12. First Nations Interests and Considerations

12.1 Introduction

This section provides an overview of how the proposed Morrison Copper/Gold Project (the Project) may potentially affect First Nations interests as they pertain to the Lake Babine Nation. Additionally, what is described is how Pacific Booker Minerals Inc. (PBM) has considered and addressed the potential effect on these interests. The Yekooche Nation's asserted traditional territory intersects the southern portion of the Project's transmission line, as well as the Lake Babine Nation's territory. For the purposes of this Project, consultation and consideration of Yekooche interests entails information distribution concerning the Project and its associated engineering and environmental studies (See Chapter 2: Information Distribution and Consultation). As such, this section primarily focuses on the efforts and activities undertaken to understand the Lake Babine Nation's interests and issues concerning the Project including general engagement and issues scoping, consultation, traditional ecological knowledge (TEK), environmental and social studies, and effects assessments. Yekooche Nation's interests and considerations are summarized in Section 12.6.

Traditional use (TU) and TEK is fundamental to understanding the context of the Project's environmental setting and the interests of a First Nation. From 2007 to 2008, the Lake Babine Nation participated in a TU/TEK study that identified interests based on a review of available information on traditional land uses, TEK, country foods, and archaeology information.

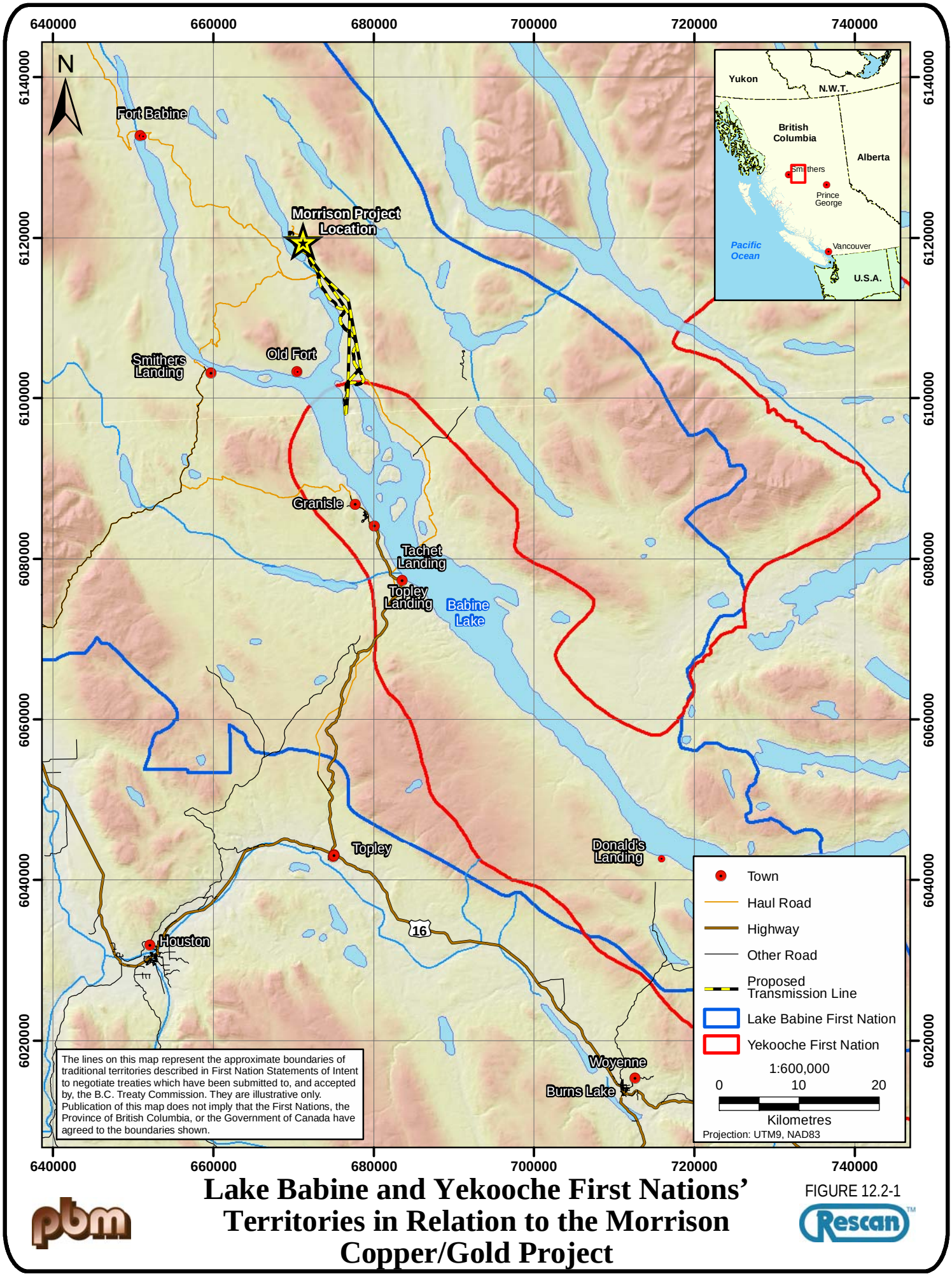
Chapter 5 provides additional detail about the TU/TEK methodology and study status. Lake Babine Nation review of and approval for the release of the TU/TEK information gathered and reported is still pending. As such, TU/TEK consideration and inclusion in this section is not possible before submission of the EA application. TU/TEK may be considered at a later date in the post-application process. Information in this report focuses on the key findings of consultation efforts and biophysical and social environment studies that are relevant to the interests and rights of the Lake Babine Nation.

Biophysical and social baseline studies were conducted concurrently and were used to identify valued environmental and socio-economic components (VECs and VSECs) as indicators upon which to assess the Project's effects.

Measures taken to address, resolve, and mitigate potential adverse effects on these interests are described as they pertain to the results of the environmental effects assessments and respective mitigation, management, and monitoring plans.

12.2 First Nations Setting

The Project is on Crown land within the asserted traditional territory of the Lake Babine Nation (Figure 12.2-1). Babine Lake is at the heart of the Lake Babine Nation's traditional territory and holds significant cultural value. The Project's potential effects on the Lake Babine Nation



Lake Babine and Yekooche First Nations' Territories in Relation to the Morrison Copper/Gold Project

FIGURE 12.2-1

communities surrounding the Project—including Fort Babine, Old Fort, Tachet, Donald's Landing, and Woyenne[1]—have been considered in this assessment.

Details on the Lake Babine Nation communities are provided in Section 7.19 and Appendix 45 (*Morrison Copper/Gold Project Socio-economic Baseline Report*).

In 1957, the government merged the Fort Babine and Old Fort bands and declared the united groups the "Lake Babine Band." While this imposed amalgamation was not initially popular among the affected parties who had previously operated independently, its purpose was to streamline the administration and delivery of services and to eventually expand reserve land (Fiske and Patrick 2000).

The Lake Babine Band Council, whose members are elected tri–annually, represents all members of the Lake Babine Nation and manages inter-governmental relations, funding, budgets, and the provision of social and health services. Additional responsibilities related to land and resource issues, treaty negotiations, and language and cultural programs belong to the Office of the Hereditary Chiefs, whose Elders' Council plays an advisory role to the elected Chief of the Band Council.

Over time, there has been a gradual decline in traditional activity participation and language use, which is currently being addressed through cultural revitalization initiatives. Important facets of Lake Babine Nation society and community life include *balhats* (cultural celebrations), subsistence economy activities, and local business operations. The well-being of the community has been ranked as slightly below average compared to other First Nations in the province, which is in part a function of the drinking water quality concerns within the community.

Currently, the Lake Babine Nation is in Stage 4 (Negotiation of an Agreement in Principle) of the 6-stage BC treaty process, whereby negotiations take place to define the rights and obligations of the topics outlined in the treaty agreement framework established in Stage 3. Treaty negotiation components include: existing and future interests in land, sea, and resources; structures and authorities of government; relationship of laws; regulatory processes; amending processes; dispute resolutions; financial components; and fiscal relations. A fundamental treaty priority for the Lake Babine Nation is to obtain recognition of unique fishing rights (BC Treaty Commission 2007)

12.3 Objectives

The purpose of this section is to describe the First Nations setting in which the Project takes place along with the Lake Babine Nation's key issues and interests as they pertain to their community and culture. The objective is thus to summarize the Lake Babine Nation's interests identified during the Project's EA and provide an overview of how these interests were addressed and/or considered.

[1] Woyenne is far removed from the Project and located outside the Lake Babine Nation traditional territory, yet the community has been included because it has developed into the administrative centre for the Lake Babine Nation due its relatively large population and extensive range of facilities.

12.4 Approach and Methodology

The approach underpinning the Project's EA is based upon principles of community engagement and consultation. PBM has endeavoured to maintain ongoing dialogue with the Lake Babine Nation to facilitate such an approach, and have welcomed and encouraged participation from the Lake Babine Nation Band Council, the Office of the Hereditary Chiefs, and general Lake Babine Nation community members.

In addition to ongoing communication and consultation efforts, the environmental and social baseline studies conducted since PBM entered the EA process in 2006 helped to determine and further understanding of the Lake Babine Nation's issues and interests as they pertain to the Project and the potential effects on those issues and interests.

