Canadian Environmental Assessment Agency
Agence canadienne d'évaluation environnementale

Analysis of IAMGOLD Corporation's Proposed Changes to the Côté Gold Mine Project

February 2019

Canada

Catalogue No: En106-219/2019E-PDF

ISBN: 978-0-660-29384-4

This document has been issued in French under the title:
Analyse des modifications proposées par IAMGOLD Corporation au projet de mine d'or Côté

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1 Introduction

IAMGOLD Corporation (the proponent) is planning for the construction, operation, decommissioning and abandonment of the Côté Gold Mine Project (the Project) located 20 kilometres southwest of the community of Gogama in northeastern Ontario. The Project includes an open-pit gold mine, on-site metal mill and structures for diverting water. Project construction is anticipated to begin in January 2019 with gold production planned for 2021.

The Project was subject to the *Canadian Environmental Assessment Act*, *2012* (CEAA 2012) and an environmental assessment was completed by the Canadian Environmental Assessment Agency (the Agency). The Minister of Environment and Climate Change issued a Decision Statement under CEAA 2012 on April 13, 2016, concluding that the Project is not likely to cause significant adverse environmental effects and allowing the Project to proceed. The Decision Statement contains legally binding conditions, which include mitigation measures and follow-up program requirements that the proponent must comply with throughout the life of the Project. In reaching her decision, the Minister considered the conclusions and recommendations outlined in the Agency's Environmental Assessment Report.

On September 11, 2018, the proponent submitted an Environmental Effects Review Report to inform the Agency of proposed changes to the design of the Project pursuant to conditions 2.10 and 2.11 of the Decision Statement.

The Agency conducted an analysis of the proposed project changes and the potential adverse environmental effects of those changes to determine:

- whether the changes constitute a new or different designated project that may require a new environmental assessment; and
- whether any modifications may be required to the mitigation and follow-up measures identified in the Environmental Assessment Report and set out as conditions in the Decision Statement.

This report provides a summary of the proposed project changes, an analysis of whether these changes may result in adverse environmental effects that may not have been considered during the environmental assessment, consideration of whether existing mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement are still applicable or need to be modified, and consideration of whether new mitigation and follow-up measures need to be recommended.

This report was informed by expert advice from Fisheries and Oceans Canada, Environment and Climate Change Canada, Natural Resources Canada, Transport Canada, and Health Canada, as well as comments on a draft version received from Indigenous groups and the proponent.

The Agency is of the view that the proposed project changes do not constitute a new or different designated project, and that the mitigation and follow-up measures recommended in the Environmental

Assessment Report and set out as conditions in the Decision Statement remain relevant with some modifications.

2 Proposed Project Changes

The key changes to the Project (Table 1; Figure 1) include a reduction in overall project footprint due to a smaller open pit, mine rock area and tailings management facility, as well as:

- relocation of several project components including the tailings management facility, reclaim pond, polishing pond, final effluent discharge point, and overburden stockpile;
- modifications to watercourse realignments including creation of New Lake; and
- selection of an alternate transmission line alignment.

The Agency conducted an assessment of the potential for the changes to cause adverse environmental effects to the following valued components: fish and fish habitat, migratory birds including federally listed species at risk, current use of lands and resources for traditional purposes, health of Indigenous peoples, physical and cultural heritage, and socio-economic conditions in relation to other federal decisions.

2.1 Relocation of Project Components

In the environmental assessment, the tailings management facility was proposed to be located a few kilometers north of the mine, in an area described as having a natural bowl feature with bedrock outcrops along its perimeter. Having acquired additional land tenure, the proponent has proposed to relocate the tailings management facility and reclaim pond closer to the ore processing facility (Figure 1). The result is a more compact project layout with shorter pipelines and fewer watercourse diversions.

The relocated tailings management facility would include a series of seepage collection ponds, ditches and localized interception trenches along its perimeter, to collect seepage. The main seepage collection pond would be located at the northeast side of the tailings management facility, adjacent to Bagsverd Lake, and would be maintained at a level slightly lower than Bagsverd Lake to create a hydraulic gradient toward the pond.

The final effluent discharge point would be relocated from Neville Lake, at the outflow of Bagsverd Creek, to Upper Three Duck Lake, anticipated near the outflow of a realignment channel. Effluent would be discharged by pipeline from the polishing pond adjacent to Upper Three Duck Lake. The polishing pond would be operated at a level lower than Upper Three Duck Lake to maintain a hydraulic gradient and avoid seepage into Upper Three Duck Lake.

The overburden stockpile was originally proposed to be integrated in the mine rock area. It would instead now, based on the proposed project changes, be located southwest of the open pit to provide overburden for reclamation and closure activities. The new overburden stockpile would have its own runoff collection system, with water either directed to the mine water pond or discharged to the environment if it meets discharge criteria.

2.2 Modifications to Watercourse Realignments

In the environmental assessment, the proponent proposed several retention dams and watercourse realignments throughout two subwatersheds. With the proposed relocation of project components and reduced project footprint, no watercourse realignments would be required in the Mesomikenda Lake subwatershed.

Two watercourse realignments would be required within the Mollie River subwatershed:

1. New Lake to Three Duck Lake (1.5 kilometers): To accommodate development of the open pit, the Mollie River would be dammed to prevent flow into Côté Lake, resulting in the formation of New Lake. New Lake would flow to the east through a realigned channel to Upper Three Duck Lake and continue to the Mollie River. Consistent with the environmental assessment, Côté Lake would be drained.

2. Clam Lake to Chester Lake (900 meters): Clam Lake would be dammed to prevent flow into Clam Creek and the open pit. Flow would be redirected south through a realigned channel into Chester Lake. Chester Lake would flow to New Lake and into Upper Three Duck Lake.

Similar to in the environmental assessment, the proponent proposes to decommission some watercourse realignments and retention dams during Abandonment Phase II, once the open pit has flooded, to restore natural drainage patterns. The proponent will re-evaluate options for maintaining a portion of New Lake as a grade control structure or as a weir to maintain fish habitat, prior to decommissioning.

2.3 Alternate Transmission Line Alignment

In the environmental assessment, the proponent considered two alternatives for the transmission line: the cross-country alignment and the Shining Tree alignment. It selected and assessed the cross-country alignment which would have required development of a new corridor through previously undisturbed habitat. With the proposed project changes, including a smaller project and reduced power requirements, the proponent has instead proposed the Shining Tree alternative. This would involve construction of 44 kilometres of new transmission line in an existing right of way between Shining Tree and the Project and refurbishment of an abandoned transmission line between Shining Tree and Timmins.

