development, agriculture, climate change and transmission line right of way maintenance. These effects will continue due to future developments (industrial, agricultural, and other projects) expected in the Ottawa River watershed. However, the implementation of the Project will only contribute to this lost minimally, and possible reverse some of this effect on Long Sault Island through the planned revegetation initiative implemented collaboratively with Indigenous groups. Future losses may be somewhat improved through the application of improved environmental and Indigenous rights legislation. The intensity of the cumulative effect related to the project itself is considered low (little change or improvement of the characteristics) and will resolve following the end of the construction period with the realization of the revegetation plan (reversible - long duration). The extent is considered project footprint because the changes will only be felt over a small area, cumulating with the effects of other projects only on the island and the Ottawa river shores next to the Project. The frequency is considered cyclic because the effects of the project will overlap with the effects of other projects at the beginning and through the construction period. Overall, the cumulative effect associated with the project is considered non-significant.

17.5.6.4.4 Follow-Up

Follow-up measures will include monitoring the growth rates of restoration plants. Beyond this, no further follow-up measures are deemed necessary beyond those outlines in Chapters 12 and 13.

17.5.6.5 Water use

17.5.6.5.1 Analysis

17.5.6.5.1.1 Historic Trends and Past Projects

Historic trends related to water quality is contained earlier in this chapter and will not be repeated here. Prior to dam construction in the early twentieth century, there were some historic impacts on water quality (from logging and early settlement) that may have influenced Indigenous water use. The AOPFN CES (AOPFN, 2022a) notes that at that time the status of the water quality was relatively pristine and there were naturally flowing channels in the Ottawa River watershed. Historically waterways such as the Ottawa River were important travel corridors. Their quantitative data show that there are 211 dams causing alienation in the AOPFN referred unceded Territory and another 22 dams in the Kipawa subwatershed. There are 97.5 billion L/day of approved water withdrawals possible daily in the AOPFN referred unceded Territory, and 169 million L/day in the Ontario portion of the Kipawa subwatershed. The number of industrial sites within 500 m of waterbodies in the AOPFN referred unceded Territory is 75 sites and another 287 in the Kipawa subwatershed.

River water quality in the RSA has been impacted by contaminants introduced from human settlement (water withdrawals, municipal storm and wastewater outfalls), other dam construction and operation, roadway run-off, agricultural run-off, natural resource development (mining, forestry), industrial facility water withdrawals and return flows. Of particular concern is the contribution of pollutants to the river from the Rayonier facility at Témiscaming. These developments have resulted in reduced access to and confidence in the use of water within the RSA.

17.5.6.5.1.2 Present and Future Projects and Activities

Increases in human settlement and associated industrial and other developments are expected to continue in the RSA including the proposed Onimiki dam project on Gordon Creek, a tributary to the Ottawa River. While the contributions of individual sources of contaminants to the Ottawa River and its' tributaries is expected to lessen due to improvements in environmental legislation, the number of input sources may still contribute contaminants and make it impossible to return to pre-dam/pre-disturbance levels. Even if actual contaminant levels decline, the perception that developments are still polluting river water could create water use barriers for Indigenous people well into the future.

17.5.6.5.1.3 Timiskaming Dam-Bridge Replacement Project in Québec

While the Project is not expected to have an impact on water quality and the Ottawa River is not a drinking water source for primary study area communities, some Indigenous people have reported that they have and will avoid the use of the Ottawa River for drinking, swimming, and bathing, particularly during Project construction, because of real or perceived contaminants in sediment and dam construction materials. The Project therefore perpetuates the barriers to water use, particularly in the reach below the dam and upstream of the Otto Holden dam during the construction phase. After application of mitigation measures, the Project residual impact on water use was determined to be non-significant mainly due to localized effects occurring only during the construction period.

17.5.6.5.2 Mitigation

Mitigations for water quality and water use are contained in Chapters 12 and 13. The AOPFN CES (AOPFN, 2022a) notes that there should be Indigenous monitoring, involvement in baseline studies, increased aquatic study areas, avoidance of fish spawning periods during construction, species-specific protection measures, and capacity building support for Indigenous guardian/stewardship initiatives. PSPC has either included these suggestions as mitigations in Chapters 12 and 13, or has provided responses to other recommendations. In addition to these, PSPC will continue to meaningfully involve Indigenous perspectives and knowledge in future decisions related to their current and future physical activities in the RSA. This may include modifying project designs so that construction, operation and maintenance activities, and emergency response procedures do not pose further risks to river water quality and thus water use. It may also include implementing the highest national environmental protection standards for those infrastructure projects.

17.5.6.5.3 Significance

The perceived and actual cumulative effects of past, present and future projects on water quality are considered significant, as all of these projects have significantly altered water quality over time. These effects will continue due to future developments (industrial, agricultural, and other projects) expected in the Ottawa River watershed.

However, the implementation of the Project will only marginally increase these cumulative effects, due to its nature and the mitigation measures that will be put in place. The intensity of the cumulative effect related to the project itself is considered low (little change in water quality characteristics) and will resolve following the end of the construction period (reversible - long duration). The extent is considered local because the changes in water quality will only be felt over a short distance, cumulating with the effects of other projects for about 1 km downstream of the work area. The frequency is considered cyclic because the effects of the project will overlap with the effects of other projects intermittently during the construction period. Overall, the cumulative effect associated with the project is considered non-significant.

17.5.6.5.4 Follow-Up

No follow-up programs are recommended for this effect.