The following is an outline of the methods used to identify issues and interests espoused by the Lake Babine Nation:

12.4.1 Community engagement and consultation

PBM initiated early engagement and relationship building with the Lake Babine Nation in 1992. During the formal pre-EA Application phase, in addition to continued informal community engagement and discussions, PBM participated in consultation activities to formally ascertain the Lake Babine Nation's specific interests pertaining to the Project through:

- meetings with elected and Hereditary Chiefs and Councilors, Elders, and treaty negotiation team;
- community open house meetings;
- working group meetings and teleconferences;
- review of comments on the Project's draft Terms of Reference (draft TOR);
- ongoing information discussions with Lake Babine Nation community members;
- project site visits.

Details of these consultation activities are described in Section 2 (Information Distribution and Consultation) of the EA Application.

12.4.2 Traditional Use and Ecological Knowledge Study

The BC EAO and Canadian Environmental Assessment Agency (CEA Agency) encourage proponents to consider TU/TEK when conducting an EA (BC EAO, 2005 and CEAA, 2004).

The TU/TEK study serves a dual purpose. First, it documents Aboriginal use of a particular study area and is used as part of an assessment of the Project's effects on traditional use sites and activities. Secondly, the results of the TU/TEK study are reviewed and integrated into aspects of the EA, including archaeology, country foods, socio-economic, land use, fisheries, wildlife, aquatics, vegetation, soils, meteorology, etc. Unfortunately the Lake Babine Nation has not agreed to the release of the study thus integration has not occurred.

TU/TEK data for the Project were gathered through a combination of desk-based and field research between 2007 and 2008. The study consisted of several sources of Lake Babine Nation TU/TEK, including accessing archival information from the Lake Babine Nation headquarters, collecting primary and secondary ethnographic research, conducting interviews with Lake Babine Nation knowledge holders, and verifying TU/TEK during a site visit to the Project.

A TEK Agreement between PBM and the Lake Babine Nation was drafted in 2008 and to date is still pending based on finalization of terms related to information sharing and confidentiality. As a result, detailed, site-specific TEK findings are not referred to in the Application. Instead, a summary of publicly available ethnographic and historical documentation for a broad cultural context were summarized. Details can be found in Chapter 6 (Traditional Use and Traditional Ecological Knowledge).

12.4.3 Environmental and Socio-economic Baseline Studies

A wide spectrum of environmental and socio-economic baseline studies was conducted in preparation for the Project's EAC application. Preliminary issues scoping (e.g., desk-based research and community meetings) identified areas of interests related to Aboriginal rights held by the Lake Babine Nation leadership and community members.

Key issues and interests are described in baseline studies; how these issues were addressed are described in the effects assessments, and mitigation and management plans. Details of the discipline-specific issues and interests including how they are considered in the EA and Project's design, are described in subsequent sections of this report.

12.4.4 Project Terms of Reference

An EAC application must comply with the Project's Terms of Reference (TOR) as approved by the BC EAO. The purpose of the TOR is to outline the information the proponent must provide in the application. Therefore, proponents are responsible for addressing and resolving issues identified in the TOR and proposing measures to avoid, mitigate, and manage potential effects. In addition to environmental and social studies, this includes values and issues raised through the consultation process, such as during the draft TOR's Working Group and public review period.

PBM worked with the Lake Babine Nation through the BC EAO and relevant government agencies to develop the scope and procedures (i.e., the terms) for the proposed Project's EAC application. Through participation on the Working Group and the TOR's review process, the Lake Babine Nation Chief, Councillor, and Land and Resource Manager provided PBM with feedback concerning the EA process and specific issues and interests related to the Project's potential environmental and social effects.

12.5 Lake Babine Nation Interests and Considerations

Through the approach and methods described above, PBM developed a better understanding of Lake Babine Nation's interests. This section outlines the Lake Babine Nation's interests and values identified through the EA process. Interests and their associated valued environmental

and socio-economic components (VECs and VSECs) included 10 bio-physical and social science discipline areas:

1. TU/TEK
2. Archaeology
3. Fisheries
4. Water quality/aquatics
5. Wildlife
6. Hydrology
7. Public health
8. Land and Resource Use
9. Socio-economics
10. Air quality

Table 12.5-1 summarizes these interests, their associated scientific discipline, and how PBM considered or addressed them. Subsequent sections provide more details concerning these interests and how they were considered.

Table 12.5-1
Summary of Lake Babine Nation Interests and Considerations

Interest Identified	Discipline Area	Resolution
Traditional Use and Ecological Knowledge	Traditional Knowledge	Lake Babine Nation knowledge holders participated in the TU/TEK study program; TU/TEK Report written for the EA application (only ethnography and publicly available information included in the Application)
Cultural Sites	Archaeology	Archaeology Impact Assessment (AIA), including identifying cultural sites and trail use conducted; mitigation, management and monitoring plans developed and included in the EA Application
Fish and fish habitat (sockeye salmon, rainbow and cutthroat trout)	Fisheries and water quality/aquatics	Baseline aquatics, fisheries and fish habitat studies, effects assessment, mitigation and management plans conducted and included in the EA Application
Wildlife and wildlife habitat (grizzly bear, moose, beaver, mule deer, marten, fisher, waterfowl, raptor)	Wildlife, water quality/aquatics	Wildlife and wildlife habitat EA, mitigation and management plans included in the EA application
Babine Lake water quality: history of past mines and environmental effects	Aquatics and ground water/hydrology	BC EAO and BC MOE delivered presentations and issued invitations for water quality and mine reclamation workshops to the Lake Babine Nation community and council members.

(continued)

Table 12.5-1
Summary of Lake Babine Nation Interests and Considerations (continued)

Interest Identified	Discipline Area	Resolution
Water quality: ground water, downstream effects on Morrison Lake; Morrison Creek and Babine Lake		Surface and ground water quality and quantity EA, mitigation and management plans included in the EA application.
Metal Leaching/Acid Rock Drainage		Metal leaching and acid rock drainage studies, water quality modelling, effects assessment, mitigation and management plans conducted and included in the EA Application
Waste rock and review of tailings facility site location		Project description including Project component location, alternatives assessment, environmental mitigation and management plans described in the EA Application
Drinking water quality	Public Health	BC EAO and BC MOE delivered presentations and issued invitations for water quality and mine reclamation workshops to the Lake Babine Nation community and council members; water quality and human health studies, effects assessment, mitigation and management plans conducted and included in the EA Application.
First Nations land use in Project area (hunting, fishing, trapping, cultural sites)	Land and Resource Use	Traditional knowledge, socio-economic, land and resource use, country foods baselines and effects assessment, mitigation and management plans included in the EA Application
Employment: hiring commitments for Lake Babine Nation members	Socio-economics	PBM committed to hiring, training, and mentoring Lake Babine Nation members as outlined in the Socio-economic mitigation and social management plans.
Training and Skills Development: need for training and education programs before the Project to ensure local residents' access to jobs		PBM committed to hiring, training, and mentoring Lake Babine Nation members as outlined in the Socio-economic mitigation and social management plans.
Economic and business development: commitment to local contracting services and partnerships		PBM developed and presented to Lake Babine Nation a proposed Training Plan framework. Submitted to the Lake Babine Nation; the Prince George Nechako Aboriginal Employment and Training Association and College of New Caledonia; Training-to-Employment proposal (in conjunction with Association of Mineral Exploration of Canada AMEC) and Aboriginal Skill Employment Partnership program Human Resources and Social Development Canada (HRSDC); PBM commitments to employment and training included in the EA application

(continued)

Table 12.5-1
Summary of Lake Babine Nation Interests and Considerations (completed)

Interest Identified	Discipline Area	Resolution
Economic and business development: commitment to local contracting services and partnerships		PBM committed to using local Lake Babine Nation contracting services wherever possible; commitments included in the social management plan and summary of commitments in the EA Application
Climate change	Air Quality	Climate change effects, mitigation and management plans are in the EA Application across five chapters including Climate Change and Meteorology; Extreme Weather Events; Forest Fire Risk; Climate Change Risk; Environmental Management Plan for Air Emissions and Fugitive Dust

12.5.1 Trans-disciplinary VEC Selection

Each potential VEC was screened for inclusion in the environmental assessment through an evaluation of baseline study results and community consultation. The consultation process involved holding public meetings with First Nations, local interest groups including regional and local government officials, community representatives, and the general public. VECs must be known to occur in, or be applicable to, the Project study area. There also must be a reasonable likelihood that the VEC would be affected by or have an influence on the Project.

12.5.2 Traditional Knowledge

Through the process of consultation, the interest in traditional knowledge and use was raised by the Lake Babine Nation as it concerned the EA's numerous disciplinary scientific studies. A desire for a higher context, holistic, and qualitative approach to understanding the potential effects of a project reflected the Lake Babine Nation's interest in numerous aspects of the environment that are fundamentally interconnected.

PBM supported the need to conduct a comprehensive TU/TEK study with the Lake Babine Nation community members' involvement. Over the span of two years, Rescan Environmental Services Ltd. (Rescan) worked with a group of Lake Babine Nation knowledge holders to obtain information about the how the Project area was used by the First Nations in the area.

Considerations of whether, what, how, and when TU/TEK is released to the public require lengthy discussions and much deliberation. At the time of writing, discussions concerning the use of the collected TU/TEK information continue between the Lake Babine Nation, PBM, and Rescan.