2.4 Agency's Analysis of Changes

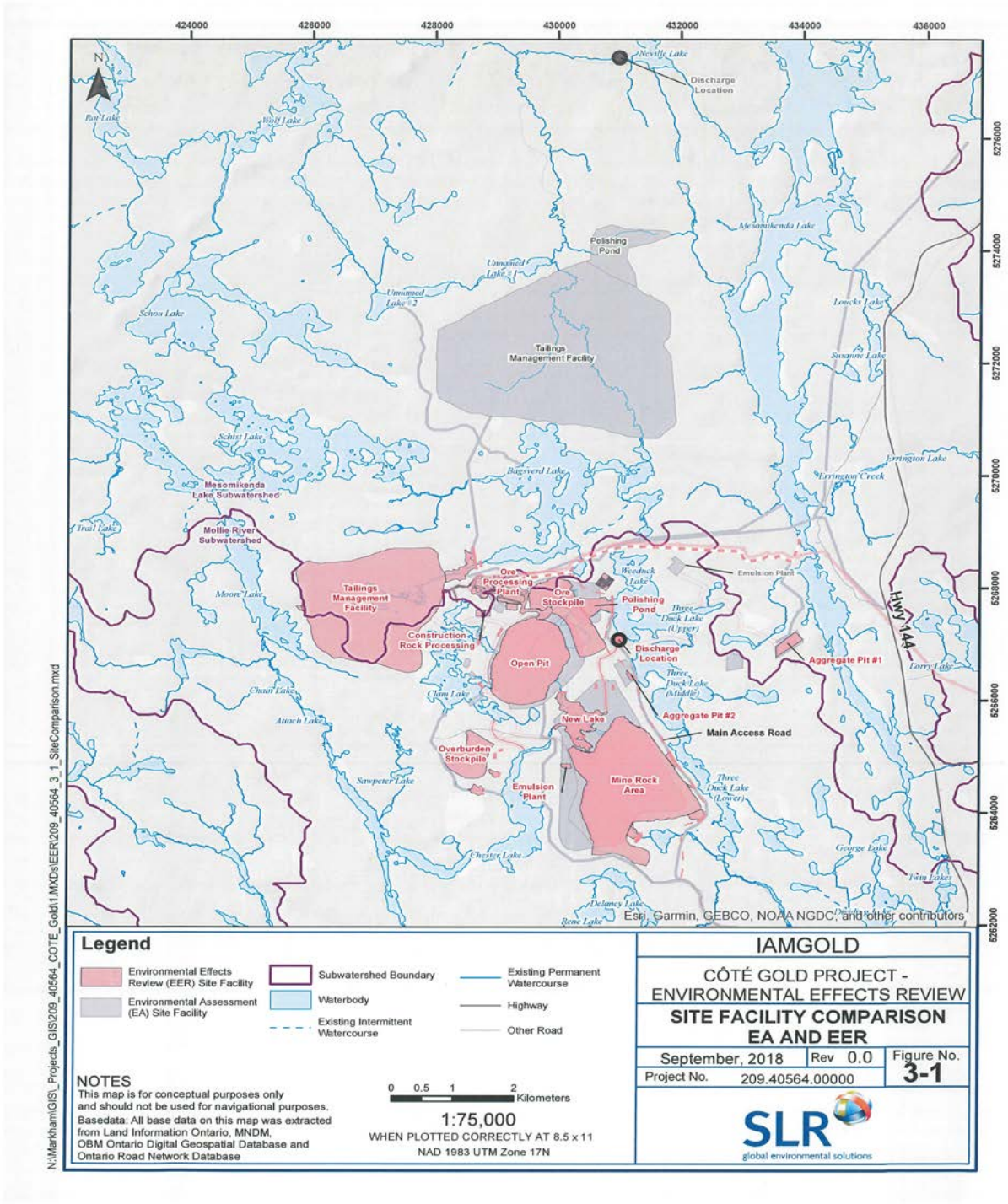
The *Regulations Designating Physical Activities* under CEAA 2012 identify the physical activities that constitute designated projects that may require an environmental assessment. On their own, the proposed project design changes are not new physical activities described in the Regulations. Consequently, the Agency determined that the changes do not constitute a new or different designated project that may require a new environmental assessment.

Table 1. Comparison between previously and currently proposed project parameters

	Previous Project Design [1]	Current Project Design [2]
Overall footprint	1,700 hectares	1,050 hectares
Project phases Construction Operation (life of mine) Decommissioning Abandonment (open pit flooding)	 2 years 15 years 2 years 50-80+ years	 2 years 17 years 2 years 25-30+ years
Open pit Footprint Ore Ore production capacity	 210 hectares 261 megatonnes 60, 000 tonnes per day	 145 hectares 196 megatonnes ~ 36,000 tonnes per day
Mine rock area Footprint Quantity	 400 hectares 850 megatonnes	 300 hectares 559 megatonnes
Processing Ore input capacity	 60,000 tonnes per day	 ~ 36,000 tonnes per day
Tailings management facility Location Footprint Maximum dam height Storage capacity Deposition method	 4.5 kilometres north of pit 840 hectares 45 metres 261 megatonnes Conventional slurry	 2.8 kilometres northwest of pit 478 hectares 70 metres 200 megatonnes Thickened tailings
Overburden stockpile Location Quantity	 Within mine rock area 11 megatonnes	 Southwest of open pit 11 megatonnes
Final effluent discharge Location	 Neville Lake, at outflow of Bagsvard Creek	 Upper Three Duck Lake, at outflow of realignment channel
Watercourse realignments Total length Number	 7.9 kilometres 7 realignments	 2.4 kilometres 2 realignments
Transmission line alignment Power Route Length of new line	 230 kilovolts Cross-country alignment ~120 km	 115 kilovolts Shining Tree alignment 44 km

[1] Previous Project Design as described in Section 2 of the Agency's Environmental Assessment Report, April 2016
[2] Current Project Design as described in the proponent's Environmental Effects Review Report, September 2018

Figure 1. Comparison between previous and currently proposed project layouts



Source: Proponent's Environmental Effects Review Report, September 2018

Disclaimer: This figure is available only in the language it was provided by IAMGOLD Corporation

3 Potential Adverse Environmental Effects from Proposed Project Changes

The following is an analysis of whether the proposed project changes, including relocation of project components, modification to watercourse diversions, and selection of the alternate transmission line alignment, would require changes to the mitigation measures and follow-up requirements set out as conditions in the Decision Statement.