Appendix 17.1 - AOO - Recommendations on Cumulative Effects and Rights Impact Assessment

MEMO

To: Public Services and Procurement Canada

From: Shared Value Solutions (Jessica Ward, Meghan Buckham, Robin Heavens, Chelsea Brecher)

On behalf of

Algonquins of Ontario

Date: October 21, 2021

Subject: Algonquins of Ontario Recommendations on Cumulative Effects and Rights Impact Assessment Methodology for the

Timiskaming Dam-Bridge of Quebec Replacement Project Draft Environmental Impact Statement (AOO File # CF 49-1-3)

PURPOSE

In close collaboration with Shared Value Solutions Ltd. (SVS), the Algonquins of Ontario have completed a review of Public Services and Procurement Canada's (PSPC) proposed methodologies for the Cumulative Effects Assessment (CEA) and Rights-Impact Assessment (RIA) for the Timiskaming Dam-bridge of Quebec Replacement Project (the TQDR Project, or the Project) Environmental Assessment (EA). This memo outlines the AOO's recommendations on the methodology and scope of the CEA, including overall framework, temporal scope, spatial scope, and project list, as well as the methodology for the RIA. Detailed information on PSPC's proposed approaches (dated March 29, 2021) can be found in Appendix A. The intent of this memo is to initiate discussions on how these recommendations can be incorporated into the draft Environmental Impact Statement (EIS) for this Project.

PROJECT AND REGULATORY CONTEXT

The Timiskaming Dam Complex was built on the Kichi-Sìbì[1] between 1909 and 1913. The Quebec side of the dam was replaced in 1930, followed by the Ontario side being rebuilt between 2014-2017. The Quebec Dam has been identified as needing repairs and replacements of significant sections that warrant the entire replacement of the Dam. Due to the dam being located between Ontario and Quebec, the TQDR Project falls under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) and requires an environmental assessment. Consultation with the AOO is required by the Impact Assessment Agency of Canada (IAAC – formerly the Canadian Environmental Assessment Agency) as part of the environmental assessment under

[1] *The Ottawa River, otherwise known as the Big River, has also been referred to in the Algonquin language as "Kichi-Sìbì", "Kichissippi", "Kitchissippi" and "Kichisippi".*

CEAA 2012. PSPC, the proponent for the project, has indicated to the AOO that it will be seeking to incorporate new elements of the new *Impact Assessment Act, 2019* into the environmental assessment process, as appropriate. Given that the TQDR Project has the potential to have adverse impacts on fish habitat, an application for authorization in accordance with the *Fisheries Act* (RSC, 1985) is required by the Department of Fisheries and Oceans Canada (DFO). Approval from Transport Canada under the *Canadian Navigable Waters Act* (RSC, 1985), among other permits or authorizations, will also be required.

In general, Environmental Assessment (EA) processes require proponents to identify and assess cumulative effects; in other words, the changes to the environment due to their own project, combined with those of other past, present, and reasonably foreseeable future projects or activities. However, the scope and actual impact of cumulative effects on the environment and exercise of Aboriginal rights and interests is often viewed very differently by proponents and the Indigenous peoples whose lands, waters, culture, and livelihoods they apply to. Despite the exercise of completing a cumulative effects assessment, proponents often try to maintain the focus and accountability on their specific projects. By contrast, Indigenous peoples views all project approval processes holistically regardless of the parameters of individual environmental assessments. To Indigenous peoples, each project occurs within a broader context and history of alienation from their territories and resources at the hands of colonizers and their desire to extract or develop natural resources. Therefore, cumulative effects assessments are a critical component of any individual EA process, but they often fall short of adequately considering impacts to the rights and interests of Indigenous peoples.

In addition to completing a cumulative effects assessment, proponents are required to consult with Indigenous peoples to understand, assess, avoid, and mitigate the potential adverse impacts of the project on potential or established Aboriginal or Treaty rights. However, these are often undertaken by proponents without consideration for the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the principles of Ownership, Control, Access, and Possession (OCAP), Free, Prior and Informed Consent (FPIC), and without adequate collaboration and partnership with affected Indigenous groups.

In the spirit of reconciliation between the Crown or proponents and Indigenous groups, to ensure adequate consultation and engagement, and most importantly to obtain consent from Indigenous groups, it is critical that proponents undertake cumulative effects and rights impact assessments in a way that represents Indigenous perspectives and interests including those mentioned above.

The following is a description of the AOO's Aboriginal rights and interests, including Aboriginal title and the context in which they practice these rights as it relates to the TQDR Project from the AOO's perspective. As Aboriginal rights and title holders within the unceded Algonquin Settlement Area, and as parties to the ongoing modern treaty negotiations with Ontario and Canada, the AOO have a strong *prima facie* claim to Aboriginal rights and title in the Project area. The AOO's Aboriginal rights and title have never been ceded nor surrendered to the Crown and the strength of the AOO's outstanding assertion of Aboriginal rights and title resulted in the commencement of the aforementioned treaty negotiations with the Crown in the early 1990s. In 2016, the AOO and the Governments of Canada and Ontario signed an Agreement in Principle, which sets out the main elements of a potential settlement including transfer of provincial Crown land to the AOO. The AOO and the Governments of Canada and Ontario are currently engaged in negotiations to reconcile the Aboriginal rights and title assertions with the Crown's interests through a negotiated Settlement Agreement that will form the basis for a modern-day treaty.

While those negotiations are underway the AOO members continue to exercise their Aboriginal right to harvest wildlife, fish and gather for sustenance, medicinal, and other cultural purposes within the AOO unceded Settlement Area. In addition, the AOO have identified cultural sites of importance, travel routes and Algonquin Ecological Knowledge regarding presence of habitat important to support the exercise of those rights.