12.5.3 Cultural Sites – Archaeology

The Lake Babine Nation expressed interest and concern for heritage and cultural resources, including archaeology. Reflecting the Lake Babine Nation's interest in cultural sites in the area,

an AIA was conducted and demonstrated that the Babine Lake area is known to have a rich cultural heritage that includes both pre-contact/prehistoric sites, important post-contact/European sites and numerous trails used both prehistorically and historically. In general, the predominately recorded archaeological site types in the region include habitation sites, cultural depression and cache pit sites, culturally modified tree (CMT) sites, trails, and historic sites. The majority of recorded sites tend to cluster along the shorelines of lakes.

Four archaeological sites were recorded in the Project footprint: GhSn-3, GhSn-4, GhSn-5, and GhSn-7 (see Table 12.5-2). GhSn-3 is within the open pit boundaries, GhSn-4 is to the northwest of the waste rock dump (WRD) in association with other infrastructure, GhSn-5 is approximately 100 m from options A and B of the transmission line study corridor (TLSC), to the southeast of the mine facilities area (MFA), and GhSn-7 is in the tailings storage facility (TSF) area. GhSn-3, GhSn-4, and GhSn-5 are all CMT sites that postdate 1846 AD and are in harvested cut blocks. These sites are in poor condition with few CMTs remaining.

Table 12.5-2
Archaeological Sites within Project Footprint

Site Borden #	Project Component	Site Type	Comments	Source
GhSn-3	Open Pit	CMT site	Site is not protected by the HCA and has been heavily affected by logging.	Norcan (2001)
GhSn-4	Other Infrastructure	CMT site	Site is not protected by the HCA and has been heavily affected by logging.	Norcan (2001)
GhSn-5	Transmission Line Study Corridor – Options A and B	CMT site	Site is not protected by the HCA and has been heavily affected by logging.	Norcan (2001)
GhSn-7	Tailings Storage Facility	Lithic scatter site		EA Application Appendix 41

As a management strategy, some of the CMTs in these areas were stumped above the scars in an effort to preserve them during logging activities. CMTs remaining in these areas are generally in poor condition and in various states of decay. Additionally, these sites are not protected by the *Heritage Conservation Act* (HCA; 1996b). GhSn-7 is a pre-contact period (prehistoric) site characterized by lithic materials made of sedimentary rock and is protected by the HCA (see Appendix 41).

Valued Environmental Component Selection

The cultural VECs of concern relate to archaeological and heritage sites protected by the HCA. Types of sites that have been found in the region include CMTs, cultural trails, archaeological sites, burial sites, earthwork features, and historical sites (e.g., structures, features, and material culture).

The potential loss of information from archaeological sites may result from development activities involving soil excavation, movement, or disturbance.

Potential Effects on Cultural Sites

Direct and indirect effects to archaeological and heritage resources could occur as a result of ground disturbance activities and increased human presence during the Project life. Ground-altering activities in the open pit area will directly affect site GhSn-3 and may affect site GhSn-4. However, both of these CMT sites have already been heavily affected by logging activities and are in poor condition. Because of the relatively recent age of these sites, they are not protected by the HCA. Effects from ground disturbance are expected to be negligible because these sites have been recorded, are in poor condition, and are unlikely to provide any additional archaeological information.

Archaeological site GhSn-5 is approximately 100 m west of options A and B of TLSC and southeast of the MFA; it may be indirectly affected by increased human presence. The site consists of CMTs postdating 1846 AD, and is not protected by the HCA because of its age. The cut block containing the site has since been logged and the site has already undergone substantial forestry-related effects. Indirect effects from increased human presence are expected to be negligible because the site has been recorded, is in poor condition, and is unlikely to provide any additional archaeological information.

Archaeological site GhSn-7, recorded in 2008 during the AIA for the Project is in the TSF. It is a pre-contact period (prehistoric) site protected by the HCA and is characterized by lithic materials made of sedimentary rock**.** Flooding the TSF will result in major effects that will bury any remaining cultural deposits at this location.

Consideration of Cultural Interest: Mitigation and Management Plans

Archaeology and heritage resources are most vulnerable to Project-related effects when construction and ground disturbance are most invasive. Protecting and preserving archaeological and heritage sites is the primary goal; therefore, site avoidance is the preferred management strategy and can often be attained through Project redesign. If avoidance is not possible, mitigation measures can be developed to reduce adverse effects to a negligible level. These measures can range from creating a buffer zone around a site to systematic data recovery through site excavation.

Sites GhSn-3, GhSn-4, and GhSn-5 will require no mitigation because these sites are not protected by the HCA, have been heavily affected by past logging activities, and are in poor condition.

Archaeological site GhSn-7 is the only site within the Project footprint that is protected by the HCA. Avoiding GhSn-7 is not possible; therefore mitigation consisting of systematic data recovery before disturbance will be required. The exact mitigation plan will be determined in consultation with the Archaeology Branch and the Lake Babine Nation. This work will require issuing a new Section 14 Heritage Inspection Permit and a Section 12 Site Alteration Permit.

All effects on archaeological sites will be managed through mitigation, monitoring, and avoidance measures. Ongoing monitoring will occur through the “Chance Find Procedure,” which provides

instructions and protocols to follow in the unlikely event that archaeological materials are discovered during the construction phase or mine life. PBM commits to ensuring that all personnel on-site will be familiar with and adhere to this procedure. If finds are made during construction activities, monitoring and/or further archaeological work may be recommended at that time. No compensation plan was recommended as part of the management plan.

12.5.4 Fisheries and Fish Habitat

Many fish species serve an important role in BC's ecology, economy and culture. In particular, salmonid species (i.e., Pacific Salmon, lake trout, rainbow trout, Dolly Varden, char) are captured in recreational fisheries, supporting local economies and cultures, while other species act as indicators of aquatic environmental health. Fish and fish habitat are protected under several forms of federal and provincial legislation, including the *Fisheries Act* (1985).

Salmon's natural cycles are central to the Lake Babine Nation culture. The Lake Babine Nation, through community consultation activities, expressed concern the Project's activities would affect the local water supply and the health of the local fish populations.

Valued Environmental Component Selection

The study are for the Project's fish and fish habitat environmental assessment study area extends from the Project licence area to the end of the transmission line at Bell Mine substation on Babine Lake, including the proposed transmission line right of way (ROW). The regional study area (RSA) includes all receiving and reference environment watersheds, including Morrison and Tahlo creek watersheds, Morrison and Tochcha lakes, and sub-watersheds of Morrison Lake.

All lethal and sublethal effects and habitat losses were considered with respect to fish and fish habitat. Any potential effects were assessed at the scale of an entire length of a stream, or an entire lake, as appropriate for that local biological community. The extent to which these potential effects could impact the entire community were also determined.

Table 12.5-3 describes the Project's identified fisheries and fish habitat VECs.

Table 12.5-3
Fish and Fish Habitat VECs of the Morrison Copper/Gold Project

VEC	Source[1]	Project Association	Rationale for Inclusion
Lake Trout	BC MOE, Lake Babine Nation	Mine Site (Morrison Lake), Access Road and Transmission Line (Babine Lake)	Culturally valuable. Indicator lake ecosystem species, important for sport fishing. Potential loss of habitat, perceived potential contamination by heavy metals.
Dolly Varden	BC MOE, BC CDC	Access Road, Transmission Line	Blue-listed fish species. Indicator stream ecosystem species. Potential loss of habitat.

(continued)

Table 12.5-3
Fish and Fish Habitat VECs of the Morrison Copper/Gold Project (completed)

VEC	Source[1]	Project Association	Rationale for Inclusion
Rainbow Trout	BC MOE	Mine Site, Access Road, Transmission Line	Indicator stream ecosystem species. Potential loss of habitat, perceived potential contamination by heavy metals.
Pacific Salmon	DFO, Lake Babine Nation	Mine Site, Access Road, Transmission Line	Culturally/commercially valuable species. Indicator species, important for sport fishing. Potential loss of habitat.
"Other" Fish Species	BC MOE, DFO	Mine Site (Morrison Lake), Access Road and Transmission Line (Babine Lake)	Potential loss of habitat, perceived potential contamination by heavy metals.
Fish Habitat	BC MOE, DFO	Mine Site, Access Road, Transmission Line	Potential loss of habitat.

[1] **Indicates where the importance of the potential valued environmental component was identified**

Potential Effects on Fisheries and Fish Habitat

Potential deleterious Project effects are grouped into three categories: lethal effects, sublethal effects, and loss of habitat.

The potential effects on fish and fish habitat identified that may arise from the Project's construction, operations, and decommissioning phase include:

- Sedimentation of spawning and rearing areas (e.g., from construction activities, erosion of disturbed soils, and precipitation runoff) resulting in the smothering of fish during early life stages.
- Noise from blasting, construction activities, and truck hauling causing mortality or behavioural changes.
- Contamination of watercourses or reduction in water quality (e.g., as a result of spills of hazardous substances, metal leaching and acid rock drainage (ML/ARD) from exposed rock, particulates and residue from trucks and construction activity, rupture of tailings dam or pipeline containing tailings, and sewage effluent) causing lethal and sublethal effects.
- Water loss in Morrison Lake from seepage into open pit, water intake, and loss of upper watersheds in tailings and waste rock areas causing winter mortality or sublethal effects.
- Loss or alteration of fish habitat and productive capacity (e.g., loss of the upper stream reaches caused by the tailings dam)

Comprehensive details of all potential effects can be found in Section 8.10 Fish and Fish Habitat. No potential major deleterious effects were recognized. The following summarizes the moderately adverse effects that could result from one or more Project components without mitigation:

Fish Habitat

- direct habitat (water) loss from stream 53400;
- loss of water from Morrison Lake affecting habitat loss;
- sedimentation or stream redirection, reduction in sunlight, food resources and/or habitat;
- damage to fish food resources from spills;
- rupture of tailings dam or pipeline affecting fish habitat and food resources.