3.1 Fish and Fish Habitat

With respect to fish and fish habitat, the proposed project changes could alter the initial assessment of adverse environmental effects related to fish habitat, passage, and spawning and contamination of fish due to changes in surface water quality.

3.1.1 Fish Habitat, Passage, and Spawning

Proponent's Assessment

The proponent predicts that overall effects on aquatic habitat would be lower with the proposed project changes than what was presented in the environmental assessment.

Some project components will directly overprint fish habitat. In the environmental assessment, the tailings management facility would overprint a portion of Bagsverd Creek which provides habitat for pike and painted turtles. With the proposed project changes, the tailings management facility would instead overprint West Beaver Pond, five unnamed waterbodies, and several unnamed tributaries to the South Arm of Bagsverd Lake[3], which provide habitat for minnows.

Some waterbodies will have reduced surface water flows due to changes within watersheds. In the environmental assessment, surface water flows in the unaltered portions of Bagsverd Creek would decrease by up to 20 percent which had the potential to impede fish passage. With the proposed project changes, surface flows in Bagsverd Creek are predicted to decrease by five percent and are unlikely to impede fish passage. Other watercourse diversions would continue to be designed to enable fish passage.

Noise and vibration from blasting in the open pit can reduce spawning success in nearby waterbodies. In the environmental assessment, Fisheries and Oceans Canada requested monitoring of spawning habitat near blasting activities in the southern basin of Clam Lake. With the proposed project changes, the proponent identified that the influence of blasting may be realized in both Clam Lake and New Lake.

Effects on fish and fish habitat can be offset with habitat compensation measures that will receive final approval through a *Fisheries Act* authorization. In the environmental assessment, Fisheries and Oceans Canada indicated support for the proponent's conceptual approach to offsetting serious harm to fish which was designed to ensure lost habitat would be replaced by that of similar quantity and quality, with

[3] Minnow Environmental Inc. June 4, 2018. Updated Review of Waterbodies Affected by Côté Gold Project relative to the Requirements for a Section 35 FAA vs MMER Schedule 2

measures to minimize lag times before new habitat would be fully productive. With the proposed project changes, the conceptual approach would need to be updated. The proponent has indicated key design considerations will include many of the same elements as the previous proposal and it would address the influence of blasting on fish habitat in both Clam Lake and New Lake.

Decommissioning of watercourse realignments can affect fish and fish habitat during the abandonment phase. In the environmental assessment, the proponent planned to decommission some retention dams and watercourse realignments after the open pit flooded, to integrate the new pit lake into the Mollie River subwatershed and return to natural drainage patterns. Fisheries and Oceans Canada noted that the proponent would have to apply for a new *Fisheries Act* authorization at that time which would require an assessment of fish habitat functionality in the new pit lake. With the proposed project changes, the proponent would decommission most watercourse realignments and retention dams for the same reason, and intends to re-evaluate options for maintaining a portion of New Lake as fish habitat prior to decommissioning.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall effects on aquatic habitat would be lower with the project changes than what was presented in the environmental assessment. Many of the same effects would occur in different geographic areas. The potential for fish passage impedance is low in Bagsverd Creek, but may occur in other watercourses, and would be monitored through the *Fisheries Act* authorization. Fisheries and Oceans Canada reviewed updated conceptual information from the proponent and determined that offsetting of serious harm continues to be feasible. The offsetting plan will take into account any effects of blasting on fish spawning in both Clam Lake and New Lake.

All key mitigation measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to fish and fish habitat, continue to be relevant to the Project, with the following two proposed modifications:

- Construct realignment channels in a manner that will provide or maintain the necessary habitat and environmental conditions (including water flows and levels and channel erosion rates reflective of natural conditions) in both the realigned channels and the natural channels downstream of realigned channels, ~~**including between Bagsverd Lake and Neville Lake**~~, for the critical lifecycle requirements of resident fish, and will allow for fish passage throughout all phases of the Project.

- Implement an offsetting plan for any serious harm to fish caused by the Project, pursuant to the *Fisheries Act,* and a fish habitat compensation plan for any fish habitat losses related to mine water disposal for the Project, pursuant to section 27.1 of the *Metal Mining Effluent Regulations*. Ensure any spawning habitat in Clam Lake **and New Lake** that will be subject to increased noise and vibrations from blasting in the open pit is accounted for in the offsetting plan. These plans would be developed with Fisheries and Oceans Canada and with Environment and Climate Change Canada, and through engagement with Aboriginal groups.

3.1.2 Contamination of Fish due to Changes in Surface Water Quality

Proponent's Assessment

The proponent predicts that overall effects on aquatic biology due to changes in surface water quality would be similar or lower with the proposed project changes than what was presented in the environmental assessment.

Mining infrastructure can release effluent to the aquatic environment through run-off, seepage, and controlled discharge. In the environmental assessment, key project components with the potential to release effluent were positioned throughout two subwatersheds. With the proposed project changes, the tailings management facility, reclaim pond, polishing pond and final effluent discharge point would be relocated from the Mesomikenda Lake subwatershed to the Mollie River subwatershed. With some exceptions around the north end of the tailings management facility, most effluent would be contained within the Mollie River subwatershed, which would allow for more focused monitoring and management.

Seepage can occur through the perimeter and base of a tailings management facility. Similar to the environmental assessment, some seepage is anticipated to bypass seepage control systems at the relocated tailings management facility and enter surrounding lakes. With the proposed project changes, high-level seepage bypass volumes were estimated [4] to inform updated surface water quality predictions in both subwatersheds. The proponent predicted that fewer substances would be elevated above background concentrations and most substances would achieve water quality guidelines [5].

Arsenic concentrations may exceed the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* in some waterbodies. In the environmental assessment, arsenic was predicted to exceed the guideline within the effluent mixing zone in Neville Lake, at times when effluent is discharged, during the operations phase. With the proposed project changes, arsenic is predicted to slightly exceed [6] the guideline in Upper Three Duck Lake (the final effluent discharge point receiver) and Middle Three Duck Lake (downstream of the effluent receiver), but effects to aquatic biota are not anticipated.

Nutrient loading can affect dissolved oxygen levels in lakes which can affect lake trout populations. During the environmental assessment, Indigenous groups expressed concern about the potential for effects from nutrient loading on lake trout in Mesomikenda Lake, which is downstream of Neville Lake. The relocation of the final effluent discharge point to Upper Three Duck Lake would eliminate any potential effects that effluent could have on dissolved oxygen in Mesomikenda Lake.