The sections below summarize PSPC's proposed methodology and scope of the CEA, including overall standards and guidelines, temporal scope, spatial scope, and project list, as well as standards and guidelines for Indigenous rights effects assessment. Each section also outlines the AOO's recommendations and expectations for how these should be applied within the context of the TQDR Project.

CUMULATIVE EFFECTS - STANDARDS AND GUIDELINES

The TQDR Project is subject to CEAA 2012 and PSPC is only required to adhere to the guidance outlined in the Guidelines for the Preparation of an Environmental Impact Statement (EIS) for this Project. However, in addition to these guidelines, PSPC has put forward Principle 8 of the First Nation Major Project Assessment Standard for consideration. At a high-level, Principle 8 specifies that "All projects will be assessed using a focus on total cumulative effects loading and best practice of cumulative effects assessment" (FNMPC, 2019, p. 11). More detailed information on these respective standards and guidelines can be found in Appendix A.

AOO Recommendations

The Algonquins of Ontario recommend that PSPC broaden the scope of their cumulative effects assessment for the TQDR Project to account for all criteria outlined under Principle 8 of the First Nations Major Project Assessment Standard. While all of these criteria are consistent with the AOO's perspective regarding adequate cumulative effects assessment, the following resonate with AOO in particular:

- 8.1 Demonstration of a similar rigour and level of effort in cumulative effects assessments as in Project-specific effects assessments, within each major project assessment
- 8.2. Provision of adequate funding, time, and resources to establish a satisfactory past (where possible, pre-industrial or in some bases pre-contact or pre-treaty) baseline to be adopted as the standard upon which to measure change for all values, including biophysical and Indigenous rights practice related values. This work may be conducted by the Proponent with guidance from First Nations, or upon request, by the First Nation(s) themselves.
- 8.9 Proponent's applications include expanded cumulative effects context sections providing an accurate representation of total cumulative effects loading on each Valued Component2 to date.
- 8.10 Avoidance of a "project contribution" approach to cumulative effects assessment and significance determination; cumulative effects methodology must be based on a Valued Component-centred approach.

[2] Note that only a list of Preliminary AOO Valued Components have been provided to PSPC to date. The AOO's Final Value Components will only be provided once the AKLUS for the TQDR Project is complete and used to validate the preliminary list. The AOO expects that the Valued Components used in PSPC's cumulative effects assessment will reflect the AOO's forthcoming Final Valued Components list.

CUMULATIVE EFFECTS – TEMPORAL BOUNDARIES

For the TQDR Project, PSPC has proposed using four key periods to define the temporal boundaries of the cumulative effects assessment. These include:

1. **Period 1:** Pre-contact / pre-disturbance.
2. **Period 2:** Colonization period – including influences of the *Indian Act*, Residential Schools, Settlement, Industrialization and River/Tributary control structures, recognition of changes over time in environmental protection measures, and other historical influences.
3. **Period 3:** Future project construction and future foreseeable projects/activities and climate change.
4. **Period 4:** Future project operation and future foreseeable projects/activities and climate change.

AOO Recommendations

The Algonquins of Ontario are in support of PSPC applying these temporal boundaries to the cumulative effects assessment, and offer the following additional recommendations or considerations:

1. It may be challenging to collect meaningful information on the condition of AOO's Valued Components during Period 1 (Pre-Contact) and Period 2 (Colonization Period). To ensure a meaningful assessment of the condition of AOO's Valued Components at these temporal scales, it will be critical for PSPC to conduct an inventory of existing data and, if necessary, a gap analysis of key missing data and information. To fill any gaps, which the AOO expect will exist, it will be important for PSPC to seek input from the AOO's Technical Advisor (Algonquin History), Joan Holmes & Associates, and/or conduct additional targeted oral history interviews with Algonquin Elders to. The AOO will aim to collect as much historical information as possible on these conditions through the Algonquin Knowledge and Land Use Study (AKLUS) for this Project, however, additional, targeted historic and AKLU research may be required as well as additional capacity funding to support this.
2. It will be particularly important for PSPC to consider the influences of industrialization (e.g., historic lumber mills) and river/tributary control structures (e.g., dams) during Periods 2-4, as these developments have significantly impacted the lands and waters upon which Algonquins rely. In particular, dams, such as the Timiskaming complex and the downstream hydroelectric dams for which the complex helps to regulate water levels, are plentiful within the watersheds of the unceded AOO Settlement Area. These dams have had detrimental impacts on culturally significant species (e.g., Kichi-Sìbì Pimisi and Lake Sturgeon) and impeded the navigation of Algonquins along their ancestral waters. In addition, historic lumber mills located along the Kichi-Sìbì have had significant impacts on its water quality and aquatic habitat (e.g., dumping of lumber mill waste creating favourable conditions for catfish species). Historical industrial development including effluent originating from lumber mills has resulted in contamination in Lake Timiskaming and the Kichi-Sìbì that directly impacts Algonquin harvesters by limiting the number of fish that can be safely consumed. Considering this, it will be critical for PSPC to consider these historic influences within their cumulative effects assessment specific to Period 2. In addition, it will be equally important for PSPC to plan for the future construction and operations of the

TQDR Project in a way that considers this specific cumulative context and is supportive of the AOO's journey of survival, rebuilding, and self-sufficiency (e.g., Kichi-Sìbì Pimisi recovery efforts, removing barriers to cultural navigation, minimizing future damage to the aquatic ecology of the Kichi-Sìbì, etc.).

