

# Memorandum



**Date:** December 24, 2015  
**To:** Ryan Todd, New Gold  
**From:** Lisa DeSandoli, ERM  
**Cc:** Nicole Bishop, Anne Currie, ERM  
**Subject:** **Blackwater Gold Project: Canadian Environmental Assessment Act, 2012  
Section 5(1)(a) and (b), and 5(2) Summaries**

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## 1. INTRODUCTION AND PURPOSE

Section 5 of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) prescribes the environmental effects of a project that are to be taken into account in the Environmental Impact Statement (EIS) for a designated project. As requested by the Canadian Environmental Assessment Agency, this memorandum has been prepared to the requirements in Section 5 of CEAA 2012 for the Blackwater Gold Project (the Project) as follows:

- changes to components of the environment within federal jurisdiction (Section 5(1)(a)),
- changes to the environment that would occur on federal or transboundary lands (Section 5(1)(b); and
- changes to the environment that are directly linked or necessarily incidental to federal decisions and the effects of those environmental changes on non-Aboriginal people and the human environment for the proposed Blackwater Project (Section 5(2)).

CEAA 2012 Section 5(1)(c) are not discussed in this memo; a discussion of the effects of changes to the environment on Aboriginal peoples is discussed in Volume 6, Section 18 of the EIS and Current Use of Lands and Resources for Traditional Purposes memo, dated November 2015.

This information presented in this memo is organized as follows:

- Presentation of where relevant information may be located in the EIS;
- A discussion of CEAA 2012 Section 5(1)(a) considerations:
  - Fish and fish habitat;
  - Aquatic species at risk;
  - Migratory birds;
- A discussion of changes to the environment that would occur on federal or transboundary lands;

- A discussion of changes to the environment that are directly linked or necessarily incidental to federal decisions:
  - *Fisheries Act* (section 35(2)) authorization);
  - Metal Mining Effluent Regulations (schedule 2 amendment);
  - *Navigation Protection Act* (section 24 exemption);
  - *Explosives Act*;
  - *Radiocommunications Act*;
  - *Transportation of Dangerous Goods Act*; and
  - A discussion of effects of changes to the environment that are directly linked or necessarily incidental to federal decisions.

## **2. DISCUSSION**

Table 2-1 provides an overview the environmental effects of the Project and where information can be found in the EIS (October 2015).

**Table 2-1. Overview of Environmental Effects of the Blackwater Gold Project as per the Requirements of the *Canadian Environmental Assessment Act, 2012***

Changes to the Environment		Section in the Environmental Impact Statement (October 2015)
Section 5(1)(a) Changes to Components of the Environment within Federal Authority		
<i>Federal Area of Interest</i>	<i>Changes to the Environment</i>	
Fish and Fish Habitat	<p><u>Mine site, transmission line and access road</u>: Fish mortality (destruction in mine footprint, fish salvage, stranding, blasting, impingement, chemicals); fish habitat loss; surface water flow (fish access and homing); water quality (erosion/sedimentation, temperature)</p> <p><u>Fish Habitat Offsets</u>: Reversal of water flows in Davidson Creek from a new dam at Reach 12 to Lake 01538UEUT; inundation will soften stream banks and flood vegetation; flow increases immediately downstream of Lake 01538UEUT will be proportionally larger than in lower reaches causing channel widening and some bank erosion where banks are soft</p> <p><u>Connector channel</u> between Lake 01682LNRS and Lake 01538UEUT will 'mix' populations of rainbow trout</p> <p><u>Matthews Creek</u>: previous cattle ranching area along Reach 5 will be used to create creek and wetland habitat for rainbow trout</p>	<p>5.3.8 Fish; 5.3.9 Fish Habitat)</p> <p>Appendix 5.1.2.6C Fisheries Mitigation and Offsetting Plan</p> <p>Appendix 5.1.2.6C Fisheries Mitigation and Offsetting Plan</p> <p>Appendix 5.1.2.6C Fisheries Mitigation and Offsetting Plan</p>
Aquatic Species	No aquatic species, as defined under subsection 2(1) of the <i>Species at Risk Act</i> (i.e., sections 2 and 47 of the <i>Fisheries Act</i> ) will be affected by the Project	
Migratory Birds	Habitat loss and alteration; sensory disturbance; mortality and health risk; movement patterns	5.4.8 Water Birds; 5.4.9 Forest Grass Birds; Appendix 5.4.8B Yellow Rail Species; Appendix 5.4.9A OSFC Species