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[4] A three-dimensional groundwater model will be completed to refine seepage estimates around the tailings management facility and to assess capture efficiency of the proposed seepage collection systems, to inform permitting.

[5] Predictions are based on the proponent's Environmental Effects Review Report as the surface water quality and groundwater models were not provided for verification.

[6] With the proposed project changes, the maximum monthly average arsenic concentrations were predicted to exceed the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (0.005 mg/L) in Upper Three Duck Lake (0.0071 mg/L) and Middle Three Duck Lake (0.0058 mg/L) for certain months under the 1 in 25 year dry condition scenario. They do not exceed the Provincial Water Quality Objectives (0.10 mg/L) or the *Guidelines for Canadian Drinking Water Standards* (0.01 mg/L). The maximum predicted arsenic concentrations in the environmental assessment were higher than those predicted for the proposed project changes.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall effects on aquatic biology from changes in surface water quality would be similar or lower with the proposed project changes than what was presented in the environmental assessment, with some uncertainty around the tailings management facility, as described below. Many predicted effects on fish due to changes in surface water quality may still occur, but in different lakes. The proponent will implement measures, such as seepage control systems and maintenance of hydraulic gradients, to contain and recycle contaminated water which align with the key mitigation measures previously identified in the Environmental Assessment Report.

The Agency acknowledges limitations in the proponent's characterization of groundwater movement at the new location for the tailings management facility and resulting uncertainties in surface water quality predictions. The proponent incorporated an estimate of the volume of seepage that may bypass the seepage collection system into its surface water quality models, but did not provide supporting technical information. In response to an inquiry from Indigenous groups the proponent confirmed that the surface water quality model accounted for seepage bypass predicted to occur from the tailings management facility to the Mesomikenda Lake subwatershed through a small waterbody (Unnamed Lake #6) and associated tributary.

Natural Resources Canada reviewed the information available and determined that uncertainty about potential seepage pathways from the relocated tailings management facility is similar to uncertainty at the previous location in the environmental assessment. Natural Resources Canada advised that there is potential for more recharge to occur than previously planned. It is reasonable to expect that this would be addressed through the refined modelling and optimization of the seepage collection system design that are already planned by the proponent.

The Agency has therefore determined that key mitigation measures in the Environmental Assessment Report would effectively manage and address uncertainty about seepage through the perimeter and base of the tailings management facility. The proponent would have to implement measures, as necessary, to comply with the *Metal and Diamond Mining Effluent Regulations* and with the *Fisheries Act*. Further, it is anticipated that the proponent will require a provincial Environmental Compliance Approval from the Ontario Ministry of the Environment, Conservation and Parks which will include seepage and groundwater monitoring programs, as well as contingency plans in case of seepage losses.

All key mitigation measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to effluent management, continue to be relevant to the Project.

3.2 Migratory Birds including Species at Risk

Proponent's Assessment

Project infrastructure will cause a direct loss of migratory bird habitat, including for species at risk. In the environmental assessment, the proponent predicted that habitat loss would not affect populations because other suitable habitat was available. With the proposed project changes, a smaller footprint and selection of the Shining Tree transmission line alignment would reduce the amount of habitat loss. The proponent supplemented the terrestrial biology baseline information to include the new locations for the tailings management facility and overburden stockpile area and did not identify any new effects.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall loss of migratory bird habitat would be lower with the project changes than what was presented in the environmental assessment. The predicted effects on migratory birds from vegetation clearing, sensory disturbances and vehicle collisions remain unchanged, but may occur in different geographic areas. Environment and Climate Change Canada agreed with the Agency that effects on migratory birds in new locations as a result of the proposed project changes would be addressed through the key mitigation and follow-up measures already identified. All key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to migratory birds, continue to be relevant to the Project.

3.3 Current Use of Lands and Resources for Traditional Purposes

With respect to the current use of lands and resources for traditional purposes, the proposed project changes could alter the initial assessment of adverse environmental effects related to traditional use of canoe routes and traditional plant harvesting, hunting, trapping, and fishing.

3.3.1 Use of Canoe Routes

Proponent's Assessment

Two canoe routes exist in lakes around the proposed project, including a traditional canoe and portage route identified by Indigenous groups and the well-known public 4M Canoe Route. In the environmental assessment, portions of both canoe routes would be modified due to watercourse realignments. Some controlled access restrictions would be in place for health and safety reasons. With the proposed project changes, the relocation of the tailings management facility would cause Clam Lake, which is part of the traditional canoe route, to be completely inaccessible during the construction and operations phases due to potential interaction with mine activities. The proponent remains committed to engaging potential users and establishing an alternate route. The 4M Circle Canoe Route would no longer be affected by watercourse realignments and would be accessible throughout all project phases with facilitated access at one portage location.

Agency's Analysis and Conclusions

The Agency acknowledges the proponent's decision to deem Clam Lake inaccessible for health and safety reasons and that a suitable route alternative would be established. Transport Canada reviewed the information provided by the proponent and did not note any concerns related to navigation. All key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to use of canoe routes, continue to be relevant to the Project.

3.3.2 Traditional Plant Harvesting, Hunting, Trapping, and Fishing

Proponent's Assessment

Traditional land use activities including plant harvesting, hunting, trapping, and fishing may be affected in close proximity to the Project as a result of habitat loss, land access restrictions, changes to the abundance and quality of resources, and changes to the experience of using the land. The proponent reviewed existing traditional land use studies that were completed for the environmental assessment and concluded that there would be fewer effects on the current use of lands and resources for traditional purposes with the proposed project changes relative to what was predicted in the environmental assessment.

In the environmental assessment, the large project footprint was spread over two subwatersheds. With the proposed project changes, the project footprint would decrease from 1,700 hectares to 1,050 hectares which would reduce effects on habitat and the ability for Indigenous peoples to have safe access to land.

In the environmental assessment, it was recognized that traditional plant resources such as blueberries might be affected during construction along the proposed cross-country transmission line alignment, including in sensitive land use areas identified by the Mattagami First Nation and Flying Post First Nation. With the proposed project changes, these effects would instead occur during construction along the Shining Tree transmission line alignment.

In the environmental assessment, Indigenous groups expressed concern that the cross-country transmission line corridor would facilitate increased access for other hunters and increase competition for resources. With the proposed project changes, the removal of the cross-country transmission line corridor would mitigate this concern. A section of the Shining Tree transmission line corridor overlaps with a large game harvesting area and upland bird harvesting area identified by the Métis Nation of Ontario. Wildlife may be displaced in close proximity to the short-term construction activities and would find equally suitable habitat in adjacent areas.

