

RED MOUNTAIN UNDERGROUND GOLD PROJECT

VOLUME 4 | CHAPTER 27

NISGA’A NATION

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27 NISGA'A NATION

27.1 Introduction

This chapter summarizes the relevant information of the Project's effects assessment for Nisga'a Nation. This chapter includes:

- Background information and context regarding Nisga'a Nation and the relevant requirements of the Nisga'a Final Agreement (NFA);
- A summary of past and planned consultation activities between IDM Mining Ltd. (IDM) and Nisga'a Nation;
- An assessment of environmental effects on residents of Nisga'a Lands, Nisga'a Lands, and Nisga'a interests, pursuant to Chapter 10, paragraph 8(e) of the NFA;
- An assessment of the effects of the Project on the existing and future economic, social, and cultural well-being of Nisga'a citizens, pursuant to Chapter 10, paragraph 8(f) of the NFA;
- A summary of any other matters of concern to Nisga'a Nation as expressed to IDM; and
- An issue summary table that identifies Nisga'a Nation's key interests and concerns, including information relating to both paragraphs 8(e) and 8(f) of the NFA, including measures to avoid, reduce, or mitigate potential adverse effects.

Several other chapters have informed the assessments in this chapter, including:

- Air Quality Effects Assessment (Chapter 7);
- Noise Effects Assessment (Chapter 8);
- Vegetation and Ecosystems Effects Assessment (Chapter 15);
- Wildlife and Wildlife Habitat Effects Assessment (Chapter 16);
- Fish and Fish Habitat Effects Assessment (Chapter 18);
- Economic Effects Assessment (Chapter 19);
- Social Effects Assessment (Chapter 20), including Commercial, Recreational, and Aboriginal Fisheries and Visual Quality; and
- Human Health Effects Assessment (Chapter 22).

27.1.1 Information Sources

This chapter is a summary of information compiled from other chapters in the Application for Environmental Certificate and Environmental Impact Statement (Application/EIS), provincial and federal databases, and from other EAs in the region, including the Kitsault Mine Project, Kerr-Sulphurets-Mitchell (KSM) Mine Project, Brucejack Mine Project, Prince Rupert Gas Transmission (PRGT) Project, and Westcoast Connector Gas Transmission Project.

Other information has been gathered from literary sources, online sources, and statistical information collected and made available by provincial and federal agencies.

27.2 Background and Context

27.2.1 Regulatory and Policy Setting

27.2.1.1 Nisga'a Final Agreement

In 1887, chiefs from Nisga'a Nation travelled to Victoria, BC, to discuss their Aboriginal title to lands in and around the Nass Valley (Nisga'a Lisims Government, no date). Although they were turned away by the BC Premier at the time, they continued their undertaking for recognition for 113 years, finally achieving the ratification and royal assent of the *Nisga'a Final Agreement Act* (Bill 51) in 2000 (Nisga'a Lisims Government, no date). The Nisga'a Final Agreement (NFA) is a treaty and land claims agreement, within the meaning of sections 25 and 35 of the *Constitution Act, 1982*, and is a tri-partite agreement between Nisga'a Nation, Canada, and BC.

Subsequently, the number 113 has become politically significant for Nisga'a Nation: it is the number of the provincial highway that links the Nass Valley with Terrace and is symbolically represented in the architecture and decoration of the Nisga'a Lisims Government (NLG) building and the Wilp Si'ayuukhl Nisga'a (WSN), the Nisga'a legislative body (Personnal Communication with M. Griffin, 2016).

The NFA confirms Nisga'a Nation's right to self-government, grants NLG the authority to make laws, and grants a number of Treaty rights for Nisga'a Nation and Nisga'a citizens over lands and resources (Nisga'a Lisims Government, no date).