Pacific Salmon, Rainbow Trout, Lake Trout and/or Dolly Varden

- sedimentation or stream redirection causing lethal smothering and/or sublethal effects;
- rupture of tailings dam or pipeline causing lethal and sublethal effects;
- water loss of Morrison Lake tributaries causing winter mortality, sublethal effects, and lost habitat.

Consideration of Fisheries and Fish Habitat Interest: Mitigation and Management Plans

The potential effects on fish and fish habitat will be minimized through environmental engineering and Project design. PBM and their engineering and environmental consultants will work towards no net loss in fishery resources through a wide range of adverse effects avoidance and mitigation measures.

To prevent harmful alteration of fish habitat and the introduction of deleterious substances to watercourses, a range of specific and generally accepted techniques for sediment control, riparian care, site isolation, timing windows, reclamation, and rehabilitation will be used. These methods are described in various environmental protection plans for the Project, included in the EA application: the water management plan (Section 13.3), fish and fish habitat management plan (Section 13.5), and erosion and sediment control plan (Section 13.7). Where mitigation is not possible (i.e., because of permanent habitat loss), a fish habitat compensation plan is developed to ensure no net loss of fish habitat. This conceptual compensation plan is presented in the fish and fish habitat compensation plan (Section 13.6).

A monitoring program for aquatic resources will also be implemented to evaluate the effectiveness of environmental protection measures and to monitor the health of aquatic ecosystems associated with the mine site (Section 14.6).

Residual Effects

Mitigation, management, and monitoring measures will assist in avoiding or minimizing the effects listed above resulting in a minimal amount of residual adverse effects on fish and fish habitat. The following residual effects have been identified as being moderate in significance:

Fish Habitat

- direct habitat (water) loss from stream 53400;
- rupture of tailings dam or pipeline affecting fish habitat and food resources;

- water loss in Morrison Lake tributaries causing winter mortality, sublethal effects, and lost habitat.

Pacific Salmon and Rainbow Trout

- rupture of tailings dam or pipeline causing lethal and sublethal effects;
- water loss of Morrison Lake tributaries causing winter mortality, sublethal effects, and lost habitat.

Particular attention will be paid to fish habitat containing or supporting regionally and locally sensitive species, including any rare or endangered species or locally threatened species. Dolly Varden, a provincially blue-listed species, is present in lower elevation streams along the transmission line route, but not within the mine site.

Finally, sockeye salmon and coho salmon spawn in Morrison Creek, with small numbers of each species spawning along a single shoreline section of Morrison Lake. They are considered valuable to First Nations in the area and will be treated with special care. In particular, the workforce during construction and operation of the mine will be fully informed of the spawning locations within and near the Project footprint during the fall spawning period.

PBM will consult with the DFO, BC MOE, and the Lake Babine Nation during the EA review and before construction to determine compensation measures.

12.5.5 Water Quality and Aquatics

High-quality freshwater is necessary to provide good quality habitat for fish and wildlife and maintain potable water sources. The Lake Babine Nation has stated through community consultation that the integrity of water systems and sources throughout the Babine Lake area and surrounding watershed is fundamental to their well-being.

Valued Environmental Component Selection

Surface water quality is considered a VEC because the streams and lakes in the Project area provide habitat for many organisms, including important fish species (see Section 7.4). In addition to its importance as habitat, surface water quality was chosen as a VEC because it is important for human health.

Freshwater aquatic resources were selected as a VEC because they are a fundamental component of aquatic ecosystem diversity and constitute a critical link in transfer of energy from primary producers to higher trophic levels (i.e, fish, birds, and humans).

Potential deleterious effects to freshwater aquatic resources include sublethal effects and mortality associated with degraded water and sediment quality, loss or alteration of aquatic habitat caused by construction (i.e., sedimentation or draining), and altered productive capacity at an ecosystem level.

Potential Effects on water quality and aquatics

Several Project activities could increase the risk of water quality degradation. Some of these activities include: surface runoff; siltation and dust particulates; nitrogen residues from blasting; ML/ARD from waste rock; and discharging potential contaminants into waterbodies.

For streams and ponds within the Project area, baseline total cyanide concentrations frequently exceeded aquatic life water quality guidelines. The majority of water quality variables measured in 2006 had concentrations that were noticeably lower than in previous years. Baseline measurements of metals in stream water that exceeded the BC and Canadian Council of Ministers of the Environment (CCME) aquatic life guidelines included total and dissolved aluminum, total arsenic, total and dissolved copper, total cadmium, total and dissolved iron, total mercury, and total selenium. Baseline metals measurements in three streams were consistently high year-round and across all sample years, indicating that these concentrations were naturally high. Metal concentrations were low in pond water, and were often below or close to detection limits. The only aquatic life guidelines that were exceeded in ponds were for total and dissolved aluminum.

Stream water quality data show numerous variables had the lowest concentrations during the freshet months (May and June). The BC Maximum guideline for total cyanide was occasionally exceeded. Many water quality variables had their maximum concentrations in two streams in the Project area. There continued to be naturally occurring cyanide concentrations in Morrison Lake with only a few metals in lake sites exceeding provincial or federal guidelines. These included total and dissolved chromium and nickel, and total cadmium.

The potential effects relating to surface water requiring mitigation and management include:

- surface runoff and siltation contaminant loading
- airborne contaminant loading;
- nitrogen residues from blasting
- ML/ARD
- discharge and spill contaminant loading

During the Project's construction phase, the water from Ore Pond and Booker Lake will be drained into Morrison Lake. The data for Ore Pond and Booker Lake (Appendix 26) indicate several variables (i.e., sulphate, ammonia, arsenic, barium, copper, manganese, molybdenum, and zinc) that have greater concentrations than in Morrison Lake.

During construction there will also be a discharge of treated sewage from a sewage treatment facility (STF) to a location near the mine site (maximum 360 personnel during the construction phase) at least 100m away from existing water bodies. Associated phosphorous and nitrogen compounds from sewage will travel slowly through groundwater movement only, and if they reach waterbodies their concentrations will be attenuated. During operations the treated sewage will be transported by the tailings pipeline to the TSF.

During the closure and post-closure phases a single point of TSF discharge will exist as a spillway on the east end of the main dam at the TSF.

Consideration of Water Quality Interest: Mitigation and Management Plans

A detailed surface water management plan is outlined in Section 13.3 of the EA application.

General techniques to mitigate and manage effects to surface water quality arising from disturbed areas during the Project's construction, operations, closure and post-closure phases have been developed. In the case of each of the identified potential effects, best management practices (BMPs) will be implemented as the basis for all work undertaken, particularly when working in or around water. Examples of BMPs to preserve surface water quality include:

- selecting appropriate clean equipment;
- properly storing and handling fuels and other chemicals (earth berms surrounding storage tanks, maintenance of tanks and hoses);
- endeavoring to keep existing vegetation intact wherever possible, as it will provide significant benefits for surface runoff and siltation management;
- implementing a spill contingency and emergency response plan;
- implementing a waste management plan;
- implementing a sediment and erosion control plan;
- using silt fences during construction near open water to capture bulk sediment loadings that could spill into adjacent waterways during construction;
- using sedimentation control ponds;
- licence requirements will be met for any water use (BC MOE, Water Stewardship Division) or sewage discharge (BC MOE, Environmental Protection Division);
- using water as a dust suppressant in areas of high traffic (i.e., the pit area) during dry periods;
- regular water quality monitoring.

In addition, mitigation and management plans will include proper decommissioning of facilities, contouring landscapes, removing culverts, and monitoring adjacent waterways to ensure aquatic environment is not affected.

Residual Effects

After considering mitigation and management the significance of most residual effects to surface water quality was assessed as being negligible with several exceptions that were assessed as minor. However, one residual effect will be major in significance: vegetation permanently replaced by infrastructure as a result of draining or burial with tailings at the mine site. However, although this does result in some habitat loss, the impact on Wildlife is moderate for moose and minor or negligible for other species studied.

During construction and operations the effects of surface runoff and siltation at the mine site have a minor significance to surface water quality and are considered to have a medium probability of occurrence with effective mitigation.

ML/ARD effects are considered minor with a medium probability of occurrence at the mine site during all phases. This is primarily because there is considerable potential for a large proportion of the waste rock to contain potentially acid generating (PAG) rock and any lack of effectiveness in mitigation measures could result in some ML/ARD effect to surface water quality.

Finally, during all phases the effects of discharges at the mine site are assessed as having a minor significance. This rating considers that discharge may require some form of treatment before release to meet permit requirements.

Detailed information concerning ML/ARD for the Project will be addressed in areas of the EA application including:

- Appendix 15 Prediction of Metal Leaching and Acid Rock Drainage
- Appendix 23 Water Balance Model
- Section 13.3 Water Management Plan
- Section 13.17 ML/ARD Prediction and Prevention Management Plan

12.5.6 Wildlife and Wildlife Habitat

Wildlife and wildlife habitat are protected under several forms of federal and provincial legislation, such as the BC *Wildlife Act* (1996a), the Canada *Migratory Birds Convention Act* (1994), the Canada *Species at Risk Act* (2002), and the BC *Water Act* (1988). Particularly, Section 34 of the Wildlife Act (1996a) protects most vertebrate animals from direct harm and harassment and specifically protects birds, eggs, and occupied nests from possession, molestation, injury, or destruction. The Canada *Migratory Birds Convention Act* prohibits killing migratory birds or depositing harmful substances in areas frequented by migratory birds and protects their eggs and nests. Relevant wildlife regulatory requirements and management practices are outlined in the wildlife management plan (Section 13.10).