3. It will be critical for PSPC to take a seven-generation approach to Period 4, to reflect Algonquin perspectives and objectives for environmental jurisdiction and stewardship.

4. For Periods 1-4, it will also be important for PSPC to consider how seasonal changes within a given year will affect the condition of the AOO's Valued Components in the broader context of cumulative effects. For example, this would be relevant to migratory birds and other species with seasonal migration patterns.

5. While the AOO are pleased to see that PSPC has proposed including consideration for climate change impacts within the cumulative effects assessment, it will be important for PSPC to do this effectively and in close collaboration with Algonquin Knowledge Holders and/or data provided through the AKLUS. The AOO are particularly interested in analyzing how industrial and climate change-related impacts may intersect with the project and influence the fish community (e.g., populations, distribution, impacts to habitat and the freshwater ecosystem, etc.) in this area of the Kichi-Sìbì.

CUMULATIVE EFFECTS – SPATIAL BOUNDARIES

For the TQDR Project, PSPC has proposed using the Kichi-Sìbì Watershed as a regional study area (RSA) boundary for the following VCs:

1. AOO Indigenous community health and socio-economic conditions
2. AOO land uses and knowledge systems
3. Fish and fish habitat

PSPC has not proposed specific RSA boundaries for the following VCs, and is instead looking for guidance from the AOO:

1. Any structure, site, or thing that is of historical, archaeological, paleontological, or architectural significance
2. Algonquin Rights
3. Water Quality
4. Terrestrial
5. Air Quality
6. Migratory birds
7. Other VCs

AOO Recommendations

The Algonquins of Ontario recommend that PSPC use cumulative effects regional study area (RSAs) boundaries for the Preliminary AOO VCs. Specific recommendations for each Preliminary AOO VC are outlined in Table 1 below. As noted in the separate Preliminary AOO VCs memo, these VCs are preliminary in nature only and have not yet been validated based on the results of the AOO's TQDR Project-specific AKLUS.

Therefore, these Preliminary AOO VCs are subject to change, along with the AOO's recommendations on their respective RSAs for the cumulative effects assessment.

At face value, many of these Preliminary AOO VCs are components of the biological or physical environments and therefore the AOO are recommending spatial boundaries that reflect potential bio-cultural influences. However, it will be important for PSPC to acknowledge that while Algonquins have historically used the lands and waters within the broader Kichi-Sìbì watershed, the AOO hold rights and jurisdiction within the unceded AOO Settlement Area boundary. Considering this, the AOO's key areas of interest with respect to this Project include Lake Temiskaming, the Kichi-Sìbì (in its entire width including its riverbanks), and the portion of the Kichi-Sìbì watershed within the unceded AOO Settlement Area boundary. For the species-based Preliminary AOO VCs, the AOO recommend that PSPC's cumulative effects not only assess the presence and distribution of these species within these spatial boundaries, but that they also measure parameters, such as species relative abundance and health, that inherently influence Algonquins' ability to exercise their rights to fish, hunt, trap, and gather.

Table 1: The Algonquins of Ontario's recommended regional study areas by Preliminary AOO VC for the proposed TQDR Project

Preliminary AOO Valued Component	**Recommended Spatial Boundary (Cumulative Effects Assessment)**
Kichi-Sìbì Pimisi (American Eel)	**Bio-cultural Impacts Perspective:** Historic and current distribution of Kichi-Sìbì Pimisi (American Eel) in Ontario and Quebec. This information can be sourced directly from the Ministry of Environment, Conservation and Parks (MECP), Department of Fisheries and Oceans (DFO), Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and the AOO's Algonquin Knowledge and Land Use (AKLU) database. **AOO Rights and Interests Perspective:** Historic and current distribution of Kichi-Sìbì Pimisi (American Eel) in the AOO Unceded Settlement Area, which supports the right to fish.
Namé (Lake Sturgeon)	**Bio-cultural Impacts Perspective:** Historic and current distribution of Namé (Lake Sturgeon) in Ontario and Quebec. This information can be sourced directly from MECP, DFO, COSEWIC, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Historic and current distribution of Namé (Lake Sturgeon) in the AOO Unceded Settlement Area, which supports the right to fish.
Lake Whitefish*	**Bio-cultural Impacts Perspective:** Historic and current distribution of Lake Whitefish in Ontario and Quebec. This information can be sourced directly from the Ministry of Natural Resources and Forestry (MNRF), DFO, and the AOO's AKLU database.

Preliminary AOO Valued Component	Recommended Spatial Boundary (Cumulative Effects Assessment)
	AOO Rights and Interests Perspective: Historic and current distribution of Lake Whitefish in the AOO Unceded Settlement Area, which supports the right to fish.
Walleye*	**Bio-cultural Impacts Perspective:** Historic and current distribution of Walleye in Ontario and Quebec. This information can be sourced directly from the MNRF, DFO, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Historic and current distribution of Walleye, in the AOO Unceded Settlement Area, which supports the right to fish.
Other Fish Species (Bass, Yellow Perch, Northern Pike, Lake Trout, etc.)*	**Bio-cultural Impacts Perspective:** Combined historic and current distributions of these fish species in Ontario and Quebec. This information can be sourced directly from the MNRF, DFO, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Combined historic and current distributions of these other fish species in the AOO Unceded Settlement Area, which supports the right to fish.
Freshwater Mussel Species (e.g., Hickorynut Mussel)*	**Bio-cultural Impacts Perspective:** Combined historic and current distributions of freshwater mussel species, particularly the at-risk Hickorynut mussel, in Ontario and Quebec. This information can be sourced directly from the MNRF, MECP, DFO, COSEWIC, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Combined historic and current distributions of freshwater mussel species, particularly the at-risk Hickorynut mussel, in the AOO Unceded Settlement Area, which supports the right to fish.
Species at Risk Turtles (Snapping Turtle, Midland Painted Turtle)*	**Bio-cultural Impacts Perspective:** Combined historic and current distribution of Snapping Turtle and Midland Painted Turtles in Ontario and Quebec. This information can be sourced directly from the MECP, COSEWIC, Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS), and the AOO's AKLU database. **AOO Rights and Interests Perspective:**