Changes to the Environment		Section in the Environmental Impact Statement (October 2015)
Section 5(1)(b) Changes to the Environment that may would occur on Federal or Transboundary Lands		
No changes to the environment will occur on federal or transboundary lands. A negligible, short-term, fully reversible change to the shoreline of IR 28 may occur due to drawdown of Tatelkuz Lake. .		2.2.1 Purpose and location of the Proposed Project; Figure 2.2.1-1; Table 2.2.1-1; Section 19, Table 19-3.1
Section 5(2) Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions		
<i>Federal Decision</i>	<i>Changes to the Environment</i>	
<i>Fisheries Act</i> (section 35(2) authorization)	<p>Reversal of water flows in Davidson Creek from a new dam at Reach 12 to Lake 01538UEUT; inundation will soften stream banks and flood vegetation; flow increases immediately downstream of Lake 01538UEUT will be proportionally larger than in lower reaches causing channel widening and bank erosion where banks are soft.</p> <p>Connector channel between Lake 01682LNRS and Lake 01538UEUT will 'mix' populations of rainbow trout.</p> <p>Habitat offset sites will create ponds and meandering creek beds, including stabilized banks with rip rap and riparian vegetation plantings (black spruce and willow), increased in-stream flows, reduced sedimentation and erosion, and modulated water temperature.</p> <p>Exclusion fencing will prevent cattle and wildlife from accessing habitat offset sites for drinking water.</p> <p>Beavers, prevalent in the area, are expected to increase activity due to increased water flows and stream-side willow plantings</p> <p>Destruction of Upper Davidson Creek, including its tributaries, removes 58% of the drainage flow into Davidson Creek. Flows in Davidson Creek will be augmented with flows from Tatelkuz Lake, which will change the ambient temperature.</p>	<p>Appendix 5.1.2.6C Fisheries Mitigation and Offsetting Plan</p> <p>Section 2.5.11.1, Alternatives and Initial Screening</p>

Changes to the Environment	Section in the Environmental Impact Statement (October 2015)
<p><i>Fisheries Act</i> Metal Mining Effluent Regulation [Schedule 2 amendment under section 36(3)]</p>	<p>Due to utilization of a zero discharge facility, no release of deleterious chemicals is anticipated.</p> <p>Seepage from the tailings storage facility (TSF) Site D dam during mine operations and closure phases is anticipated to be 55 L/s. The majority of this seepage volume will be captured by the environmental control dam (ECD); 2L/s of seepage is expected to bypass the ECD dam and pond. This represents a 96% seepage recovery efficiency.</p> <p>Construction of wetlands in the TSF Site C pond in Years 4 and 5 of operations and construction of wetlands in the TSF Site D pond in the final year of operations (Year 18) and first year of closure (Year 19). The sinuous shape of the wetland constructed in the TSF Site D pond will ensure that when the pit lake over-flows to the TSF during closure that the inflow fully mixes with the TSF supernatant prior to discharge to Davidson Creek. The purpose of these wetlands is to lower the concentration of dissolved metals and nutrients (e.g., ammonia, nitrates) in the TSF supernatant.</p> <ul style="list-style-type: none"> <li>• Operation of the FSS will continue to augment flows in lower Davidson Creek. This will be continued until water quality monitoring shows that the TSF supernatant meets site-specific water quality objectives for Davidson Creek (expected to be approximately 18 years after mine operations have ceased).</li> <li>• Construction of a spillway in the Site D TSF dam that will terminate in a constructed plunge pool in Davidson Creek. Once water is discharged from the TSF, this plunge pool will prevent erosion of the stream bed and minimize the mobilization of sediment.</li> <li>• Construction of treatment wetlands in the former ECD pond and freshwater reservoir. Once water is discharged from the TSF, these wetlands will be used to further reduce dissolved metal and nutrient concentrations of the TSF supernatant before it enters Davidson Creek. These wetlands will have a total combined area of about 26 ha.</li> <li>• A total of 60,150 m<sup>2</sup> of stream habitat, or 92,360 rainbow trout habitat units, will be affected by the deposit of deleterious mine tailings and waste rock in the Davidson Creek and Creek 661 watersheds (Table 7-12).</li> </ul>
<p><i>Navigation Protection Act</i></p>	<p>Based on the analysis in Appendix 7.2.6A, it is assumed that an exemption under Section 24 of the Act will not be required.</p>

Changes to the Environment		Section in the Environmental Impact Statement (October 2015)		
<i>Radiocommunications Act</i>	It is anticipated that a license will be required for the Project; the effects on the environment from this authorization would be negligible.			
<i>Explosives Act</i>	It is anticipated that a license under section 7(1)a, an authorization to Assemble and Blend Ammonium Nitrate and Fuel Oil and a Mechanical Ammonium Nitrate and Fuel Oil Certification will be required for the Project; the effects on the environment from these authorizations would be negligible.			
<i>Transportation of Dangerous Goods Act</i>	It is anticipated that a permit will be required for the Project; the effects on the environment from these permits would be negligible.			
<b>2.0 Effect of Changes to the Environment</b>				
Section 5(2) Effect of Changes to the Environment due to Federal Decisions				
<i>Federal Decision</i>	<i>Changes to the Environment</i>	<i>Social Component</i>	<i>Effect of Changes to the Environment</i>	
<i>Fisheries Act</i> [authorization under 35(2)]	Habitat offsets at Matthews Creek (creek restoration, tributary creation and restoration of a wetland)	Health and Socioeconomic Conditions	Effect on cattle ranching due to exclusion of cattle from habitat offset sites in the vicinity of Matthews Creek through the use of fencing and pavement/rock placement. As reach 5 was sold to New Gold for the purpose of creating habitat offsets, no negative socioeconomic effect is predicted.	Appendix 5.1.2.6C Fisheries Mitigation and Offsetting Plan
		Physical and Cultural Heritage	No effect	
		Any structure, site or thing of historical, archaeological, paleontological or architectural significance	No effect	