In the environmental assessment, the mine rock area was predicted to be visible from several lakes which might affect the experience of using the land. With the proposed project changes, the taller tailings management facility would also be visible from several lakes due to the increased height of dams.

In the environmental assessment, the open pit would take 50-80 years to fill with water. With the proposed project changes, it would take 25-30 years, enabling a quicker return to pre-project conditions.

This may reduce the duration of some effects on the current use of lands and resources for traditional purposes.

Information from Indigenous Groups

Mattagami First Nation informed the Agency that the Shining Tree transmission line goes through an actively-used trapline area licensed to a Mattagami First Nation family. The family uses the trapline area for trapping, hunting, fishing, plant harvesting, connecting spiritually and emotionally with the land, teaching youth, and conducting ceremonies. The corridor has had significant plant regrowth which currently restricts access by other people though it is used by the family to access fishing areas. It is frequented by moose which are traditionally hunted. Sweet grass is harvested along a portion of the corridor. Mattagami First Nation expressed concerns about increased access to non-Indigenous people, the methods of vegetation removal, and the effects of encountering construction work during the practice of traditional activities. It requested that the proponent be required to share the transmission line construction work schedule 60 days in advance of activities so that members can avoid the area during peak construction periods, and other proposed mitigation (Appendix A).

The Métis Nation of Ontario confirmed that a 10 kilometre stretch of the Shining Tree transmission line overlaps with a large mammal harvesting area and a bird harvesting area. It also identified two non-commercial fishing areas on Dividing Lake within the Mollie River watershed and expressed concerns that the new effluent discharge location further upstream at Upper Three Duck Lake may affect the viability of fishing in Dividing Lake. The Métis Nation of Ontario suggested that the proponent should work with them to confirm whether wildlife and fish harvesting still occurs in these areas and, if so, to assess effects, mitigate, accommodate and follow-up.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall effects to current use of lands and resources for traditional purposes would be lower with the project changes than what was presented in the environmental assessment. Taking into consideration the Indigenous comments, the predicted effects on plant harvesting, hunting, trapping, and fishing appear to be similar and would in many cases occur in different geographic areas.

The Agency notes the potential effects to the current use of lands and resources for traditional activities by Indigenous groups from the construction and maintenance of the Shining Tree transmission line. The Mattagami First Nation's request for a construction schedule can be achieved through conditions 5.7 and 9.1 of the Decision Statement which require the proponent to share an implementation schedule with Indigenous groups at least 30 days prior to the start of construction. Mattagami First Nation confirmed it was amendable to a 30 day advanced notice period.

With respect to the Métis Nation of Ontario's concern with the viability of fishing at Dividing Lake, the Agency is of the view (as per subsection 3.1.2) that contamination of fish due to changes in surface water quality is not predicted in Dividing Lake. The Agency recommended measures in the Environmental Assessment Report for the proponent to develop and implement a follow-up program, in consultation with Indigenous groups, to verify the accuracy of predictions about the effects of the Project on traditional fishing. The Métis Nation of Ontario is encouraged to work with the proponent to integrate

any concerns about traditional fishing on Dividing Lake into that follow-up program. In addition, the proponent has committed to monitoring surface water quality during all project phases in surface water receivers, including Dividing Lake.

Based on the information provided to date and the Indigenous comments received, all key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to the current use of lands and resources for traditional purposes, continue to be relevant to the Project.

3.4 Health of Indigenous Peoples

The proposed project changes could alter the initial assessment of adverse environmental effects related to methylmercury in fish, and exposure through water, air and traditional plants.

3.4.1 Methylmercury in Fish

Proponent's Assessment

Under certain conditions, flooding of terrestrial land can cause methylmercury to bioaccumulate in fish which can become a health risk to people who consume fish regularly. In the environmental assessment, proposed flooding in the southern arm of Bagsverd Lake may have created conditions suitable for methylmercury production. The proponent committed to removing organic soil and terrestrial vegetation in this area prior to flooding. Water levels were predicted to increase in several other waterbodies, but soil and vegetation removal was not suggested because methylmercury production was not anticipated.

With the proposed project changes, the southern arm of Bagsverd Lake would not be flooded, but a different terrestrial area would be flooded to create New Lake. Water levels would increase in Lower Three Duck Lake (11 centimeters), Upper Three Duck Lake (3 centimeters), Chester Lake (2 centimeters) and Schist Lake (1 centimeter), all of which are similar to or lower than the water level increases predicted in the environmental assessment. The proponent committed to remove organic soil and terrestrial vegetation that contains mercury, in areas that would be flooded, to prevent methylmercury production.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall potential for methylmercury production would be lower with the project changes than what was presented in the environmental assessment, taking into account the smaller area to be flooded and the proposed mitigation.

The Agency considered whether the proponent should be required to remove organic soil and terrestrial vegetation in all areas that would be flooded, or just at New Lake, to adequately reduce the risk of methylmercury production. Soil and vegetation removal can have ancillary effects on the natural environment and should not be imposed where not necessary to reduce risks to human health.

Environment and Climate Change Canada recommended that soil and vegetation removal be implemented only in areas where it can reasonably be assumed there would be a significant risk of

methylmercury production. However, in the absence of baseline information on all contributing factors (soil concentrations, source waters, atmospheric deposition, mercury mobility in soil, bacterial activity) and subsequent modelling to determine the risk, it is prudent to require removal of organic carbon prior to flooding. Environment and Climate Change Canada also suggested that it does not seem practical to require removal of soil and vegetation for small water level increases such as those predicted for Lower Three Duck Lake (11 centimeters).

The Agency also took into account the level of certainty in water level predictions when considering suitable mitigation and follow-up measures related to methylmercury and health. In the environmental assessment, Environment and Climate Change Canada noted some uncertainties in the hydrology modelling and the Agency identified health-related follow-up measures in the Environmental Assessment Report. With the proposed project changes, Environment and Climate Change Canada advised that there is no evidence to suggest that uncertainty in the surface water quality model outputs should be any greater than what was previously acknowledged. Fisheries and Oceans Canada confirmed that if updated hydrology information received through the application for authorization under the *Fisheries Act* suggests that additional areas will be flooded, the risk of methylmercury production would be considered at that time, with advice from relevant federal experts.