Preliminary AOO Valued Component	Recommended Spatial Boundary (Cumulative Effects Assessment)
	Combined historic and current distribution of Snapping Turtle and Midland Painted Turtles in the AOO Unceded Settlement Area. This provides an indicator of overall ecosystem health, which supports the understanding of impacts to the right to fish, hunt, trap, and gather. It is also integral to maintaining the AOO's connection to, and transmission of, knowledge to younger generations regarding Algonquin history, culture, and values.
Waterfowl Species (Ducks, Geese, Common Loon)*	**Bio-cultural Impacts Perspective:** Combined historic and current distribution of waterfowl species in Ontario and Quebec. This information can be sourced directly from the MNRF, MECP, ECCC-CWS, COSEWIC, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Combined historic and current distribution of waterfowl species in the AOO Unceded Settlement Area, which support the right to hunt.
Riparian Plants and Medicine Species (e.g., Staghorn sumac, chokecherry, red raspberry) *	**Bio-cultural Impacts Perspective:** Riparian habitats within the Kichi-Sìbì Watershed. This information can be sourced directly from the MNRF, MECP, ECCC-CWS, COSEWIC, and the AOO's AKLU database. **AOO Rights and Interests Perspective:** Riparian habitats within the unceded AOO Settlement Area portion of the Kichi-Sìbì Watershed (including the full width of the Kichi-Sìbì and the TQDR Project location), which support the right to gather plants and medicines.
The Kichi-Sìbì (Ottawa River)	**Bio-cultural Impacts Perspective:** The Kichi-Sìbì Watershed. **AOO Rights and Interests Perspective:** Portions of the Kichi-Sìbì Watershed within the unceded AOO Settlement Area (including the full width of the Kichi-Sìbì and the TQDR Project location), which supports the right to hunt, fish, trap, and gather, as well as the right to steward healthy aquatic and terrestrial environments and ensure the persistence of Algonquin culture.
Île Long Sault	**Bio-cultural Impacts Perspective:** The Kichi-Sìbì Watershed.

Preliminary AOO Valued Component	Recommended Spatial Boundary (Cumulative Effects Assessment)
	AOO Rights and Interests Perspective: Portions of the Kichi-Sìbì Watershed within the unceded AOO Settlement Area (including the full width of the Kichi-Sìbì and the TQDR Project location), which supports the right to hunt, fish, trap, and gather, as well as the right to steward healthy aquatic and terrestrial environments and ensure the persistence of Algonquin culture.
Access and Travel throughout Algonquin Lands and Waters (e.g., canoe and portage routes, boat launches, shore and boat based angling locations)	**Bio-cultural Impacts Perspective:** The Kichi-Sìbì Watershed. **AOO Rights and Interests Perspective:** Portions of the Kichi-Sìbì Watershed within the unceded AOO Settlement Area (including the full width of the Kichi-Sìbì and the TQDR Project location), which supports the right to hunt, fish, trap, and gather, as well as the right to steward healthy aquatic and terrestrial environments and ensure the persistence of Algonquin culture.

CUMULATIVE EFFECTS – PROJECT LIST

For the TQDR Project, PSPC has proposed including the following future foreseeable and past projects or activities that have created or could create changes to Indigenous VCs and rights within the cumulative effects assessment scope:

- Alexandra and Chaudière Bridge Replacement Project
- Rayonier Plant operational changes over time
- All dams and structured that are influencing flows in the Ottawa River watershed (including on all tributaries)
- Agricultural, forestry, mining, and other resource development activities in the watershed
- Human settlement
- Parks and protected area designations
- Government policy including *Indian* Act policies, residential schools, and other policies that have influenced health and socio-economic conditions over time
- Climate change
- Energy Services Ottawa outfalls and intakes of Ottawa River project

AOO Recommendations

The Algonquins of Ontario are in support of PSPC including the above future foreseeable and past projects or activities in the cumulative effects assessment for the TQDR Project and offer the following additions or specifications. All of these have in the past, are currently, or are projected to alienate Algonquins from their traditional lands and waters in the unceded AOO Settlement Area in the future.