Changes to the Environment				Section in the Environmental Impact Statement (October 2015)
<i>Metal Mines Effluent Regulations</i> [schedule 2 amendment]	2L/s of seepage of a deleterious substance is expected to bypass the ECD dam and pond affecting 60,150 m <sup>2</sup> of rainbow trout stream habitat in the Davidson Creek and Creek 661 watersheds.	Health and Socioeconomic Conditions	No effect  There will be no surface water discharges from the Project during the operations phase and seepage from mine facilities will be managed. Water quality in streams downstream of the project is predicted to meet BC Freshwater Guidelines or site-specific water quality objectives throughout all phases of the Project. Therefore, this is not expected to result in harmful accumulation and release of metals to downstream surface water or sediments.	Section 19.3.36 Environmental Exposures
		Physical and Cultural Heritage	No effect	
		Any structure, site or thing of historical, archaeological, paleontological or architectural significance	No effect	

## 2.1 Fish and Fish Habitat

The Project area encompasses several fish-bearing and non-fish-bearing streams, rivers, and lakes providing fish and aquatic habitat (periphyton, benthic invertebrates, and sediments) that could be affected by Project activities. The *Fisheries Act* protects fisheries (commercial, recreational, and Aboriginal) and fish species that support these fisheries. Twelve fish species are found within the Project area and are outlined in Table 2.1-1. No species listed under the *Species at Risk Act* (2002a) occur in the Project area, although a population of white sturgeon (“endangered”) may be present in the Nechako River where the transmission line is proposed to cross over the Nechako River.

Spatial boundaries of the Local Study Area (LSA) were based on the watersheds potentially affected by the mine site, the freshwater supply system, airstrip, transmission line, and the mine access road. The LSA included the following:

- Davidson Creek Watershed;
- Turtle Creek Watershed;
- Creek 661 Watershed;
- Creek 705 Watershed;
- Tributaries following into Tatelkuz Lake from the south;
- Tatelkuz Lake; and
- Chedakuz Creek between the confluence with Creek 661 and Tatelkuz Lake (i.e., middle Chedakuz Creek) and between Tatelkuz Lake and the confluence with Turtle Creek (i.e., lower Chedakuz Creek).

The LSA for the transmission line extended approximately 140 km between the BC Hydro Glenannan sub-station near Fraser Lake and the mine site. The LSA for the mine access road covered 194-km along a network of forest service roads originating at the community of Engen, approximately 20 km west of Vanderhoof, and ending at the terminus of Kluskus-Ootsa Forest Service Road (FSR). The transmission line and access road LSAs also include a 40 m buffer width on either side of the centre line.



**Table 2.1-1. Fish Species Captured in the Project Area**

Common Name	Scientific Name	<i>Species at Risk Act or Committee on the Status of Endangered Wildlife in Canada Listings</i>
Kokanee	<i>Oncorhynchus nerka</i>	none
Rainbow trout	<i>Oncorhynchus mykiss</i>	none
Mountain whitefish	<i>Prosopium williamsoni</i>	none
Northern pikeminnow	<i>Ptycheilus oregonensis</i>	none
Longnose sucker	<i>Catostomus catostomus</i>	none
Largescale sucker	<i>Catostomus macrocheilus</i>	none
Burbot	<i>Lota lota</i>	none
Brassy minnow	<i>Hybognathus hankinsoni</i>	none
Lake chub	<i>Couesius plumbeus</i>	none
Slimy sculpin	<i>Cottus cognatus</i>	none
Longnose dace	<i>Rhinichthys cataractae</i>	none
White sucker	<i>Catostomus commersonii</i>	none
White sturgeon	<i>Acipenser transmontanus</i>	endangered (SARA) <sup>1</sup>

<sup>1</sup> Endangered under the Species at Risk Act (SARA) means a fish species that is facing imminent extirpation (no longer exists in Canada) or extinction. A population of white sturgeon (*Acipenser transmontanus*) is present in the Nechako River. That river is outside the aquatic RSA of this Project, but it will be crossed by the transmission line.

Table 2.1-3 provides a summary of the effects assessment for fish and fish habitat.