The NFA divides Nisga'a Nation's treaty lands into four main categories:

- Nisga'a Lands, which comprise of approximately 1,992 square kilometres (km²) of land in the Nass Valley that Nisga'a Nation owns in fee simple. Nisga'a Nation owns all mineral resources on or under Nisga'a Lands, all submerged lands within Nisga'a Lands, and all forest resources on Nisga'a Lands;
- Category A and B Fee Simple Lands, which are lands outside of Nisga'a Lands that Nisga'a Nation owns in fee simple;

- The Nass Area, 28,838 km² of land where Nisga'a Nation holds Treaty rights to harvest and manage migratory birds; and
- The Nass Wildlife Area, 16,101 km² of land nested within the Nass Area where Nisga'a Nation holds Treaty rights to harvest and manage wildlife (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

These areas are represented in Figure 27.2-1. The Project is within the Nass Area and the Nass Wildlife Area and is not within Nisga'a Lands. Nisga'a Nation's Treaty rights to harvesting and managing fish, wildlife, and migratory birds within the Nass Area and the Nass Wildlife Area are set out in Chapters 8 and 9 of the NFA.

Chapter 8 of the NFA identifies Nisga'a Nation's treaty rights to harvest fish and aquatic plants (the Nisga'a fish entitlements), subject to measures that are necessary for conservation and legislation enacted for the purposes of public health or public safety. Notwithstanding the Nisga'a fish entitlements, Chapter 8 describes the Nisga'a fish allocation that is set out as a percentage of the total allowable catch. Nisga'a fish entitlements and fish allocations include:

- Nass salmon (i.e., chinook, chum, coho, sockeye, and pink salmon originating in the Nass Area);
- Nass steelhead (i.e., summer and winter runs originating in the Nass Area); and
- Non-salmon species and aquatic plants in the Nass Area (for domestic purposes), including:
 - Dungeness, tanner, and king crab;
 - Halibut;
 - Prawns and shrimp;
 - Herring;
 - Aquatic plants used in the herring roe-on-kelp fishery (i.e., all marine and freshwater plants, including kelp, marine flowering plants, benthic and detached algae, brown algae, red algae, green algae, and phytoplankton);
 - Eulachon; and
 - Intertidal bivalves.

Nisga'a fish entitlements and fish allocations are not based on traditional past or current use.

Chapter 8 of the NFA also outlines NLG's authority to enact conservation and public health and safety legislation with respect to fish and aquatic plants and to participate in the general commercial fishery. The chapter establishes the structure and processes necessary for NLG

and the Minister responsible for the management of fisheries and fish habitat to co-manage the conservation and harvest of fish and aquatic plants (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

Chapter 9 of the NFA identifies Nisga'a Nation treaty rights to harvest wildlife and migratory birds in the Nass Wildlife Area and Nass Area, respectively, and to enact conservation and public health and safety legislation with respect to wildlife and migratory birds. Nisga'a citizens have the right to harvest any wildlife species that is not designated in accordance with the NFA for domestic purposes. For species that are designated, Nisga'a citizens have the right to harvest that designated species in accordance with the wildlife allocation, which is determined in accordance with the formula set out in the NFA. Wildlife species designated under the NFA are moose, grizzly bear, and mountain goat. Chapter 9 of the NFA also addresses responsibilities regarding trapping and guide outfitting and the management and trade (barter and the sale) of marine wildlife (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

Chapter 10 of the NFA identifies the requirements relevant to the environmental assessment of proposed activities within lands identified under the NFA. Paragraph 8 specifically sets out the required activities to be conducted in addition to the relevant environmental assessment legislation for a given proposal. The activities include:

- 8(a): coordinating, to the extent possible, the environmental assessment requirements placed by the Parties upon a project proponent;
- 8(b): requiring the project proponent to provide information or studies, as appropriate, about the project, its potential environmental effects, and the measures that can be taken to prevent or mitigate those effects;
- 8(c): ensuring that all information relevant to the assessment of the project is available to the public, other than information that is required to be kept confidential under applicable law;
- 8(d): providing for public participation in the assessment process, including public notice of the project, an opportunity to make submissions, and, when deemed appropriate by the Party conducting the assessment, public hearings conducted by an independent review panel;
- 8(e): assessing whether the project can reasonably be expected to have adverse environmental effects on residents of Nisga'a Lands, Nisga'a Lands, or Nisga'a interests (as set out in the NFA) and, where appropriate, make recommendations to prevent or mitigate those effects;
- 8(f): assessing the effects of the project on the existing and future economic, social, and cultural well-being of Nisga'a citizens who may be affected by the project;
- 8(g): setting out time periods within which the assessor must make its recommendation in respect of whether or not the project should proceed;

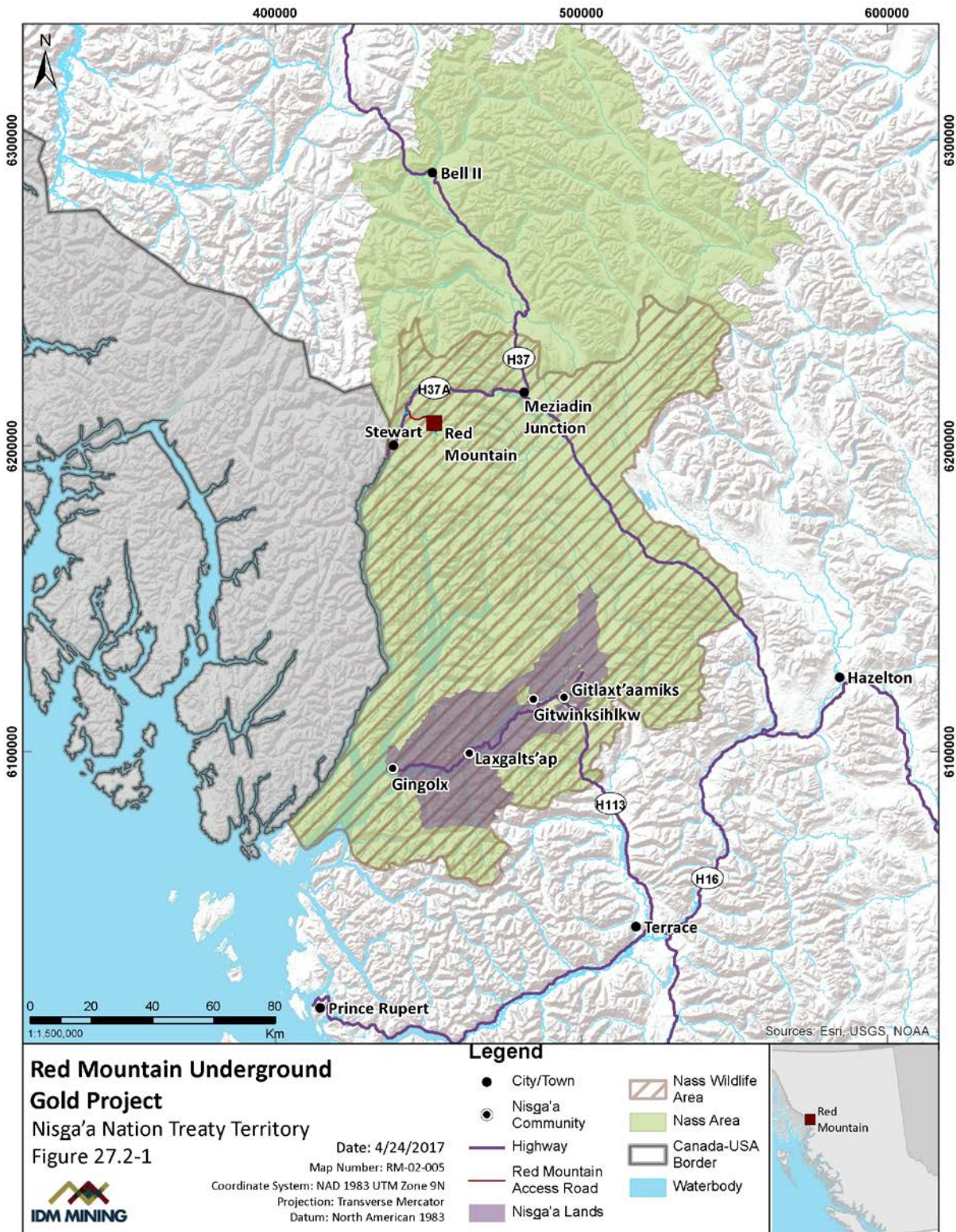
- 8(h): providing recommendations, based on the assessment, to the Party or Parties with decision-making authority over the project, in respect of whether the project should proceed;
- 8(i): taking into account any agreements between the project proponent and Nisga'a Nation or a Nisga'a Village concerning the effects of the project; and
- 8(j): requiring the assessment to be conducted and completed by a Party before that Party issues final approval (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