- Water level and flow management in the Kichi-Sìbì, including historic losses of land area due to flooding as a result of structures and management activities.
- The entire National Capital Region (NCR) Crossings Program of work, including the construction repairs or replacement of Alexandra Bridge and Chaudière Bridges, as well as the potential future sixth crossing, and past construction of or repairs to the Macdonald-Cartier Bridge and Portage Bridge;
- All crossing structures that have potential impacts on water flows (e.g., old railroad crossings with abutments below the high-water mark) and water flow management bodies such as the Ottawa River Regulation Planning Board;
- Existing and future nuclear projects and activities impacting and occurring along the Kichi-Sìbì, including the Nuclear Power Demonstration Closure Project, Near Surface Disposal Facility Project, the Global First Power Micro Modular Reactor Project, and future additional Small Modular Reactor projects;
- Agricultural activities, particularly those that are adjacent waterbodies within the unceded AOO Settlement Area;
- Commercial fisheries, including a potential future Algonquin catfish fishery in the Kichi-Sìbì.
- Forestry activities, locations, and policies, including forest management units, forest management plans, past forest depletions, planned forest depletions, forestry access roads, and historic lumber mills, within the unceded AOO Settlement Area;
- Pulp mill effluent policies and regulations, including paper product manufacturing plants
- Mining projects and activities including the proposed Northern Graphite Bissett Creek Mine, mining leases, past mining claims, active mining claims, aggregate pits and quarries;
- Human settlements, including municipal boundaries;
- Parks and protected areas including provincial parks, conservation reserves, and conservation authority properties;
- Patented lands;
- Fish and wildlife management policies and areas, including Wildlife Management Units, Fisheries Management Plans, invasive species management plans, and related conservation or management actions undertaken or planned by conservation organization including the North Bay-Mattawa Conservation Authority;
- Canadian Forces Base (CFB) Petawawa; and
- Linear corridors, including transmission lines, pipelines, railroads, and roadways.

RIGHTS IMPACT ASSESSMENT FRAMEWORK

The TQDR Project is subject to CEAA (2012) and PSPC is only required to adhere to the guidance outlined in the Guidelines for the Preparation of an Environmental Impact Statement (EIS) for this Project. However, in addition to these guidelines, PSPC has put forward the Impact Assessment Agency of Canada's (IAAC's) Policy Context and Guidance on the Assessment of Potential Impacts on the Rights of Indigenous Peoples as well as Principles 1 – 3 of the First Nations Major Project Assessment Standard for consideration.

In short, the Policy Context and Guidance on the Assessment of Potential Impacts on the Rights of Indigenous Peoples documents provide guidance for designated projects under the new Impact Assessment Act (IAA). This guidance requires proponents to undertake a seven-step process that requires more meaningful dialogue and validation with Indigenous groups at each step.

At a high-level, Principles 1 – 3 specify that:

- Principle 1: First Nations Rights will be respected, maintained, and promoted.
- Principle 2: First Nations will be fully engaged in assessment and decision-making for major projects, integrating their laws, norms, and values.
- Principle 3: First Nations stewardship and governance rights and responsibilities will be respected and adhered to throughout the major project life cycle.

More detailed information on these respective standards and guidelines can be found in Appendix A.

AOO Recommendations

Based on experience participating in federal environmental assessments for projects under CEAA, 2012, the Algonquins of Ontario note that this legislation is woefully inadequate in assessing the potential impacts of projects on the rights of Indigenous peoples. Considering this, Algonquins of Ontario strongly recommend that PSPC use the Policy Context and Guidance on the Assessment of Potential Impacts on the Rights of Indigenous Peoples, as well as the First Nations Major Project Assessment Standard's Principles 1- 3 within the environmental assessment for the TQDR Project.

Based on the AOO's experience, a critical gap in existing environmental assessment is an approach that factors in multiple VCs and associated effect pathways and provides an inter-dependent, or holistic analysis of impacts to the health and well-being of Algonquins. This requires an Indigenous lens that is relevant to the AOO's Aboriginal rights, interests, and way of life. Without such an approach, there is a risk that the rights impact assessment will be inadequate in assessing and addressing impacts to Algonquin health, wellbeing, and socioeconomics, and in turn will not adequately convey the full range and depth of impacts to AOO's section 35 Aboriginal rights and interests. An example of an approach to conducting an integrated assessment include the Sustainable Livelihoods Framework (SLF) but would ultimately be informed and grounded in the Algonquin worldview. The AOO are interested in supporting PSPC with developing such an approach, however this would require the provision of additional capacity funding.

Regarding PSPC undertaking dialogue with the AOO at each of the seven steps outlined in the Policy Guidance on the Assessment of Potential Impacts on the Rights of Indigenous Peoples, the Algonquins of Ontario offer the following recommendations or additional considerations:

1. It is not sufficient to simply ensure that dialogue occurs at every step of the Rights Impact Assessment process. This dialogue must be meaningful, include two-way communication between the AOO and PSPC, and PSPC must undertake all reasonable efforts to ensure that the AOO's concerns are heard and adequately addressed.

2. It will be critical for PSPC to seek approval from the AOO's Planning and Environment Working Group (PEWG) and Algonquin Negotiation Representatives (ANR) Table at each step of the rights impact assessment process, to ensure that meaningful dialogue has occurred. The ANRs may provide directions for AOO Consultation Office Staff or Technical Advisors to carry out or communicate on their behalf, but the authority and all final approvals must come from the ANRs.

3. For each of the seven steps, it will be critical for PSPC to schedule the Rights Impact Assessment to align with the Planning and Environment Working Group's deadlines for project proponents, which is provided in Appendix B. This will require the submission of requests and documents for consideration

approximately three to four weeks in advance of PEWG meeting dates. Formal ANR responses will then be communicated back to PSPC approximately two to three weeks following the PEWG meeting dates.

CONCLUSION

In the spirit of reconciliation, we request that PSPC implement the recommendations for cumulative effects and rights impact assessment into the EA process for the Timiskaming Dam-Bridge of Quebec Replacement Project. We look forward to further discussing mutually beneficial ways in which this can be done to ensure the adequate assessment of potential impacts to Algonquin rights and interests.