**Table 2.1-3. Summary of Interaction Pathways and Mitigation Measures for Fish and Fish Habitat**

Subject Area	Interaction Pathways	Key Potential Effect	Mitigation Measures	Residual Effect	Significance of Residual Effects	Cumulative Residual Effects <sup>1</sup>
Fish Habitat	Change in Surface Water Quantity	Change in the surface water flows of monthly and annual flows, peak flows, low flows, and lake levels of Davidson Creek, Creek 661, Creek 705 and lower Chedakuz Creek	<ul style="list-style-type: none"> <li>Where applicable, surface water mitigation measures for the proposed Project will follow guidelines outlined in the Environmental Code of Practice for Metal Mines (EC, 2009). The proposed Project Mine Water Management Plan (MWMP) for the site contains aspects such as the Tailings Storage Facility (TSF) operation, on-site water management, and surface water diversions. This section lists the key mitigation used in the assessment process.</li> </ul> <p>A full list of mitigation used in the assessment is discussed in <b>Sections 5.3.2 and 5.3.9</b> of the EIS.</p>	Surface water flows will change in Davidson Creek downstream of the Project.	Not Significant	None anticipated
	Change in Water Quality	Surface water quality (including physical and chemical changes in water), can adversely affect fish and aquatic habitat receptors (periphyton, benthic invertebrates, planktonic communities) in varying degrees, the most severe being through direct lethal effects. Indirect effects can range from an individual to population level and can be presented through changes in health, productivity, biomass, and alterations to fish and aquatic community structures.	<ul style="list-style-type: none"> <li>Develop and implement the Sediment and Erosion Control Plan (SECP) that includes constructing sediment control facilities such as diversion and collection ditches and sediment control ponds and implementing BMPs prior to surface disturbance as described in the Application.</li> <li>Prohibit surface water discharge from mine site during operations and closure.</li> <li>Implement a seepage management system to ensure negligible surface discharge.</li> <li>Prevent impacts to Davidson Creek water quality employing a no-surface-water-discharge design for the TSF. During the approximate 18 years closure phase, water management will essentially be the same as during operations. No surface water will be discharged from the TSF, and all site contact surface water will be captured.</li> <li>Ensure maintenance of water quality during post-closure discharge. At approximately Year 35, the TSF will discharge to Davidson Creek. At that time pit lake water will mix with supernatant water in the TSF. Surface water at the time of discharge from the TSF is expected to be very near receiving environment background quality and to meet provincial and federal guidelines or site-specific objectives.</li> <li>Construct wetlands in Pond C, Pond D, ECD, and water reservoir during the closure period to prevent seepage from the TSF. As a contingency, should it be required, construct an additional wetland downstream of the ECD and water reservoir.</li> <li>Locate intake pipes at depth in Tatelkuz Lake to produce temperatures in Davidson Creek most similar to baseline.</li> </ul>	Residual effects relate to potential exceedances of water quality guidelines and are parameter-specific. While there are exceedances predicted according to the water quality model, they are almost all driven by background concentrations above guidelines and are therefore not considered residual. The possible exception is sulphate. Given natural attenuation of sulphate the probability of guideline exceedance is low because baseline concentrations are well above the detection limit.	Not significant	None anticipated

Subject Area	Interaction Pathways	Key Potential Effect	Mitigation Measures	Residual Effect	Significance of Residual Effects	Cumulative Residual Effects <sup>1</sup>
Fish	Change in Riparian Habitat	Loss of fish habitat in the mine site.	<ul style="list-style-type: none"> <li>Minimize the spatial extent of the overall Project footprint by clustering the TSF, open pit, waste rock dumps, stockpiles, and all other mine site facilities as closely together as possible.</li> <li>Minimize the number of watersheds potentially affected by locating the TSF and all mine site facilities within the headwaters of Davidson Creek and Creek 661.</li> <li>Avoid and protect kokanee spawning habitat.</li> <li>Implement the Fisheries Mitigation and Offsetting Plan (FMOP) as defined in authorizations issued by DFO under section 35(2)(b) of the <i>Fisheries Act</i> for the replacement of lost fish habitat in Davidson Creek and other watersheds.</li> </ul>	Losses of fish habitat will be offset with fish habitat restoration, enhancement, and creation. Two overwintering and rearing ponds will be constructed near the mid-reaches of Davidson Creek. Additional fish habitat will be created elsewhere in the LSA, the Regional Study Area (RSA), and in the larger region to offset this loss. There are no residual effects	N/A	N/A
	Mortality (Direct)	Project construction at the mine site could lead to direct fish mortality due to blasting activities, access removal, fish salvage, impingement on water intake screens or smothering of spawning areas.	<ul style="list-style-type: none"> <li>Establish and implement a Fish Salvage Plan and an Aquatic Effects Monitoring Plan (AEMP) appropriate for each phase of mine development, including reporting to BC MOE, DFO, and designated Aboriginal groups.</li> <li>Implement the FMOP as defined in authorizations issued by DFO under section 35(2)(b) of the <i>Fisheries Act</i> for the replacement of lost fish habitat in Davidson Creek and other watersheds</li> </ul> <p>A full list of mitigation used in the assessment is discussed in <b>Section 5.3.8</b> of the EIS.</p>	The loss of fish on the mine site will be replaced by productive fish habitat, as described by the FMOP which is based on proven concepts that have been used successfully in other offsetting plans for mines in BC. Therefore there is no residual effect predicted.	N/A	N/A
	Mortality (Indirect)	Disruption of homing to Davidson Creek, mercury mobilization in Lake 01682LNRS, changes in water temperature in Davidson Creek and reduction in littoral fish habitat of Tatelkuz lake	<ul style="list-style-type: none"> <li>Establish and implement a Fish Salvage Plan and an AEMP) appropriate for each phase of mine development, including reporting to BC MOE, DFO, and designated Aboriginal groups.</li> <li>Implement the FMOP as defined in authorizations issued by DFO under section 35(2)(b) of the <i>Fisheries Act</i> for the replacement of lost fish habitat in Davidson Creek and other watersheds Locate Tatelkuz Lake FSS intake at a depth that will produce temperatures appropriate for Davidson Creek.</li> <li>Operate a Temperature and Flow Control System (TFCS).</li> <li>Divert Lake 01682LNRS and Reach 12 of Davidson Creek into Lake 01538UEUT of the Creek 705 Watershed to ensure downstream connectivity for these waterbodies.</li> <li>Install a seepage management system consisting of seepage collection ponds, a seepage collection trench, and an ECD to prevent surface water discharges during operations and closure or sediment contributions to downstream receiving environments.</li> <li>At Lake 01682LNRS and the diversion channel, strip areas to be flooded of all vegetation and topsoil up to the high water line to reduce potential for mobilization of mercury and uptake by aquatic plants and animals, including fish. Employ erosion and sediment control measures, based on the ESCP, to protect erodible soils and minimize erosion of soils within the mine site.</li> </ul> <p>A full list of mitigation used in the assessment is discussed in <b>Section 5.3.8</b> of the EIS.</p>	<p>The residual Project effect of flow augmentation using Tatelkuz Lake water on homing behaviour is unlikely and capable of being managed should it occur.</p> <p>The effect of mercury mobilization is reversible because mercury concentrations are expected to fall back to baseline concentrations in the post-closure period.</p> <p>The effect of changes in water temperature in Davidson Creek on rainbow trout and kokanee is low in magnitude and local in extent, even though it is chronic in duration and irreversible. A Minor qualifier is attached to this assessment because the modified temperature regime is just as likely to produce positive effects on fish growth, survival, and reproduction as negative effects. The likelihood of temperature change in Davidson Creek as a result of Project activities is high, but confidence in this assessment is moderate because of limitations in the data and in the model used to predict water temperatures in all phases.</p> <p>All potential residual effects due to reduction in littoral fish habitat of Tatelkuz Lake on rainbow trout and Kokanee are reversible once pumping ceases at the end of the closure phase.</p>	Not Significant	None anticipated