Taking into account the expert advice from Environment and Climate Change Canada and Fisheries and Oceans Canada, the Agency determined that organic soil and terrestrial vegetation should be removed in areas that will be flooded to form New Lake. A conditional requirement for similar mitigation at Lower Three Duck Lake, Upper Three Duck Lake, Chester Lake and Schist Lake does not seem warranted due to the small water level increases predicted. It is reasonable to expect the proponent to adapt its plans if refined hydrology modelling results in flooding predictions not disclosed in the Environmental Effects Review Report. Existing follow-up requirements remain relevant, including requirements for the proponent to monitor methylmercury concentrations in surface water and fish tissue in all water bodies where an increase in water level is predicted and to communicate associated health risks to Indigenous groups.

In summary, the key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement with respect to methylmercury, continue to be relevant with the following proposed modification:

- Implement measures prior to construction to avoid methylmercury production in **New Lake** ~~**Bagsverd Lake South**~~.

3.4.2 Exposure through Water, Air, and Traditional Plants

Proponent's Assessment

Traditional land use activities including plant harvesting, hunting, trapping, fishing and canoeing may occur in close proximity to the Project, including within the property boundary. This creates the potential for effects on the health of Indigenous peoples who may be exposed to contaminants through water, air and traditional plants. The proponent predicts that overall changes to water quality, air quality and

traditional plants, as well as related effects on the health of Indigenous peoples, would be similar or lower with the proposed project changes than what was presented in the environmental assessment.

In the environmental assessment, arsenic was predicted to occasionally exceed the *Guidelines for Canadian Drinking Water Quality* within the effluent mixing zone in Neville Lake. With the proposed project changes, arsenic is not predicted to exceed this guideline anywhere, including in Upper Three Duck Lake which will receive final effluent. As noted in Section 3.1 it would occasionally exceed the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*.

In the environmental assessment, airborne particulate matter levels were predicted to exceed the Province of Ontario's *Ambient Air Quality Criteria* in a small area proximate to the project footprint. With the proposed project changes exceedances are still predicted, but the changes to ambient air quality are predicted to be lower due to having a smaller footprint, processing less rock, and using fewer and smaller trucks[7]. Relocation of the tailings management facility and realignment of the on-site haul road may modify the specific location of some effects. Any changes to soil quality from dust deposition are not predicted to lead to a health risk through consumption of plants.

Agency's Analysis and Conclusions

The Agency accepts the proponent's conclusion that overall changes to water quality, air quality, and traditional plants, as well as related effects on the health of Indigenous peoples, would be similar or lower with the project changes than what was presented in the environmental assessment, based on the smaller project footprint and lower ore production capacity. Some predicted effects may occur in different geographic areas. All key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to the health of Indigenous peoples, continue to be relevant to the Project.

3.5 Physical and Cultural Heritage and Structure, Site or Thing of Historical, Archaeological, Paleontological or Architectural Significance

Proponent's Assessment

The proponent predicts that effects on archaeological and built heritage will be lower or similar with the proposed project changes. Archaeological assessments have been ongoing at the property and new archaeological sites have been identified, but the proponent concludes that no archaeological resources will be affected by the Project.

Information from Indigenous Groups

Mattagami First Nation identified two new culturally significant areas including a natural spring near the Shining Tree Distribution Station and an old trap cabin within one kilometer of the Shining Tree transmission line right-of-way, and requested the opportunity to monitor construction activities to ensure they remain protected.

[7] The greenhouse gas emissions caused by the Project are also predicted to be lower with the proposed project changes than what was presented in the environmental assessment.

Agency's Analysis and Conclusions

The Agency acknowledges that with the proposed project changes, some predicted effects may occur in different geographic areas. Mitigation measures already identified in the Environmental Assessment Report and the requirement to adhere to provincial legislation, such as the *Ontario Heritage Act*, will continue to provide sufficient mitigation to ensure that adverse environmental effects to physical and cultural heritage sites and structures of historical or archaeological importance would be mitigated. The Agency encourages the proponent to collaborate with Mattagami First Nation members on opportunities to monitor transmission line construction activities such that areas of cultural significance can remain protected. All key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement, related to physical and cultural heritage and archaeological sites, continue to be relevant to the Project.

3.6 Other Effects Related to Federal Conditions

In accordance with subsections 5(2)(a) and (b) of CEAA 2012, the Agency considered changes to the environment, and effects of those changes, that are directly linked or necessarily incidental to federal decisions that may be required for the Project pursuant to other legislation.

Potential effects on wetlands and turtle habitat would be reduced as a result of the smaller project footprint, fewer watercourse realignments and relocation of the tailings management facility away from Bagsverd Creek. Changes to canoe routes are described in a previous section. Effects on bait harvesting and recreational fishing would occur in different geographic areas or be reduced overall.

No key mitigation and follow-up measures were recommended in the Environmental Assessment Report or set out as conditions in the Decision Statement, in relation to section 5(2)(a) or (b) of CEAA 2012. No new mitigation or follow-up measures are recommended in relation to the proposed project changes.

3.7 Impacts to Aboriginal Rights

The Project is located in the Treaty 9 area of Ontario, also known as the James Bay Treaty of 1905-1906. Treaty 9 establishes rights to hunting, trapping and fishing. The Project is located within the identified traditional territories of Mattagami First Nation and Flying Post First Nation, and is in proximity to the traditional territory of Brunswick House First Nation. Part of the transmission line is located within the identified traditional territory of Matachewan First Nation. The Project is also within an area that the Métis Nation of Ontario have identified as the Abitibi/Temiscamingue and James Bay Region 3 traditional harvesting area.

Analysis of effects of changes to the environment on current use of lands and resources for traditional purposes, health of Indigenous peoples, physical and cultural heritage, and biophysical resources informed the assessment of impacts on Aboriginal rights as protected by Section 35 of the Constitution Act, 1982. The Agency is of the opinion that with the proposed project changes, these effects are similar to or lesser than what was previously presented in the environmental assessment. Some of the effects will occur in different places and therefore affect different people, such as the effects of the construction and maintenance of the Shining Tree transmission line which overlaps with a trapline area licensed to a

Mattagami First Nation family and traditional harvesting areas identified by the Métis Nation of Ontario. Based on the analysis of environmental effects of the proposed project changes on Indigenous peoples and the related mitigation and follow-up measures set out as conditions in the Decision Statement, with minor modifications recommended in this report, the Agency does not anticipate the proposed project changes would cause additional impacts to Aboriginal or treaty rights.