APPENDIX A. DETAILED INFORMATION ON PSPC'S PROPOSED APPROACHES TO THE CUMULATIVE EFFECTS ASSESSMENT AND RIGHTS IMPACT ASSESSMENT

Temiskaming Quebec Dam Replacement Project
Cumulative Effects Methodology – CONCEPTS FOR DISCUSSION

Standards and Guidelines for cumulative effects assessment:

CEAA 2012 EIS Guidelines for the project:	• Changes to the environment on Health, socio-economic conditions • Physical and cultural heritage • Current use of lands and resources for traditional purposes • Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance • Effects that cross provincial boundaries • Effects on federal lands • Effects on fish, fish habitat • Effects on migratory birds
First Nation Major Project Assessment Standard, Principle 8:	• Large landscape level • Accounts for implications of the sum total of cumulative impacts from the past, present and future activities. • Significance determined compared to pre-disturbance/lesser disturbed conditions, not to the current or accumulated state of the current environment. • Total cumulative effects loading will be established prior to assessment of Project effects to determine resilience and vulnerability to further change. It provides the context in which the project effects will be assessed.

Temporal Boundaries – for discussion:

Period 1:	Pre-contact / pre-disturbance
Period 2:	Colonization period – including influences of Indian Act, Residential Schools, Settlement, Industrialization and River / Tributary control structures. Recognition of changes over time in environmental protection measures? Other historical influences that should be considered here?
Period 3a:	Future project construction and future foreseeable projects/activities and climate change
Period 3b:	Future project operation and future foreseeable projects/activities and climate change

Spatial Boundaries – for discussion:

Valued Component	Regional study area boundary
AOO indigenous community health and socio-economic conditions,	Ottawa River Watershed
AOO land uses and knowledge systems	Ottawa River Watershed
Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	To discuss
Algonquin Rights	To discuss / AOO to provide
Fish and fish habitat	Ottawa River Watershed
Water quality	To discuss
Terrestrial	To discuss
Air Quality	To discuss
Migratory birds	To discuss
Other VCs?	To discuss

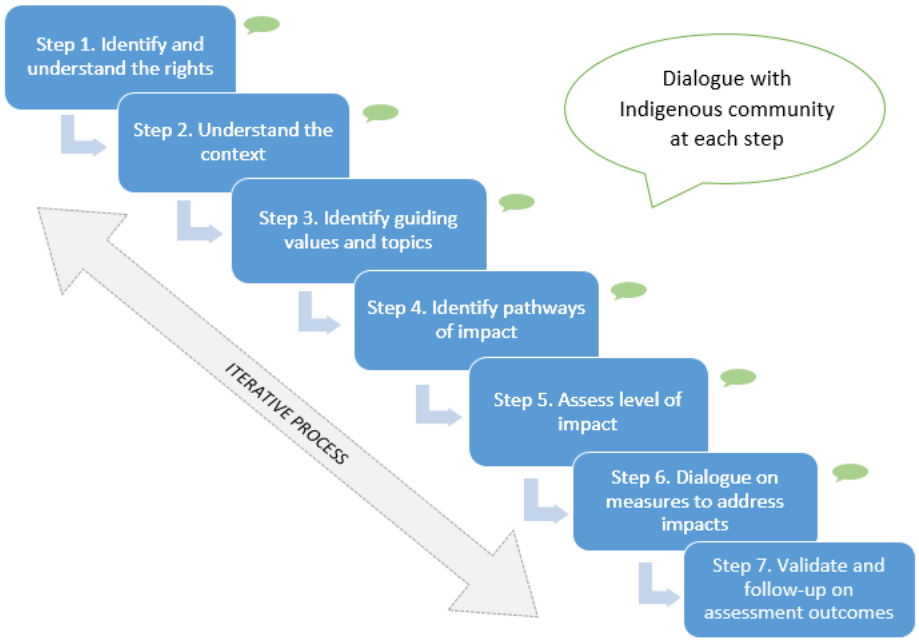
Future foreseeable and past projects or activities that have created or could create changes to Indigenous VCs and rights:

- Alexandra and Chaudière Bridge Replacement projects
- Rayonier plant operational changes over time
- All dams and structures that are influencing flows in the Ottawa River watershed (including on all tributaries)
- Agricultural, Forestry, Mining and other resource development activities in the watershed
- Human settlement
- Parks and protected area designations
- Government policy including Indian Act policies, residential schools, and other policies that have influenced health and socio-economic conditions over time.
- Climate change
- Other?

Temiskaming Quebec Dam Replacement Project
Rights Effects Methodology – CONCEPTS FOR DISCUSSION

Standards and Guidelines for Indigenous rights effects assessment:

CEAA 2012 EIS Guidelines for the project:	With respect to potential adverse impacts of the project on potential or established Aboriginal or Treaty rights, the EIS will document for each group identified in Part 2, Section 5 of these guidelines (or in subsequent correspondence from the Agency): 1. potential or established Aboriginal or Treaty rights, when this information is directly provided by a group to the proponent, the Agency or is available through public records, including but not limited to: • location of the right being practiced or exercised • context in which the right is practiced or exercised (including information about which groups of an Indigenous group practice the right (women, elders, youth), how the right was practiced historically), • how the Indigenous Peoples' cultural traditions, laws and governance systems inform the manner in which they exercise their rights (the who, what, when, how, where and why) • the Indigenous Peoples' perspectives on the importance of the land on which the Project is located and how and to what extend the project interacts with uses and/or land management by Indigenous Peoples; • how often the right is practiced or exercised and timing or seasonality of the practice or exercise of the right; and, • maps and data sets (e.g., fish catch numbers); 2. potential adverse impacts of each of the project components and physical activities, in all phases, on potential or established Aboriginal or Treaty rights, including those raised by Indigenous Peoples. 3. measures identified to accommodate potential adverse impacts of the project on the potential or established Aboriginal or Treaty rights. These measures will clearly describe how the proponent intends to implement them, and may go beyond mitigation measures that are developed to address potential adverse environmental effects. Include perspectives and specific suggestions raised of potentially impacted Indigenous Peoples; as well as any views of Indigenous Peoples on the effectiveness of mitigation measures. 4. potential adverse impacts on potential or established Aboriginal or Treaty rights that have not been fully mitigated or accommodated as part of the EA and associated engagement with Indigenous Peoples. Include perspective of potentially impacted Indigenous Peoples; and 5. potential adverse impacts that may result from the residual and cumulative environmental effects. Include the perspectives of potentially impacted Indigenous Peoples. This information and assessment will be informed from engagement with Indigenous Peoples described in Part 2, Section 5 of these guidelines. The information sources, methodology and findings of the assessment of paragraph