<sup>1</sup> N/A - Not Applicable: There are no interactions between the fish and fish habitat VCs (surface water flow, surface water quality (including water temperature), riparian habitat and fish mortality) and the seven residual effects for the projects and activities identified as part of the cumulative effects assessment.

## 2.2 Aquatic Species at Risk

No aquatic species as defined in subsection 2(1) of the *Species at Risk Act* (2002) occur in the Project area or have the potential to be affected by the Project.

## 2.3 Migratory Birds

Under the *Migratory Birds Convention Act* (1994), individual birds, eggs and active nests are protected. The Project's potential effects to migratory birds are summarized in Table 2.3-1. Many species of migratory birds occur or have the potential to occur in the Project area; the assessment contained within the EIS utilizes indicator species to evaluate the Project effects to all migratory birds. Due to different habitat requirements and life histories, unique indicator species were selected for migratory waterbirds and migratory landbirds. These species and their rationale for selection are discussed below.

### 2.3.1 Migratory Waterbirds

Waterbirds and their habitats are represented in the EIS by the migratory water birds, specifically yellow rail and ring-necked ducks, although the yellow rail (*Coturnicops noveboracensis*) has not previously been recorded as occurring in the LSA or observed during Project field surveys, this species was selected as a representative waterbird VC because it is a species of conservation concern, Red-listed provincially, and listed as a Species of Special Concern federally (Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2002)). Ring-necked duck (*Aythya collaris*) was also selected as an indicator for waterbirds as its habitat requirements are representative of most of the wetland and open water environments found within the study areas that may be affected by the Project.

### 2.3.2 Migratory Landbirds

Migratory landbirds, as evaluated with forest and grassland birds, are a well-known group of birds with respect to taxonomy, ecology, biology, and conservation status and include songbirds. They are commonly grouped together as forest and grassland birds due to shared habitat requirements and predator-prey relationships. Effects on migratory forest birds and their habitats are represented by olive-sided flycatchers. The conservation of these this species and associated protective actions help preserve other forest and grassland birds in the Project area, including several other species of conservation concern that use similar habitat.