The wildlife assessment focuses on potential Project issues that may violate provincial and federal acts, policies, and BMP guidelines applicable to wildlife and wildlife habitat in BC. Analysis entails considering two spatial areas, the local study area (LSA) and the RSA. The LSA involves an area encompassing a 2-km buffer around the Project footprint. The RSA is a larger area involving a 10-km buffer around the footprint.

Wildlife Valued Environmental Component Selection

Wildlife VECs are those perceived to generate concern for regulators, First Nations, and the general public. VECs may include species that have conservation status, are of biological importance, or are regionally occurring species that have particular cultural, social, or economic significance to First Nations, the province, or other Canadians. Table 12.5-4 summarizes the VECs.

Table 12.5-4
Wildlife Valued Environmental Components in the Morrison Environmental Assessment

Wildlife VEC	Source[1]	Rationale for Inclusion
Grizzly bear (*Ursus arctos horribilis*)	COSEWIC, BC Province	Provincially blue-listed, federally species of Special Concern. Species of cultural significance, and economically important to local outfitters. High value foraging habitat in the Project area and presence confirmed during baseline studies. Potential loss of habitat, risk of direct mortality from human- or vehicle-interactions.
Moose (*Alces alces*)	First Nation	Identified as an important food source for First Nations and local hunters. Biologically important as keystone species. High and moderately high moose winter habitat throughout the RSA and presence confirmed during baseline studies. Potential loss of habitat, risk of direct mortality (vehicle interactions) and indirect mortality (increase hunting pressure), and potential movement barrier created by roads and increased traffic.
Mule deer (*Odocoileus hemionus*)	First Nation	Identified as an important food source for First Nation and local hunters. Presence confirmed in the study area during baseline studies.
American marten (*Martes americana*)	First Nation	Culturally and economically important furbearer to trappers. Biological importance as an indicator species. Presence confirmed in the study area during baseline studies.
Fisher (*Martes pennanti*)	First Nation, BC Province	Provincially blue-listed. Economically important furbearer to trappers. Biological importance as an indicator species. Presence confirmed in the study area during baseline studies.
Western Toad (*Bufo boreas*)	*Canada Species at Risk Act* (SARA)	Species of Special Concern under Schedule 1 of SARA. Biological importance as indicator species. Confirmed presence in wetlands during baseline studies. Potential loss of breeding habitat and direct mortality.
Waterfowl	*Migratory Birds Convention Act*, BC *Wildlife Act*, First Nation	Individuals, eggs, and active nests protected under *Migratory Birds Convention Act* and BC *Wildlife Act.* Group includes economically and culturally important waterfowl species. Confirmed presence on wetlands during baseline studies. Cavity-nesting species may be affected by changes in forest habitat.
Forest Birds	*Migratory Birds Convention Act*, BC *Wildlife Act*	Individuals, eggs, and active nests protected under *Migratory Birds Convention Act* and BC *Wildlife Act.* Confirmed presence of 56 species in the study area during baseline studies.
Raptors (bald eagle, osprey)	*BC Wildlife Act,* First Nation	Nests and certain raptors protected under BC *Wildlife Act*. Active bald eagle nests (3) and osprey observed on Morrison Lake. Potential disturbance and direct mortality during vegetation clearing, potential poor water quality issues.
Grouse spp. (*Bonasa umbellus, Dendragapus canadensis, Dendragapus obscurus*)	First Nation	Not listed under COSEWIC and Yellow-listed (Secure) in BC. Potential Project effects reflected by forest species assessments.
Black Bear (*Ursus americanus*)	First Nation	Economically and culturally important species. Effects of the Project will be captured by analyses of changes in grizzly bear habitat.

(continued)

Table 12.5-4
Wildlife Valued Environmental Components in the Morrison Environmental Assessment (completed)

Wildlife VEC	Source[1]	Rationale for Inclusion
Beaver (*Castor canadensis*)	First Nation	Species of cultural significance. Not listed under COSEWIC and Yellow-listed (Secure) in BC. Potential effects of Project on beaver dams and lodges are covered under separate permitting process under BC *Wildlife Act*.
Grey wolf (*Canis lupus*)	First Nation	Considered not-at-risk under COSEWIC and Yellow-listed (Secure) in BC. Species of cultural significance. Prey species included in assessment (moose and mule deer), and potential effects of Project would be captured by analyses of changes in forest habitat and by considerations of other wide-ranging carnivores like grizzly bears.
Bluebird (*Siala* spp.)	First Nation	Species of cultural significance. May occur in the study area, but not found during baseline studies. Effects of Project would be captured by analyses of changes in forest bird habitat
Muskrat (*Ondatra zibethicus*)	First Nation	Species of cultural significance. May occur in the study area, but not found during baseline studies. Potential effects of Project on muskrat dams and lodges are covered under separate permitting process under BC *Wildlife Act*. Other potential effects of Project would be captured by analyses of changes in wetland habitat.
Porcupine (*Erethizon dorsatum*)	First Nation	Species of cultural significance. Effects of Project would be captured by analyses of changes in forest habitat and by considerations made for American marten and fisher.
Frog (*Rana* spp.)	First Nation	Species of cultural significance. Presence of two species (Columbia spotted frog and northern wood frog) confirmed in the baseline studies. Both are considered not-at-risk under COSEWIC and Yellow-listed (Secure) in BC. Effects of Project would be captured by analyses of changes to wetland habitats.
Caribou (*Rangifer tarandus*)	First Nation	Species of cultural significance. Unlikely to occur in the study area, not found during baseline studies.
Rabbit (order *Lagomorpha*)	First Nation	Species of cultural significance. Snowshoe hare found during baseline studies. Effects of Project would be captured by analyses of changes in forest habitat.

Potential Effects on Wildlife and Wildlife Habitat

Given the hierarchical nature of biological systems, wildlife effects are assessed with regard to changes at both the individual animal level (e.g., behaviour, physiological condition, survival) and the population level (population size, distribution, mortality rate, reproductive fitness). Effects at the population level are of greater concern than those at the individual level, thus the assessment primarily focuses on the effects to local populations.

Potential adverse effects raised in Section 6.5 of the TOR included:

- habitat loss or alteration of terrestrial and wetland habitats
- physical hazards and attractants
- chemical hazards

- sensory disturbance

These general effects may lead to the following issues for wildlife:

- avoiding the area, decreasing the carrying capacity of the landscape for wildlife;
- mortality (direct and indirect);
- disturbance to feeding, nesting, denning, or breeding habitats;
- reduced movement, dispersal, and genetic diversity of animals across the landscape;
- features acting as attractants, creating "problem" animals;
- reduced health or reproduction through chemical body burdens;
- disruptions, blockages, impediments, and sensory disturbances to wildlife movements;
- reduced wildlife fecundity or productivity.

Table 12.5-5 summarizes the overall significance ratings for the Project (habitat loss, physical hazards and attractants, chemical hazards, and sensory disturbances) for each VEC. Overall, the Project is expected to have the largest potential overall effect on moose. Lesser effects are predicted for grizzly bear, fisher, western toad, and waterfowl.

Table 12.5-5
Summary of Overall Significance of Project Effects on each VEC

	Grizzly Bear	Moose	Mule Deer	American marten	Fisher	Western toad	Waterfowl	Forest birds	Raptors
Overall Rating	Minor	Moderate	Negligible	Negligible	Minor	Minor	Minor	Negligible	Negligible

Consideration of Wildlife and Wildlife Habitat Interest: Mitigation and Management Plans

Details on how these mitigation measures will be implemented and monitored are provided in the wildlife management plan (Section 13.10). This management plan includes the following proposed sub-plans:

- human presence and activity management plan
- nest avoidance management plan
- waste and wildlife attractant management plan
- sensory disturbance management plan
- wildlife and road interaction management plan
- wildlife and transmission line interaction management plan
- employee wildlife education plan

Location-based monitoring will enable effective and thorough data collection and the implementation of a consistent, coherent adaptive management process.

To facilitate an adaptive management approach, a Wildlife Working Group has been proposed to review and comment on wildlife management and monitoring practices. This working group may consist of representatives from: PBM management, biological consultants, the BC MOE, the Lake Babine Nation, the Canadian Wildlife Service, and stakeholders such as Canadian Forest Products Ltd. (Canfor) and local land users.

By implementing mitigation, monitoring, and management plans, effects to wildlife will be minimized to negligible or minor, with one exception. Considering the total available suitable habitat potentially affected in the RSA, moose use within the area, and the long-term duration of this effect, the residual effect of habitat loss following mitigation is expected to be of moderate significance.

12.5.7 Human Health - Drinking Water and Country Foods

The Lake Babine Nation cited drinking water and country foods as a concern related to the Project's activities. This section focuses on the interests of these two components of human health as they pertain to the Lake Babine Nation communities near the Project.