Through the Section 11 Order issued by the BC Environmental Assessment Office (EAO) and the Guidelines for the Preparation of an Environmental Impact Statement pursuant to the *Canadian Environmental Assessment Act, 2012* (the EIS Guidelines) issued for the Project by the Canadian Environmental Assessment Agency (the Agency), each discussed more below, certain procedural aspects of consultation have been delegated to IDM. These aspects include:

- Consultation with Nisga'a Nation, as represented by NLG, as outlined in paragraph 8(b);
- The assessments under paragraphs 8(e) and 8(f); and
- Consideration of agreements between IDM and Nisga'a Nation entities, as outlined in paragraph 8(i).

All of these aspects are included in this chapter of the Application/EIS.

Figure 27.2-1: Nisga'a Nation Treaty Territory



27.2.1.2 BC Environmental Assessment Act

The Project is reviewable under the *BC Environmental Assessment Act* (BCEAA). Section 11 of the BCEAA states that the executive director, when determining the scope of the assessment and the procedures and methods for conducting the assessment, may also specify “the persons and organizations, including but not limited to the public, first nations, government agencies and, if warranted in the executive director's opinion, neighbouring jurisdictions, to be consulted by the proponent or the Environmental Assessment Office during the assessment, and the means by which the persons and organizations are to be provided with notice of the assessment, access to information during the assessment and opportunities to be consulted,” (Government of BC, 2002). Pursuant to this, EAO issued a Section 11 Order for the Project in February 2016.

Nisga’a Nation is listed on Schedule B of the Section 11 Order, signifying that EAO will invite Nisga’a Nation to participate in the Advisory Working Group established to review the Project and that EAO will delegate procedural aspects of consultation with Nisga’a Nation to IDM. Paragraph 12.3 of the Section 11 Order lists the procedural aspects of consultation that have been delegated to IDM, including:

- The preparation of an Aboriginal Consultation Plan that will guide consultation activities with the Nisga’a Nation during the Pre-Application and Application Review Stages of the assessment and will be provided to Nisga’a Nation for review and comment prior to finalization;
- Providing copies of the Application/EIS to Nisga’a Nation for information and consultation purposes;
- Identifying any potential effects on Nisga’a interests under the NFA that are raised by Nisga’a Nation and identifying measures to avoid or mitigate such potential adverse effects and/or to otherwise address or accommodate the concerns of Nisga’a Nation, as appropriate; and
- As directed by the Project Assessment Lead, providing a response to comments received from Nisga’a Nation, to the satisfaction of and within the timeframe specified by the Project Assessment Lead; and
- Within time limits set by the Project Assessment Lead, providing to the Project Assessment Lead and Nisga’a Nation a written summary report of agreements, if any, reached with the Nisga’a Nation within the meaning of paragraphs 8(i) and 10 of Chapter 10 of the NFA.

The Nisga’a Consultation Plan, prepared by IDM in compliance with paragraph 12.3.1 of the Section 11 Order, continues to guide IDM’s consultation efforts with Nisga’a Nation. The Nisga’a Consultation Plan is available on EAO’s Electronic Project Information and Collaboration website (EPIC) at:

<https://projects.eao.gov.bc.ca/p/red-mountain-underground-gold/docs>.