**Table 2.3-1. Summary of Interaction Pathways and Mitigation Measures for Migratory Birds**

Subject Area	Interaction Pathways	Key Potential Effect	Mitigation Measures	Residual Effect	Significance of Residual Effects	Cumulative Residual Effects
Migratory Birds (Waterbirds)	Direct Mortality	Direct mortality from physical exposure to traffic or attractants, mortality related to transport options and increased hunter access.	<ul style="list-style-type: none"> <li>• Development and implementation of a Wildlife Management Plan;</li> <li>• Posting speed limits along roads for Project related vehicles, as well as implementation of BMPs of road surface maintenance; and</li> <li>• Water quality monitoring and adaptive management.</li> </ul>	Potential for increased mortality caused by vehicle and aircraft collisions, and increased hunter access.	Not Significant	None anticipated
	Habitat Loss and Alteration	Areas that will be cleared of vegetation for Project infrastructure (e.g., facility direct footprint, road surface and cut / fill, borrow areas, etc.) result in temporary to long-term habitat loss.	<ul style="list-style-type: none"> <li>• Development and implementation of the Wildlife Management Plan, Wetlands Compensation Plan, Soils and Vegetation management Plan, Invasive Species management Plan, Sediment and Erosion Control Plan, and the Aquatic Resources Management Plan.</li> <li>• Road design using existing roads and cleared areas, and locating proposed access roads and transmission lines away from wetland and riparian areas or spanning wetlands;</li> <li>• Implementing pre-clearing nest surveys of areas to be cleared during the bird breeding seasons (March to August) to identify any nests or listed species to allow avoidance or adaptive management such as delayed clearing until after the least-risk window for any species found;</li> <li>• Implementing invasive plant management techniques as defined in the ISMP;</li> <li>• Minimizing sensory disturbance due to noise and light to areas adjacent to the mine area and airstrip, as stated in the Noise and Vibration Mitigation Measures; and Implementing the FMOP and Wetland Compensation Plan.</li> </ul>	Unavoidable loss of habitat, some habitat areas are lost temporarily	Not Significant	None anticipated
	Change in Population Dynamics	Indirect mortality due to changes in predator access or competing species.	<ul style="list-style-type: none"> <li>• Development and implementation of the Wildlife Management Plan, Wetlands Compensation Plan, Soils and Vegetation management Plan, Invasive Species management Plan, Sediment and Erosion Control Plan, and the Aquatic Resources Management Plan.</li> <li>• Restoring disturbed habitats at mine closure or development of habitats capable of supporting water birds as defined in the RCP; and</li> <li>• Minimizing sensory disturbance due to noise and light to areas adjacent to the mine area and airstrip, as stated in the Noise and Vibration Mitigation Measures.</li> </ul>	Potential for increased mortality caused by increased predator access related to alternate prey increases near roads.	Not Significant	None anticipated
Migratory Birds (Forest Birds)	Habitat Loss and Alteration	Areas cleared of vegetation for Project infrastructure (e.g., facility direct footprint, road surface and cut/fill, borrow areas, etc.) result in temporary to long-term habitat loss.	<ul style="list-style-type: none"> <li>• Development and implementation of the Wildlife Management Plan, Wetlands Compensation Plan, Soils and Vegetation management Plan, Invasive Species management Plan, Sediment and Erosion Control Plan, the Aquatic Resources Management Plan, and the Air Quality and Emissions Management Plan, and the Industrial and Domestic Waste Management Plan.</li> <li>• Road design using existing roads and cleared areas, and locating proposed access roads and transmission lines away from wetland and riparian areas or spanning wetlands;</li> <li>• Implementing pre-clearing nest tree surveys of areas to be cleared during the bird breeding seasons (February to August) to identify any nests or listed species to allow avoidance or adaptive management such as delayed clearing until after the least-risk window for any species found or pre-clearing surveys and contacting regulators if exceptions arise;</li> <li>• Restoring disturbed habitats at mine closure or development of habitats capable of supporting a diversity of wildlife species, using local native vegetation wherever possible or appropriate such as replanting conifer forest and especially whitebark pine in suitable sites.</li> </ul>	>20% reduction in relative forest and grassland bird habitat abundance or habitat areas with a moderate to high suitability ratings (e.g., >20% change in amount of forest and grassland bird moderate to high suitable habitats within the RSA, as estimated in suitability model). Evidence of lack of use or displacement due to sensory disturbance may be included as lost habitat if evident..	Not Significant	None anticipated

### 3. CHANGES TO THE ENVIRONMENT THAT WOULD OCCUR ON FEDERAL OR TRANSBOUNDARY LANDS

The Project is located on provincial Crown land. The proposed Project footprint does not overlap with any federal land; the nearest federal land, Tatelkuz Lake Indian Reserve (IR) 28, is located downstream of the Project Mine Site on the shore of Tatelkuz Lake. Tatelkuz Lake will be drawn down by a maximum of 0.11m during Project operations, potentially affecting the shoreline of IR 28. This effect is predicted to have a negligible short-term effect on federal lands, and will be fully reversible upon Project closure. Other IRs located in proximity to the Project are Stellaquo IR 1 and Seaspunkut IR 4 (Table 3-1). No Project effects on these IRs are predicted.

**Table 3-1. Indian Reserves Located within 15 km of the Proposed Project Footprint**

Reserve Name	Proximity (km)	Aboriginal Groups	Component
Tatelkus Lake 28	<1	Lhoosk'uz Dene	Transmission line
	6	Nation	Mine access road
	15		Mine site
Stellaquo 1	3	Stellat'en First Nation	Transmission Line
Seaspunkut 4	9	Nadleh Whut'en First Nation	Transmission Line

No potential for transboundary effects outside of BC are predicted.