During the land and resource use baseline studies, Morrison Lake was identified as a drinking water source near the Project area. This water is typically boiled before consumption to remove microbials and bacteria. No other waterbodies were specifically identified as being used for drinking water purposes during the land use baseline studies

Country foods are animals, plants, or fungi used by people for medicinal or nutritional purposes that are harvested through hunting, gathering, or fishing. Country foods take up chemicals from the environmental media (i.e., water, soil, and vegetation). Thus, their concentrations (i.e., quality of the food) are directly related to the concentrations in the environmental media. Subsequently, any Project activity that has the potential to affect the quality of water, soil, and vegetation also has the potential to affect the quality of country foods.

Valued Environmental Component Selection

The following describes the specific human VECs selected for evaluation and the rationale for their selection.

Drinking Water

The selection of human VECs for the evaluation of drinking water was based on Health Canada guidance (Health Canada 2004). When evaluating the potential effects of chemicals from drinking water, the human receptor selection is dependent on the type of chemical evaluated. For instance, the receptor selected for non-cancer-causing chemicals (i.e., threshold chemicals) is the group that has the greatest exposure per unit body weight per day. Therefore, for the assessment of drinking water effects, the toddler life stage (i.e., six months to four years old) was selected as the human VEC for non-cancer-causing chemicals. If the effects assessment finds acceptable effects to toddlers then it would also be acceptable for all other life stages. Adults

(ages 20+) were also selected as VECs for the evaluation of effects from drinking water, because the land users are typically adults and are the ones who would be drinking the surface water. For cancer-causing chemicals (i.e., non-threshold chemicals) adult receptors were selected as the human VECs. Adults are selected as the age group for evaluation of potential carcinogenic effects because exposure is estimated over an entire lifetime.

Country Foods

The selection of human VECs for the evaluation of country foods was based on Health Canada guidance (Health Canada 2004). Therefore, for the assessment of county foods effects, the toddler life stage (i.e., six months to four years old) was selected as the human VEC for non-cancer-causing chemicals. If the effects assessment finds acceptable effects to toddlers then it would also be acceptable for all other life stages. Adults (ages 20+) were also selected as VECs for threshold chemicals. For cancer-causing chemicals (i.e., non-threshold chemicals) adult receptors were selected as the human VECs. Adults were selected as the age group for evaluation of potential carcinogenic effects because exposure is estimated over an entire lifetime.

Potential Effects on Human Health (Drinking Water and Country Foods)

To determine the extent of potential effects, predicted changes to the environmental media were reviewed from other relevant, discipline-specific sections of this EA application (i.e., water, soil, and vegetation effects assessment chapters). If the extent of the effect was considered to be minor, moderate, or major a screening level risk assessment was conducted to identify whether or not the effect had the potential to result in unacceptable human health risks.

The following summarizes the relevant information derived across disciplinary EAs related to drinking water and country foods.

Drinking Water[1]

The spatial boundary for this effects assessment included all streams crossed by the transmission line, road, pit and tailings footprint, as well as the downstream waterbodies Morrison Lake and Morrison Creek. The only Project component where potential effects to surface water quality were identified was the mine site, including the TSF (Section 8.22). The main area identified as potential effect was the TSF.

During operations and closure the following water quality parameters were predicted to exceed one or more of the drinking water guidelines: nitrate, antimony, arsenic, lead, manganese. These parameters are predicted to remain elevated above the drinking water guidelines and/or criteria for a long period following closure, with the exception of arsenic, which is predicted to be within the guidelines by Year 99.

All of the exceeded parameters are for health-based guidelines, with the exception of manganese, which is based on aesthetics guidelines. The extent of effects from the water within the TSF during operations is considered minor during operations and moderate during closure. Mitigation will include posting signs around the TSF indicating that the water is not potable and that no public access is permitted. Because of the predicted appearance of the water and signs barring public access, the potential for people to consume or be exposed to this water is unlikely during

operations. Upon closure, the water will be monitored to verify its quality; at that time, a human health risk assessment will be conducted to identify the potential safety of the water for human use. If risks are found to be unacceptable, additional mitigation will be developed. After mitigation, are health effects not expected, therefore the significance is assessed as negligible. Although no health effects are predicted, there may be some impacts due to lack of the ability to fully utilize this waterbody. Effects to land use from quality of experience were assessed in Section 8.18.

Country Foods

The only potential residual effects on human health from country foods during operations would be from wildlife (moose and grouse) that may ingest affected soil and water in the TSF and soil near the grade ore stockpile during operations. The screening level risk assessment has shown that the predicted changes to moose and grouse during operations will not result in unacceptable risks to human health. It also showed that upon mine development and operations, the country foods harvesters can continue to consume moose and grouse at rates and frequencies to which they are accustomed. Monitoring and adaptive management, presented in Section 13.10.7, will ensure that no unacceptable health effects occur from country foods quality upon closure and post closure.

No effects were predicted for terrestrial vegetation (i.e. berries) and fish that may be consumed by harvesters.

Soil: During construction and operations soil quality could be affected by minor fuels spills at the mine site, transmission line, and haul road. These minor spills will be remediated as per the spill management plan (Section 13.18).

During operations at the mine site, soil quality is predicted to be affected by the TSF (i.e., elevated metals along the beaches) and possibly at the low grade ore stock pile (Section 8.13). During operations, edible vegetation will likely not grow in these areas. Furthermore, people will not be permitted to use these areas for vegetation harvesting purposes. Thus, there are no predicted effects to vegetation used for consumptive purposes because of changes in soil quality during operations. However, there is the possibility that country foods wildlife species may incidentally ingest the affected soils, and thus there is the possibility of the quality of the wildlife to decrease. The extent of this effect is considered minor.

Vegetation: The quality of edible vegetation is not predicted to be affected during Project operations or closure. In addition, the general public will not be permitted to harvest vegetation from the site during operations.

Upon post-closure in the TSF wetland, vegetation is expected to establish along the shores of each dam, down to 2 m below the water surface. Wetland vegetation could uptake metals from the submerged tailings at these locations. If the wetland vegetation takes up the metals, this would result in a valid exposure pathway of metals to wildlife that ingest wetland vegetation (i.e. herbivores). This may subsequently reduce the quality of country food wildlife species. However this effect is negligible. The monitoring and adaptive management will ensure that no unacceptable health effects occur from country foods quality upon closure and after closure.

Wildlife: During operations, the water and soil quality are predicted to be affected in the TSF, which may reduce the quality of wildlife who incidentally ingest this environmental media. This could result in human health effects in people who consume these animals. Wildlife is not expected to spend appreciable amounts of time in this active area during operations. In addition, wildlife will be deterred from spending time in the TSF. Details on the proposed deterrent methods are described in the wildlife management plan.

Consideration of Human Health (Drinking Water and Country Foods): Mitigation and Management Plans

Drinking Water

First Nations and public consultation for this Project indicated that there is concern regarding changes to the quality of county foods in the Project area from mine development. In addition, the TOR for this assessment specifies that an assessment of human health, based on predictions from other areas of the application (i.e., air, water), must be conducted. Thus, the potential effects to human health caused by changes in country foods quality were assessed as part of the Project's EA application.

Lake Babine Nation members are predicted to access surface water for consumption from waterbodies surrounding the Project area during land use activities such as hunting and trapping and/or berry picking. Project activities involving any discharge and/or explosives are considered to potentially affect surface water for human consumption. Mitigation, management, and monitoring will compare discharge levels to federal regulatory guidelines.

The human health effects assessment demonstrated that drinking water should be safe to consume, providing water is boiled. This is standard protocol for any natural waterbody used for human consumption as no river, lake, or stream in Canada is technically potable; with or without a mine nearby. However, consumption rate and concentration levels will be assessed and monitored throughout the life of the mine, ensuring that all levels meet government regulatory guidelines

The Project will employ a water treatment plant for domestic consumption. PBM will apply for a drinking water permit from the Northern Health Authority. The water quality parameters for human consumption that aid in designing the water treatment plant will be specified by the Northern Health Authority.

Ongoing monitoring through the Project life will be required to ensure the water remains safe to drink. Details of the monitoring plan will be provided in the permit application and/or specified in the permit itself.

Finally, an EMP for the unlikely event that the water becomes contaminated will also be provided in the permit application. If at some point during the Project the water fails to meet certain parameters or there is a risk that the source becomes contaminated, then the contingency plan would likely be to bring bottled water to site temporarily until the system is stabilized or restored. For example, turbidity levels over the course of the year would involve adjustment of the treatment as for any water system. Given these provisions, the focus of this drinking water assessment is on surface water rather than groundwater.

Country Foods

Because spills and all associated affected soils will be cleaned up, there is no potential for such spills to affect the quality of country foods during all Project phases. Thus, the extent of this effect is considered negligible.

The soils and overburden materials management plan (Section 13.8) indicates that upon closure the soils and overburden used for reclamation will be of similar quality to baseline levels for all Project components. Thus, no effects to soils upon reclamation are predicted. Subsequently, there would be no effects to country foods from changes in soil quality.

During transmission line operation, vegetation will be mechanically managed (i.e., slash methods) rather than managed chemically (i.e. only those sites where eliminating or containing target species by mechanical methods cannot be successfully achieved will undergo chemical control.). Thus, no effects to the quality of soil or country foods are predicted along the transmission line during operations.

Airborne deposition of contaminants from mine operations including the tailings impoundment is not predicted because of the low winds in the Project area (Section 8.2).