IDM's consultation efforts with Nisga'a Nation are summarized below and are detailed in Aboriginal Consultation Report #1, which is available on the EAO EPIC website for the Red Mountain Project, and Report #2, which is appended to this document (Appendix 27).

27.2.1.3 Canadian Environmental Assessment Act, 2012

The Project is reviewable under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). The Agency issued the EIS Guidelines for the Project in January 2016.

Section 5(1)(c) of CEAA 2012 states that the Environmental Impact Statement must assess, with respect to Aboriginal peoples, the potential changes to health and socio-economic conditions; physical and cultural heritage; the current use of lands and resources for traditional purposes; and any structure, site or thing that is of historical, archaeological, paleontological, or architectural significance that may be caused by changes to the environment caused by the Project (Government of Canada, 2012). The EIS Guidelines amend this slightly for Nisga'a Nation, stating that, as expressed by the NLG, the assessment of potential effects on the current use of lands and resources for traditional purposes does not apply to Nisga'a Nation (Canadian Environmental Assessment Agency, 2016).

A key objective of CEAA 2012 is to promote communication and cooperation with Aboriginal peoples, which includes First Nations, Inuit, and Métis. The proponent is expected to engage with Aboriginal groups that may be affected by the Project as early as possible in the Project planning process. The proponent will provide Aboriginal groups with opportunities to learn about the Project and its potential effects, make their concerns known about the Project's potential effects, and discuss measures to mitigate those effects. The proponent is strongly encouraged to work with Aboriginal groups in establishing an engagement approach. The proponent will make reasonable efforts to integrate traditional Aboriginal knowledge into the assessment of environmental impacts.

The EIS Guidelines further outline the consultation activities and objectives IDM will conduct with Nisga'a Nation, including meeting with Nisga'a Nation and making key summary documents available and accessible to Nisga'a Nation.

The EIS Guidelines require that IDM prepare, in consultation with Nisga'a Nation, a work plan outlining how it will address the 8(e) and 8(f) assessments required under the NFA. During IDM's consultation with Nisga'a Nation, Nisga'a Nation expressed a preference for all relevant information about the methodology of the 8(e) and 8(f) assessments to be included in the Project's Application Information Requirements (AIR). The Agency agreed with this approach and it was implemented by IDM.

27.2.2 Nisga'a Nation Cultural Setting

27.2.2.1 Ethnographic Background

Nisga'a Nation are part of the Tsimshian ethno-linguistic group, along with the Gitksan First Nation, Coast Tsimshian (Kitselas and Kitsumkalum First Nations), and Southern Tsimshian (Lax Kw'alaams Band, Metlakatla First Nation, Haisla Nation, Gitga'at First Nation, and

Gitxaala Nation) (Halpin & Seguin, 1990). Nisga'a Nation is centered along the Nass Valley, approximately 90 kilometres (km) from the Project.

Nisga'a Nation, like other Tsimshian groups, is divided into four, exogamous matrilineal *pdeek* (clans), and each *pdeek* has two major crests:

- Ganada: Raven/Frog;
- Laxgibuu: Wolf/Bear;
- Gisk'aast: Killer Whale/Owl; and
- Laxsgiik: Eagle/Beaver (Nisga'a Lisims Government, no date).

Pdeek are further divided into matrilineal *wilp* (houses) (Nisga'a Lisims Government, no date). The clans' primary function is to regulate marriage and to serve as a way of integrating house groups in an exchange system that joins Nisga'a Nation with other Tsimshian groups (Inglis, Hudson, Rigsby, & Rigsby, 1990). The houses control territories and resources (Inglis, Hudson, Rigsby, & Rigsby, 1990).