4 Consultation with Indigenous Groups

The Agency identified five Indigenous groups that are most likely to have an interest in the proposed project changes. Four of these are identified in the definition of Indigenous groups to be consulted on the implementation of relevant conditions in the Decision Statement: Mattagami First Nation, Flying Post First Nation, Brunswick House First Nation, and the Métis represented by the Métis Nation of Ontario Region 3 Consultation Committee (the Métis Nation of Ontario). A fifth group, Matachewan First Nation, was included because a small part of the proposed transmission line would overlay its traditional land use area at a new location that was not contemplated in the environmental assessment.

Prior to submitting the Environmental Effects Review Report, the proponent actively engaged Mattagami First Nation, Flying Post First Nation, and the Métis Nation of Ontario, including targeted meetings and correspondence. Open houses were held in Mattagami First Nation and Flying Post First Nation communities in May, 2018. The proponent received and responded to preliminary technical comments from Mattagami First Nation and Flying Post First Nation and has indicated it continues to work with them on their review of the technical aspects of the Environmental Effects Review.

The proponent provided other Indigenous communities such as Brunswick House First Nation and Matachewan First Nation information about the Environmental Effects Review through project newsletters dated February 2018 and May 2018, and invitations to attend public open houses in town centres held in February 2018 and May 2018.

On October 31, 2018, the Agency notified the five Indigenous groups that it had received an Environmental Effects Review Report from the proponent describing proposed changes to the Project and that, pending the outcome of the Agency's initial review, Indigenous groups may be invited to comment on the Agency's analysis and recommendations.

On November 2, 2018, the Agency participated in a teleconference meeting with Mattagami First Nation and Flying Post First Nation to discuss the federal process for reviewing project changes and their comments on the proponent's Environmental Effects Review Report.

On November 15, 2018, the Agency commenced a 19-day targeted comment period inviting the five Indigenous groups to comment on a draft version of the Agency's Analysis Report and proposed modifications to the Decision Statement conditions. Participant funding was offered to all groups.

The Agency received comments from Mattagami First Nation, Flying Post First Nation, and the Métis Nation of Ontario. These groups also applied for and received participant funding. Matachewan First

Nation advised that it supports Mattagami First Nation's and Flying Post First Nation's initiatives and did not provide comments.

The key issues raised in relation to the Agency's analysis include limitations in the documentation of modelling reports and resulting uncertainties in surface water quality predictions, questions about the Agency's rationale for the location of methylmercury mitigation, and effects on the current use of lands and resources for traditional purposes and cultural heritage from the construction and maintenance of the transmission line.

All comments received were considered in the finalization of the Analysis Report and in the proposed amendments to the conditions set out in the Decision Statement that the Agency will recommend to the Minister of Environment and Climate Change. Selected comments are provided throughout this report and in Appendix A.

5 Conclusion

Considering the changes to the potential adverse environmental effects of the Project in relation to the proposed project changes, and in light of expert advice from federal authorities and Indigenous views received, the Agency concludes that the key mitigation and follow-up measures recommended in the Environmental Assessment Report and set out as conditions in the Decision Statement continue to be relevant to the Project, with the following modifications:

- Construct realignment channels in a manner that will provide or maintain the necessary habitat and environmental conditions (including water flows and levels and channel erosion rates reflective of natural conditions) in both the realigned channels and the natural channels downstream of realigned channels, ~~**including between Bagsverd Lake and Neville Lake**~~, for the critical lifecycle requirements of resident fish, and will allow for fish passage throughout all phases of the Project.
- Implement an offsetting plan for any serious harm to fish caused by the Project, pursuant to the *Fisheries Act,* and a fish habitat compensation plan for any fish habitat losses related to mine water disposal for the Project, pursuant to section 27.1 of the *Metal Mining Effluent Regulations*. Ensure any spawning habitat in Clam Lake **and New Lake** that will be subject to increased noise and vibrations from blasting in the open pit is accounted for in the offsetting plan. These plans would be developed with Fisheries and Oceans Canada and with Environment and Climate Change Canada, and through engagement with Aboriginal groups.
- Implement measures prior to construction to avoid methylmercury production in **New Lake** ~~**Bagsverd Lake South**~~.

Appendix A: Additional Highlights from Comments Received

This appendix summarizes additional selected comments received from federal departments and Indigenous groups during the review of the draft Analysis Report, including comments that required additional clarification or that may inform regulatory decisions or the proponent's actions.

Commenter	Summary of Comment	Agency Response
Environment and Climate Change Canada Health Canada	There are new *Canadian Ambient Air Quality Standards* for nitrogen dioxide that should be used as benchmarks for air quality comparisons.	Conditions 2.4, 6.4 and 6.5 collectively require the proponent to monitor air quality for nitrogen oxides, implement additional mitigation measures if necessary, and communicate to Indigenous groups any health risks and corrective measures that are taken. In doing so, the proponent would have to take the new *Canadian Ambient Air Quality Standards* for nitrogen dioxide into account.
Environment and Climate Change Canada	The Agency inquired as to whether the change from slurry tailings to thickened tailings could affect air quality and health predictions. Environment and Climate Change Canada responded that drier tailings may result in higher dust generation, but tailings are not typically considered a major emissions source. Condition 6.1 requires the proponent to implement measures to mitigate emissions of fugitive dust and airborne contaminants. Environment and Climate Change Canada recommended that the proponent's Dust Best Management Plan include the implementation of measures to control fugitive dust emissions from the tailings management facility such as installation of water sprinklers, use of cover or revegetation, or installation of a wind fence.	Condition 6.1 requires the proponent to implement measures to mitigate emissions of fugitive dust and airborne contaminants. Conditions 2.4, 6.4 and 6.5 collectively require the proponent to monitor dust deposition rates, implement additional mitigation measures if necessary, and communicate to Indigenous groups any health risks and corrective measures that are taken. In doing so, the proponent is encouraged to implement the advice from Environment and Climate Change Canada about dust best management practices for thickened tailings.
Health Canada	Beyond meeting the *Guidelines for Canadian Drinking Water Quality* value of 0.01 mg/L for arsenic, the proponent should endeavor to keep arsenic levels as low as reasonably achievable because this is not a health-based guideline, but one based on treatment achievability.	Even though arsenic is not predicted to exceed the guidelines, the proponent is encouraged to implement Health Canada's advice.
Mattagami First Nation Flying Post First Nation	There are limitations and uncertainties in the proponent's surface water quality predictions in relation to groundwater modelling, wastewater assimilation modelling, predictive mercury modelling and GoldSim hydrology modelling. The proponent provided results and conclusions with no supporting evidence in the form of modelling reports which can therefore not be independently verified. Requested that the Agency consider the resulting uncertainty in its assessment of mitigation and follow-up measures.	Sections 3.1 (Fish and Fish Habitat) and 3.4 (Health of Indigenous Peoples) have been modified to further clarify how the Agency took into account continued uncertainties in surface water quality predictions in the assessment of whether additional mitigation and follow-up measures may be required. In the absence of model reports, the Agency's and federal experts' review considered the smaller project footprint, lower production rate, information available about changes made to the models previously reviewed during the environmental assessment, low potential for acid-generation and metal-leaching from mine material with the implementation of mitigation, and the outcome-based nature of