Because of the many variables that affect metals uptake into wetland vegetation, it is not possible to model what the concentrations of metals in wetlands vegetation will be in the TSF at closure and post-closure. Subsequently, an adaptive management plan is proposed to ensure that country food wildlife species are not exposed to metals levels that could pose unacceptable human health risks to people who consume the wildlife (Sections 13.10 and 14.7 through 14.10).

Following mitigation, the only potential residual effects on human health from country foods will be from wildlife that incidentally ingest affected soil and water in the TSF and soil near the low grade ore stock pile during operations. Monitoring and adaptive management will ensure that no unacceptable health effects occur from country foods quality upon closure and post-closure.

12.5.8 Land and Resource Use

First Nations land and resource use activity (i.e., hunting, fishing, trapping, and cultural activities) in the Project area was identified as an interest during community consultation and land use baseline research. Pertinent details of the land and resource use baseline are summarized in Section 7.18 of the Application, including existing management approaches, forestry, mineral tenures, angling, guide outfitting, access, hunting, and trapping.

The land and resource use effects assessment does not consider the interaction between individual activities associated with the Project and land uses. Instead, it focuses on the overall aspect of each Project component, including the mine site (and associated infrastructure) and access routes, transmission line, and human resources (e.g., mine personnel).

Valued Environmental Component Selection

Land and resource use was selected based on the Project's TOR, outcomes of community consultation efforts, values documented in the Morice Land and Resource Management Plan

(LRMP), information contained in the *Morrison Copper/Gold Project Land and Resource Use Baseline Study* (Appendix 28), and professional knowledge and experience.

Table 12.5-6 presents an overview of the VECs selected for the Morrison land use effects assessment.

Table 12.5-6
Description of Selected VECs for Land and Resource Use

VEC	Description	Identified by	Link to Project
Access	Access to land in the vicinity of the Project is supported by a network of forest service roads (FSR) and Lake Babine, and is valued for a variety of recreational, business, and subsistence purposes by a variety of groups, including Lake Babine Nation and non-Aboriginals.	Tenure holders Professional judgement Government agencies	The existing access road
Quality of Experience	Both Aboriginal and non-Aboriginal land users and tenure holders value the quality of remote activities and experiences in and around the Project site. Various aspects of the environment may be affected by activities and infrastructure associated with the Project, including aesthetic changes such as noise, dust, and visual quality.	Lake Babine Nation Tenure holders Professional judgement	Mine operations, transmission line, traffic and other industrial activities.
Quantity of Resources	The abundant natural resources, including wildlife, fish, and vegetation available in and around the Project area, are valued by land users and tenure holders alike. The Project may affect the quantity of these resources and the ability of stakeholders to harvest from the area.	Lake Babine Nation Tenure holders Professional judgement	Interaction of and effects on wildlife, fish, and vegetation with mine facilities, transmission line, haul route.
Cultural Value of Land	Lake Babine Nation values the area in and around the Project for cultural reasons related to their potlatch system, their treaty, and the longevity of the use and knowledge of the land from generation to generation. Non-Aboriginal people also value the area for its history.	Lake Babine Nation Professional judgement	The Project is located in an area valued for a variety of subsistence, historic, and cultural uses.
Land Management Objectives	The Project lies within the Morice LRMP, which include a number of biophysical and socio-economic goals and objectives.	Government agencies	Development of the mine site, transmission line, and haul route overlaps with the boundary of the Morice LRMP.

Potential Effects on Land and Resource Use for First Nations

Members of the Lake Babine Nation, especially those from Old Fort and Fort Babine, currently use the FSRs to access the area for cultural and traditional activities, including hunting, trapping, and plant gathering. Although the level of Lake Babine Nation use of the Project area is not documented, outcomes of community consultation activities and land use baseline studies

provide descriptions and details of past and contemporary use. The following summarizes the key effects concerning land use as they related to First Nations interests:

Access: depending on the Project phase, there may be potential for change in access to areas in which they participate in land use activities near the Project. Operations and post-closure phases will improve access, which will be moderately beneficial in effect. Conversely, construction and closure may diminish access because of road closures, which constitutes a minor adverse effect.

Increased third-party access: this is of particular concern to members of Lake Babine Nation, who wish to maintain the remote wilderness environment and protect culturally sensitive areas and cultural heritage sites. This effect is predicted to be minor adverse during all Project phases.

Increased Road Hazards: employee and heavy industrial traffic may pose risks during construction and closure phases, when mine equipment will be moved to and from the mine site, and road construction will be in progress. Effects are expected to be minor adverse during these phases and moderate adverse during operations.

Traplines: registered trapline tenure boundaries with the Project area are owned by members of the Lake Babine Nation. One trapline tenure area intersects with the Project's access road and a portion of the transmission line, while the other overlaps with the mine site. Both traplines have remained unused in the last three and ten years. Because access to traplines has not occurred for several years, access methods are unknown. Trapping activity, when it was prevalent, was concentrated in the winter months and focused primarily on marten. Should First Nations individuals decide to actively trap again, improved access described above would result in negligible benefit and diminished access would be adverse to a negligible degree.

Trapline holders may be affected, but only to a negligible degree from increased third-party access to the Project area and increased road hazards as described above.

Traditional Land Use Practice: With respect to Project-related employment, Lake Babine Nation land users may experience both an increase and/or decrease in their ability to undertake traditional land use activities, depending on the Project phase.

Members of the Lake Babine Nation, who are employed at the mine, may enjoy an increase in their annual salary, allowing them to purchase land use-related equipment (e.g., all-terrain vehicles (ATVs), skidoos, hunting gear, and boats) as well as fuel to support access to traditional land use activities. This is expected to provide a moderate beneficial effect to Lake Babine Nation mine employees during construction and operations.

Conversely, Lake Babine Nation participation in traditional use may be impeded by employment scheduling considerations and requirements. Some seasonal traditional use activities occur over several weeks and require extensive travel and/or preparation and follow-up. The salmon harvest is a significant cultural event and many Lake Babine Nation members set aside several weeks to participate in the harvest to capture a year's supply of salmon for family and community members. Given the work shift rotation, Lake Babine Nation Project employees may be impeded in their ability to take part in these important seasonal activities. This is expected to

have a moderate adverse effect on Lake Babine Nation members employed at the mine during construction and operations.

During closure and post-closure Project phases, the loss of mine-related income for Lake Babine Nation employees may hinder their ability to participate in traditional use activities. Over the Project's 21-year operations phase, Lake Babine Nation employees may have grown accustomed to the relatively high income levels related to working at a mine. At closure, the effect of the income loss may cause a minor adverse effect on Lake Babine Nation employees.

Consideration of Land and Resource Use Interest: Mitigation and Management Plans

Discussions between PBM and the Lake Babine Nation are ongoing and will involve developing agreements that address the effects identified above. Although exact outcomes will depend on the priorities and objectives of each party and therefore cannot be fully anticipated, the following components may be included in such agreement and commitments:

- Support for continued Lake Babine Nation TU/TEK studies, cultural monitoring, and management linked to cultural sites, country foods, and archaeology.
- Compensation where appropriate for the loss of lands to participate and practice constitutionally protected rights to traditional uses, such as hunting, fishing, and vegetation gathering.

12.5.9 Socio-economics

A wide range of inter-dependent aspects of the human environment are considered when assessing the potential socio-economic effects of a project on the surrounding communities and region. Such aspects include population and demographics, community well-being, programs and services, health and safety, housing, economic stability, infrastructure, and socio-cultural identity and sustainability. Through preliminary issues scoping and community consultation, the Lake Babine Nation demonstrated interest in economic development, employment, training and skill development.

As the Project area is within the asserted traditional territory of the Lake Babine Nation, the First Nation as a whole is considered in addition to the Nation's individual communities of Fort Babine, Old Fort, Tachet, Donald's Landing, and Woyenne.

Valued Environmental Component Selection

VSECs are issue and interest-based human environment elements valued by members of communities in the Project's study area. Table 12.5-7 lists and describes each VSEC included in the socio-economic effects assessment and how it was identified.

Potential Effects on Socio-economics for First Nations

All socio-economic effects pertain to human resources and the need for a labour force to develop the Project through each phase of its life. Numerous effects were identified throughout the socio-economic effects assessment. Those identified by the Lake Babine Nation—employment, training and skills development, and economic and business development—are the focus of this

section (comprehensive supporting details are found in Section 8.19 of the Effects Assessment of the Application).

Table 12.5-7
Summary of Valued Socio-economic Components

VSEC	Description	Identification Source
Employment and income opportunities	Opportunities related to direct and indirect hiring, salaries, and wages of Project's workforce.	First Nations, public, and issues scoping
Education, skills, and training	Increased opportunities for and achievement of education and training necessary to obtain employment related to the Project, and/or the potential for skills development on the job. Also considers existing skill levels available in the study area, and how these may be enhanced.	First Nations, public, and issues scoping
Business opportunities and economic development	Direct, indirect, and induced business opportunities and economic development resulting from goods and services required for the Project.	First Nations, public, government, and issues scoping
Cultural identity and sustainability	Ways of being, thinking, and acting valued and expressed by distinct cultural groups such as First Nations.	First Nations issues scoping
Community well-being	Quality of life and health of community members and community as a whole.	First Nations, public, government, and issues scoping
Population and demographics	Changes in population size and demographic profiles resulting from in-migration of workers to study communities (i.e., related to direct, indirect, and induced employment, business opportunities, etc.).	Public and issues scoping
Services and infrastructure	Changes in the demand and/or competition for goods, services, and community amenities and resources, including tax revenue allotment.	Public, government, and issues scoping
Land-based livelihoods	Environmental degradation associated with the Project's activities may indirectly affect surrounding businesses that cater to clients wanting wilderness and/or hunting experience (i.e., wilderness lodge and hunting camp on Morrison Lake).	Public, stakeholders, and issues scoping

Increase in employment and income: During construction and operations, Lake Babine Nation community members are predicted to experience an increase in employment and income through direct workforce hiring, indirect supplier hiring, and induced hiring in response to new consumption from employee wages. The level of employment and income increases for each community is contingent on education, training, and skill development that are discussed in this section. Conversely, community members will experience a decrease in employment and income upon the mine's closure and decommissioning.