### 4. CHANGES TO THE ENVIRONMENT THAT ARE DIRECTLY LINKED OR NECESSARILY INCIDENTAL TO FEDERAL DECISIONS

Pursuant to Section 5(2) of CEAA 2012, a federal environmental assessment must evaluate changes to the environment that are directly linked or necessarily incidental to federal decisions as a result of the Project. Specific to the Project, Table 4-1 presents a list of permits, licenses, authorizations and certificates currently understood to be required under federal regulations.

**Table 4-1. Potential Federal Permits, Licenses and Authorizations Required for the Project**

Enabling Legislation	Authorization or Requirement	Agency	Project Phase			
			C	O	CL	PC
<i>Fisheries Act</i> (last amended on 25 November 2013)	Authorizations under section 35(2) - Approval of final Fisheries Mitigation and Offsetting Plan	DFO	✓	✓	✓	
	Authorizations under section 36(3) - Schedule 2 Amendment under MMER					
	Authorizations under section 36(3) - Schedule 2 Amendment under MMER	DFO and EC		✓		
<i>Explosives Act</i> Explosives Regulations	License under section 7(1)(a)	NRCan		✓		
	Mechanical Ammonium Nitrate & Fuel Oil Certificate			✓		
<i>Radiocommunication Act</i>	License	Industry Canada	✓	✓	✓	
<i>Transportation of Dangerous Goods Act</i> Transportation of Dangerous Goods Regulations	Transportation of Dangerous Goods Permit <sup>1</sup>	TC	✓	✓	✓	
<i>Navigation Protection Act</i> (Amended Navigation Waters Protection Act on 1 April 2014)	Order in Council is required for Proclamation of exception under section 24 of the <i>Navigation Protection Act</i>	TC	✓			

<sup>1</sup> The Transportation of Dangerous Goods Permit will be required for any contractor transporting hazardous materials for the Project.

#### 4.1 *Fisheries Act (Section 35(2) Authorization)*

Construction and operation of the Blackwater Project will result in “serious harm to fish.” This “serious harm” includes the permanent alteration or destruction of fish habitat under and upstream of the mine site footprint in the Davidson Creek and Creek 661 watersheds used by rainbow trout for different parts of their life history. Because rainbow trout are part of recreational and Aboriginal fisheries near the Project, the Proponent requires a Section 35(2) *Fisheries Act* authorization from DFO before it can proceed with the Project. This serious harm to fish includes:

- Direct loss of fish and fish habitat under the mine site footprint;
- Indirect reduction in growth, survival and recruitment of fish due to isolation of fish populations upstream of the mine site footprint;
- Indirect reduction in growth, survival, and recruitment of fish and indirect reduction in habitat quality and quantity downstream of the mine site due to flow changes; and
- Indirect reduction in growth, survival, and recruitment of fish due to changes in downstream water quality, temperature, and suspended solid concentrations due to working in or around water.

Serious, permanent harm requiring offsets under Section 35(2) of the *Fisheries Act* total 101,073 m<sup>2</sup> (Appendix 5.1.2.6C, Table 7-10 of the EIS). The spatial area lost is stream habitat in the upper Davidson Creek and Creek 661 watersheds that is located under the facility footprint, is isolated upstream of the footprint, or is affected by reduced flows downstream of the Project (Creek 661 tributaries only). The offsets required will be accomplished by creating lake and stream habitat associated with the Lake 01682LNRS enlargement and diversion project, and creation of off-channel ponds in Davidson Creek and Creek 661. Offsetting gains from these projects total approximately 153,700 m<sup>2</sup> which amounts to a spatial offset ratio of approximately 1.5:1.

Appendix 5.1.2.6C outlines a Fisheries Mitigation and Offsetting Plan (FMOP) for the section 35(2)(b) *Fisheries Act* authorization that describes the avoidance, mitigation and offsetting measures for all mine components or activities that result in “serious harm to fish” (not including “serious harm to fish” related to deposit of a deleterious substance), resulting from the construction, operation, and closure of the Project. By looking to avoid first and offset last, this plan is consistent with DFO’s hierarchy of habitat conservation and protection guidelines (DFO 1998) and DFO’s recently issued *Fisheries Protection Policy Statement* (DFO 2013).

##### 4.1.1 *Metal Mining Effluent Regulations (schedule 2 amendment under section 36(3) of the Fisheries Act)*

Section 36 of the *Fisheries Act* prohibits the deposit of deleterious substances into waters “frequented by fish.” The Project will result in the deposition of mining effluent, tailings and waste rock in waters “frequented by fish.” These waters, used exclusively by rainbow trout, include the upper reaches of Davidson Creek within the TSF. As a result of their use by fish, the Proponent requires an amendment to Schedule 2 of the Metal Mining Effluent Regulations (MMER) so that the headwaters of Davidson Creek and Creek 661 where mining effluent, tailings, and waste rock will be deposited are designated as a Tailings Impoundment Area (TIA).



Section 27.1 of the MMER requires proponents to develop and submit a fish habitat compensation plan (now an “offsetting” plan) that demonstrates that the “productive capacity of fish habitat” is undiminished. If DFO is satisfied with the plan, Environment Canada will recommend to the Minister of Environment that Schedule 2 of the MMER should be amended to designate these waters as a TIA.