		many of the conditions in the Decision Statement. The Agency understands the proponent will provide additional technical information in support of other regulatory decisions. The Agency has determined that the key mitigation and follow-up measures identified in the Environmental Assessment Report and set out as conditions in the Decision Statement adequately address continued uncertainties in surface water quality predictions. The proponent will continue to be required to comply with the *Metal and Diamond Mining Effluent Regulations* and subsection 36(3) of the *Fisheries Act*, implement seepage control measures at the tailings management facility, collect and (if necessary) treat effluent before it is deposited in water frequented by fish, remove terrestrial vegetation and organic soil prior to flooding to form New Lake, monitor methylmercury concentrations, and communicate health risks to Indigenous groups.
Mattagami First Nation Flying Post First Nation	Fish habitat compensation plans have thus far not included input from First Nations. Different options should be presented for consideration that span a gradient from the typical "like-for-like" habitat enhancements to "out of kind" offsets that have been effectively implemented as part of other fish habitat compensation plans in Ontario.	As described in Condition 3.7 of the Decision Statement, the proponent is required to consult with Indigenous groups on the development and implementation of any plans required to offset the loss of fish and fish habitat. The Agency understands that the proponent is updating the proposed offsetting plan to address the project changes. The Agency will share this comment with Fisheries and Oceans Canada.
Mattagami First Nation Flying Post First Nation	The duration to fill the open pit with water has been reduced from 50-80 years to 25-30 years, but is still of concern. First Nations have sustained nearly 100 years of impacts to their use of the area due to mining, mineral explanation and forestry, and this project prolongs those impacts.	Comment is noted and will be shared with the Ontario Ministry of Northern Development, Energy and Mines for consideration in any Closure Plan requirements under Ontario's *Mining Act*.
Mattagami First Nation Flying Post First Nation	Increased water levels are predicted in Upper Three Duck Lake, Lower Three Duck Lake, Chester Lake and Schist Lake. There is no evidence to support the statement that conditions in these lakes would not be suitable for methylmercury production. Indicate how the Agency accepts the proponent's conclusions without updated predictive methylmercury modelling.	Section 3.4 (Health of Indigenous Peoples) has been modified in the finalization of the Analysis Report to include additional information that informed the Agency's conclusions. Water levels predicted for these lakes are similar to or lower than what was predicted in the environmental assessment and are likely within seasonal variation. Methylmercury production was not anticipated in these lakes in the environmental assessment. It is further noted that in Chester Lake the predicted water level increases in the environmental assessment were much higher and the potential for methylmercury production was carefully considered (Environmental Assessment Report subsections 6.4.1, 7.4.2 and 7.4.3). The proponent did not anticipate methylmercury production would occur in Chester Lake as a result of the Project because the predicted water level increases would lead to minimal flooding of land, flooded areas would be less than 40 cm deep, surface water conditions in flooded areas would remain oxic, and water level increases would be within seasonal variation.

Mattagami First Nation Flying Post First Nation	The Project will irreversibly affect a bald eagle nest which is an important and iconic animal in Anishnawbe culture. This effect was not analyzed.	The Agency acknowledges the spiritual and cultural importance of bald eagles to some Indigenous groups. In the environmental assessment, a bald eagle nest near the mine site would need to be removed for construction of the Project. The proponent committed to remove it in a culturally sensitive manner and to engage with the affected Indigenous groups in doing so. With the proposed project changes the eagle nest will still need to be removed and the proponent has maintained its commitment. Condition 7.1 continues to apply.
Mattagami First Nation Flying Post First Nation	The Project creates real or perceived effects on fish and wildlife that are harvested for consumption in terms of abundance, distribution, and health conditions. These effects were not analyzed.	The Agency acknowledges the real or perceived effects on the consumption of country foods that may be caused by the Project. In the environmental assessment, Indigenous groups expressed concern about risks to waterbirds and shorebirds resulting from exposure to contaminants in the tailings management facility and polishing pond, and related potential effects to human health. Conditions 2.4, 6.3, 6.4 and 6.5 collectively require the proponent identify measures (in consultation with Indigenous groups) to deter ungulates and birds from frequenting the tailings management facility and polishing pond, implement those measures, monitor for the presence of ungulates, take corrective actions if needed, and communicate to Indigenous groups any health risks and corrective actions taken. With the proposed project changes the tailings management facility and polishing pond have been relocated, and the conditions continue to apply.
Mattagami First Nation Flying Post First Nation	Construction work on the transmission line should be completed in the winter to limit surface damage to roads. Sensitive rearing and breeding periods should be avoided to limit effects on wildlife.	Condition 4.1 requires the proponent to apply Environment and Climate Change Canada's *Avoidance Guidelines* for migratory birds. The Agency will share this comment with the proponent for additional consideration.
Mattagami First Nation Flying Post First Nation	If mechanical methods are used to control vegetation growth in the transmission line right-of-way, Mattagami First Nation members should be hired to mechanically brush the right-of-way.	The Agency will share this comment with the proponent for consideration.
Mattagami First Nation Flying Post First Nation	Suggested inclusion of a Decision Statement condition related to the health of Indigenous peoples that would require the proponent to monitor, in collaboration with Indigenous groups, the effects of chemical vegetation management on plants, wildlife and fish, should chemical spraying be required along the transmission line right-of-way.	The Environmental Effects Review Report reaffirms the proponent's previous commitment to use only mechanical vegetation management along the transmission line. Condition 5.1 requires the proponent to use mechanical methods for controlling vegetation and, if that is not practicable or effective, to consult with Indigenous groups on the timing and application of chemical agents. The Agency encourages Indigenous groups to discuss opportunities for monitoring during the consultations with the proponent should chemical agents be required.