The effects of decommissioning and post-closure are projected to be beneficial to a negligible extent in all of the study communities, because of the small workforce requirements during these phases. However, in general, termination of employment and decreases of income for Lake Babine Nation members employed at the mine will be adverse to a moderate extent at the closure and decommissioning phases.

Education, Skills and Training: During construction and operations there will be an overall increase in skills base for the Lake Babine Nation communities. To benefit from the employment opportunities the mine will afford, there is an anticipated increase in incentive for community members to pursue education and in turn, a demand for mining specific training and skill development programs.

These effects will be beneficial to a moderate extent in the Lake Babine Nation communities. A major development such as the Project presents a positive opportunity for First Nation youth in the area to develop their skills and employment potential, provided that the relevant training and education is available and accessible (this topic is addressed in subsequent sections). Conversely, there will be a decreased demand for training and skill development resources upon the mine's closure.

Business Opportunities and Economic Development: demand from the Project and its employees for goods and services are anticipated to provide local suppliers with business opportunities throughout the life of the mine.

Larger service centres in the Project's study areas will experience moderate benefits from the Project. Smaller communities (e.g. such as the Lake Babine Nation communities, Topley Landing, Smithers Landing, Topley, and Telkwa) will experience an increase in business opportunities and economic development to minor extent as existing businesses typically have a small base of potential employees and customers, with fewer resources at their disposal to capitalize on new demand.

The converse of this effect will apply at the mine's closure, as the overall number of supply contracts will decline between construction and operations and again between operations and decommissioning/post-closure. A decrease in business opportunities is considered adverse to a minor extent in the lake Babine Nation communities.

Overall, the Project is expected to create direct, indirect, and induced demand for goods, services, and employees, helping to drive economic development. This beneficial effect will predominantly be felt at a regionally to a moderate extent.

Consideration of Socio-economic Interest: Mitigation and Management Plans

Mitigation measures specific to socio-economics were designed to enhance the beneficial effects identified of the Project.

Detailed mitigation and enhancement measures are further elaborated in the Project's Social Management Plan (SMP) in Chapter 13. This section provides an overview of the proposed

mitigation/enhancement measures in the SMP as they pertain to the socio-economic interests identified by the Lake Babine Nation.

Employment and income: a human resources manager will be hired who will implement local hiring practices with an aim to hire a minimum of 30% or more employees from local communities. PBM will support ongoing opportunities for employees (particularly Lake Babine Nation youth and recent graduates) to obtain apprenticeships, mentorships, and on-the-job training associated with the Project, and career counselling services.

Education training and skills development: PBM will partner with local educational institutions and government agencies to provide skills development and training programs. This includes supporting local and regional mining education programs by enabling trained and experienced employees to provide guest lectures, etc., to students, linking studies with real employment opportunities. Additionally, PBM will fund scholarships, bursaries, and awards for local students. Finally, apprenticeships and mentorship programs will be developed to provide supported on-the-job training.

Economic development and business opportunities: before the Project's development, PBM's human resources manager will coordinate information sessions and job/business fairs, providing local residents with a contact person to discuss all matters related to employment, training, and business contracts; as well as the requirements for obtaining these positions. PBM will support and partner with local economic development associations and support local initiative wherever possible. And finally, in general, PBM will provide clear information on the timelines of contract work so that local businesses and service providers may further benefit from these opportunities, including establishing a local community sustainability advisory committee to collaborate on economic sustainability initiatives.

12.5.10 Air quality

The topic of climate change was raised during community meetings. Specifically, questions regarding how global warming would affect environmental effects from the Project and conversely, how the Project would affect climate change. Extensive air quality baseline studies and ongoing monitoring was used to predict effects on air quality. The following focuses on the effects as they pertain to the Lake Babine Nation's interests in climate change.

Valued Environmental Component Selection

Air quality was selected as a VEC because of its importance to the health of employees and surrounding community residents, wildlife, vegetation, and water quality. Air quality is also considered for its aesthetic qualities in terms of visibility and odour. In addition, air quality issues can extend to regional and global scales to include potential acidic depositions (acid rain) and climate effects (global warming). These last two issues are those identified by the Lake Babine Nation.

There will be emissions during the Project construction, operations, and decommissioning and closure phases comprising diesel emissions from trucks, ventilation systems, and fugitive dust from drilling and blasting and traffic on unpaved roads.

Potential Effects on Socio-economics for First Nations

Potential air quality effects stem from activities associated with different Project components. This includes the mine site and loadout, plant site, access road, utilities, and tailings impoundment and the different Project phases. The assessment considers air quality effects from the Project as a whole instead of as contributed by individual components.

Potential effects on ambient air quality entails reduced visibility and increased concentrations of criteria air contaminants (CACs). The Project components that consume fuel will affect air quality through emissions, which may increase the ambient concentrations of SO_2, NO_2, CO, and PM_{10} and $PM_{2.5}$. Finally, mine-related traffic along paved and unpaved roads and mine blasting will produce fugitive dust, which also increases PM concentrations.

A description of air quality modelling results and details regarding the effects on air quality can be found in Section 8.3.

Consideration of Air Quality-Climate Change Interest: Mitigation and Management Plans

To mitigate, manage, and monitor air quality-related effects and specifically, the issue of climate change, the topic was addressed in five different chapters in the EA application:

1. Section 8.2 Climate and Meteorology estimates the Project's greenhouse gas (GHG) emissions and compares it to regional, provincial, and national totals and mining industry averages. The significance of the climate assessment (operations phase) after mitigation was rated as minor adverse.
2. Section 10.1 Extreme Weather Events addresses the effects of climate change on the future Morrison weather patterns.
3. Section 10.2 Forest Fire Risk makes the connection between climate change and increased forest fire risk.
4. Section 10.4 Climate Change Risk describes the effects of the environment on the Project with respect to climate change.
5. Section 13.2 is the environmental management plan for air emissions and fugitive dust and contains PBM's strategies to minimize air emissions and hence the effects of climate change.

12.6 Yekooche Nation Interests and Considerations

Approximately 4.5 km of the proposed transmission line is within the asserted Yekooche First Nation's traditional territory. As such, Pacific Booker Minerals, as directed by the BC EAO, has engaged, consulted and shared project information with the Yekooche First Nation. Table 12.6-1 summarizes the issues and interests raised by the Yekooche Nation and how PBM addressed them.

All issues and interests raised by the Yekooche were considered throughout the EA process through information distribution initiated by either the EAO or PBM; consultation and by the multiple disciplinary studies that were conducted to predicts impact on the environment, land and its resources from the Project. Sections 12.5.3 to 12.5.10 outlined above describe how the

overall eco-system and First Nations interests were considered through the various mitigation and management plans developed.

Table 12.6-1
Yekooche Nation Issues Identification and Resolution: Summary

Description of Issue Raised by Yekooche First Nation	Activity or Response to Address Issue	Status
Project information requested to understand scope of Project.	Project Description sent to Yekooche First Nation.	Resolved
Information requested on the extent of the Project and amount of overlap with Yekooche asserted traditional lands.	PBM prepared a Project map showing where the proposed transmission line intersects asserted Yekooche traditional lands. Map sent to Yekooche Nation.	Resolved
Yekooche Nation to remain on PBM mailing list for Project information bulletins.	Yekooche Nation added to PBM master contact list.	Resolved
Yekooche Nation interested in employment opportunities related to the Project.	PBM committed to hiring, training, and mentoring First Nation members as outlined in the Socio-economic mitigation and social management plans.	Resolved
Yekooche Nation requested information on baseline studies related to their traditional territory.	Baseline studies provided to Yekooche First Nation.	Resolved
Yekooche Nation to be informed of results of the cumulative effects assessment for the Project.	PBM has committed to providing information on cumulative effects assessments to Yekooche when the Application is completed.	Pending Application completion

In regards to employment interests identified by the Yekooche, PBM will commit to hiring local First Nations as well as supporting education, training and skill development programs to increase capacity amongst local First Nations communities.

12.7 Summary

Lake Babine Nation and Yekooche Nation interests were identified through community engagement, consultation, and environment and socio-economic baseline studies over the course of three years. These interests pertained to 10 disciplinary areas and linked to relevant VECs and VSECs to determine the effect of those interests.

An overview of each discipline's mitigation, management, and monitoring were provided to demonstrate how the Lake Babine Nation's interests were considered and ultimately, how effects identified were minimized or avoided.

In addition to implementing environmental and social mitigation, management, and monitoring plans, commitments and ongoing community involvement and consultation will take place over the course of the mine's life (as described in Section 13.12 and Section 18.1 in the Application). PBM is committed to incorporating the Lake Babine Nation's interests into the Project to optimize its environmentally and socially sustainable development.