As the Project is proposed to be operated as a zero discharge facility, no release of deleterious chemicals is anticipated. Seepage from the TSF Site D dam during mine operations and closure phases is anticipated to be 55 L/s. The majority of this seepage volume will be captured by the Environmental Control Dam (ECD); only 2L/s of seepage is expected to bypass the ECD dam and pond. This represents a 96% seepage recovery efficiency.

The total habitat area permanently altered or destroyed by the deposit of deleterious mine tailings and waste rock in the Davidson Creek and Creek 661 watersheds (inside the TIAs) is approximately 60,150 m<sup>2</sup> (Appendix 5.1.2.6C, Table 6-5). The majority of this habitat is within the Davidson Creek Watershed (58,130 m<sup>2</sup>), while approximately 2,000 m<sup>2</sup> is within upper tributaries of Creek 661.

Plans to offset this habitat loss include habitat rehabilitation in the Mathews Creek watershed and replacement of three pre-code, fish-barrier culverts in the Vanderhoof Forest District. The total habitat gains provided by these plans are estimated to be 105,600 m<sup>2</sup>, which amounts to a spatial offset ratio of approximately 1.8:1 (Appendix 5.1.2.6C, Table 7-12).

Appendix 5.1.2.6C outlines a conceptual Fisheries Mitigation and Offsetting Plan (FMOP) for the section 35(2)(b) *Fisheries Act* authorization that describes the avoidance, mitigation and offsetting measures for all mine components or activities that result in “serious harm to fish” (not including “serious harm to fish” related to deposit of a deleterious substance), resulting from the construction, operation, and closure of the Project. The EIS proposes to meet MMER requirements by incorporating the MMER habitat offsets into a single FMOP.

#### **4.1.2 Navigation Protection Act (Section 24 Exemption)**

None of the waters affected by the Project are listed in the *Navigation Protection Act* (NPA) schedule of navigable waters (1985) so approvals under Section 5 of the NPA are not required.

Five waterways potentially affected by Project works were assessed in Appendix 7.2.6A of the EIS to be navigable: the Nechako River at aerial crossing TL-1065, the Stellako River at aerial crossings TL-937 or SR-003, Turtle Creek at the mine site access road crossing AP-007, and Tatelkuz Lake at FSS-000 where the water intake for the freshwater supply system would be located. These Project works would be considered minor works under the NPA. Minor works include aerial cables, erosion-protection works, and outfalls and water intakes. Chedakuz Creek, which is downstream of the Project, is also deemed navigable.

Section 22 of the NPA prohibits deposition of material into all navigable waters in Canada, whether or not they are listed under the NPA. The Project will deposit tailings, waste rock, and low grade ore into the upper reaches of Davidson Creek and Creek 661; however, these

waterways are not navigable (as determined by the navigability assessment in Appendix 7.2.6A of the EIS). Therefore, NPA Section 22 prohibitions are not considered to apply to these waterways.

Section 23 of the NPA prohibits 'dewatering' (i.e., drying up) of a navigable water. Project activities are expected to affect streamflows in Davidson Creek, Creek 661, Creek 705, and Chedakuz Creek and water levels in Tatelkuz Lake. Davidson Creek, Creek 661 and Creek 705 are not considered navigable; whereas, both Chedakuz Creek and Tatelkuz Lake are considered navigable. These latter two waterways will be subject to flow effects due to water withdrawals from Tatelkuz Lake. However, the drawing of water from Tatelkuz Lake will negligibly affect lake levels in lake elevations of not greater than 0.11 m for any month and will negligibly affect flows in Chedakuz Creek. Therefore, Section 23 prohibitions on dewatering are not considered to apply to these waterways.

#### **4.1.3      *Explosives Act***

It is anticipated that a license under section 7(1)a under the *Explosives Act*, an authorization to Assemble and Blend Ammonium Nitrate and Fuel Oil and a Mechanical Ammonium Nitrate and Fuel Oil Certification will be required for the Project; however the effects on the environment from these authorizations will be limited to small land disturbances and are expected to be negligible.

#### **4.1.4      *Radiocommunications Act***

It is anticipated that a license under the *Radiocommunications Act* will be required for the Project; however the effects on the environment from this authorization are expected to be negligible.

#### **4.1.5      *Transportation of Dangerous Goods Act***

It is anticipated that a permit under the *Transportation of Dangerous Goods Act* will be required for any contractor transporting hazardous materials to or from the Project; however the effects on the environment from these permits are expected to be negligible.

### **5.      EFFECTS OF CHANGES TO THE ENVIRONMENT THAT ARE DIRECTLY LINKED OR NECESSARILY INCIDENTAL TO FEDERAL DECISIONS**

Section 5(2)(b) of the CEAA 2012 outlines how an EIS must evaluate changes to the environment that are directly linked or necessarily incidental to federal decisions as a result of the Project that result in an effect to health or socio-economic conditions, physical and cultural heritage, or any site or thing that is of historical, archaeological, paleontological or architectural significance. A summary of these changes to the environment were presented in Table 2-1. No effects of changes to the environment that are directly linked or necessarily incidental to federal decisions are predicted.

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