	5(1)(c) effects under CEAA 2012 may be used to inform the assessment of potential adverse impacts of the project on potential or established Aboriginal or Treaty rights. However, there may be distinctions between the adverse impacts on potential or established Aboriginal or Treaty rights and paragraph 5(1)(c) effects under CEAA 2012. The proponent will carefully consider the potential distinction between these two aspects and, where there are differences; will include the relevant information in its assessment.
IAAC Policy Guidance and IAAC Guidance: Assessment of Potential Impacts on the Rights of Indigenous Peoples	Policy: UNDRIP, reconciliation, assessment conducted in partnership based on a collaborative approach developed with the Indigenous group, IK used, OCAP principles, community defined thresholds and measures of impact for key indicators, established impact pathways, cumulative effects and context important, transparency in approach, works towards addressing adverse impacts to allow for continued exercise of rights. Guidance: 7 - Step process 
First Nation Major Project Assessment Standard	• Principles 1 - 3

Proposed Assessment approach:

- VC based (changes in abundance, ability to use / access the resource) rather than on the project list contributions.
- AOPFN / Firelight to share public data and assessment of common factors
- AOO – to review draft cumulative effects assessment and add specific information related to cumulative effects on AOO members.
- We will discuss methods with FL so we can ensure some level of consistency in what is assessed and in what way. We will share this method with the other Indigenous groups for verification

APPENDIX B. AOO PLANNING AND ENVIRONMENT WORKING GROUP DEADLINES

Planning and Environment Working Group Deadlines for the Project Proponents[1]
Year 2020/2021

Planning and Environment Working Group – Fiscal Year 2020/2021					
Date when AOO Response will be communicated to proponent	**Recommendations arising to the ANR Table for Review and Approval**	**Date of Working Group**	**Circulation of Draft Agenda and Supporting Materials**	**Completion Date for the review of Draft Reports by AOO Third Parties for Internal AOO Review**	**Date Draft Reports required from External Parties for review by AOO Third Parties**
The week of January 4 – 8, 2021	The week of December 15 – 18, 2020	**Monday, December 7, 2020**	Monday, November 30, 2020	Monday, November 23, 2020	Monday, November 9, 2020
The week of January 25 – 29, 2021	The week of January 19 – 22, 2021	**Monday, January 11, 2021**	Monday, January 4, 2020	Monday, December 7, 2020 [2]	Monday, November 30, 2020
The week of February 22 – 26, 2021	The week of February 16 – 19, 2021	**Monday, February 8, 2021**	Monday, February 1, 2021	Monday, January 25, 2021	Monday, January 11, 2021
The week of March 22 – 26, 2021	The week of March 16 – 19, 2021	**Monday, March 8, 2021**	Monday, March 1, 2021	Monday, February 22, 2021	Monday, February 8, 2021
The week of April 26 – 30, 2021	The week of April 20 – 23, 2021	**Monday, April 12, 2021**	Monday, April 5, 2021	Monday, March 29, 2021	Monday, March 8, 2021
The week of May 24 – 28, 2021	The week of May 18 – 21, 2021	**Monday, May 10, 2021**	Monday, May 3, 2021	Monday, April 26, 2021	Monday, April 12, 2021

[1] **This schedule is a sample only and it should not be assumed that the review period as detailed in this chart would be appropriate for any other proposed projects**

[2] **Advanced deadline as AOO Consultation Office is CLOSED: Monday, December 21, 2020 REOPENING: Monday, January 4, 2021**

The week of June 21 – 25, 2021	The week of June 22 – 25, 2021	**Monday, June 14, 2021**	Monday, June 7, 2021	Monday, May 31, 2021	Monday, May 10, 2021
The week of July 26 – 30, 2021	The week of July 20 – 23, 2021	**Monday, July 12, 2021**	Monday, July 5, 2021	Monday, June 28, 2021	Monday, June 14, 2021
No AOO Working Groups held in August 2021					
The week of September 27 – October 1, 2021	The week of September 21 – 24, 2021	**Monday, September 13, 2021**	Tuesday, September 7, 2021	Monday, August 30, 2021	Monday, August 16, 2021
No AOO Working Groups held in October 2021					
The week of November 22 – 26, 2021	The week of November 16 – 19, 2021	**Monday, November 8, 2021**	Monday, November 1, 2021	Monday, October 25, 2021	Monday, October 11, 2021
The week of January 3 – 7, 2022	The week of December 14 – 17, 2021	**Monday, December 6, 2021**	Monday, November 29, 2021	Monday, November 22, 2021	Monday, November 8, 2021