There are approximately 65 houses in Nisga'a Nation (Inglis, Hudson, Rigsby, & Rigsby, 1990). A house owns territories for hunting, fishing, and gathering (its *ango'oskw*) as well as songs, dances, stories, and crests (its *adaawak*) (Nisga'a Lisims Government, no date). As stated by Sterritt et al. (1998), "At the foundation of ... Nisga'a society lies the inalienable and exclusive title of each house to its territories and resources." Houses are led by a *sim'oogit*, a hereditary chief who is the highest-ranking individual in the house (Halpin & Seguin, 1990). Houses can vary widely in size: some are small and must resort to adoption (Halpin & Seguin, 1990), while some are so large that they are split into two or three smaller houses, each named for the highest ranking chief (Nisga'a Lisims Government, no date). These related houses are called *wilnaat'ahl* (those of the same kind) (Nisga'a Lisims Government, no date).

A house's *adaawak* are the traditional histories about Nisga'a Nation, the Nass Valley, and the ancestors of the house itself, going back to time immemorial (Nisga'a Lisims Government, no date). The *adaawak* describe a house's territory, "major events in the life of the house, such as natural disasters, epidemics, war, the arrival of new peoples, the establishment of trade alliances, and major shifts in power. The [*adaawak*] also contain *limx'oy*, ancient songs that refer to events in which the people endured great hardship or loss" (Sterritt, Marsden, Galois, Grant, & Overstall, 1998). Some belong to all Nisga'a citizens, while some are the private property of a house and may only be told by members of that house (Nisga'a Lisims Government, no date). A house's *adaawak* is under the control and stewardship of the *sim'oogit* (Halpin & Seguin, 1990) and gives the *sim'oogit* legitimate title to the *ango'oskw* (Nisga'a Lisims Government, no date). The *adaawak* "is taught to other people in line for the *sim'oogit* name and related publically at feasts by a rightful teller as a means of legitimizing the transfer of the *sim'oogit* name and the *ango'oskw* attached to it" (Nisga'a Lisims Government, no date).

Feasts are the ceremonial mechanism by which status and authority are formally assumed and reiterated (Rose, 2000). Gifts are given to guests, who serve as witnesses to the bestowal of noble titles, crests, and ceremonial rights, in accordance with the rank of the guest and to show the wealth of the feast-giver (Rose, 2000).

27.2.2.2 Ayuukhl Nisga'a and Common Bowl

The oral code for the Nisga'a social systems and the rules for the appointment of resources are embodied in the *Ayuukhl Nisga'a* (Rose, 2000). Nisga'a citizens see their *Ayuukhl Nisga'a* as a "complicated body of traditional knowledge which holds their true laws and which serves as a source of guidance for younger generations of Nisga'a," (Griffin, 2008). Traditional law regulates property access and sharing, such as the concept of the Common Bowl discussed below, as well as social and cultural practices. *Ayuukhl Nisga'a* is integrated with NLG's operations and, in accordance with the Nisga'a Constitution, the Council of Elders advises NLG on matters relating to traditional values (Nisga'a Lisims Government, no date).

Nisga'a Nation manages land and resources in accordance with the Common Bowl philosophy (*sayt k'il'hl wo'osihl Nisga'a*). The Common Bowl is the principle that Nisga'a lands and resources are common property (Griffin, 2008). The Common Bowl is a concept that has existed in Nisga'a culture since time immemorial and has adapted over time to form the basis the modern NLG administration (Griffin, 2008). The traditional concept is based partly on a collective acknowledgement that some property and resources are shared, while others are owned by individual houses and managed by the house chief for the benefit of the family (Griffin, 2008).

The concept has evolved over time to meet the changing needs of Nisga'a citizens. In order to move forward with the treaty process Nisga'a citizens and leaders recognized that the collective ownership of lands and resources by the Nisga'a Nation were more important than traditional house territories (Griffin, 2008). Today, the Common Bowl is the land under the jurisdiction of the Nisga'a Nation (Griffin, 2008).

27.2.2.3 Cultural Activities and Practices

Fishing

Nisga'a Nation holds Treaty rights to manage and harvest fish species in the Nass Area, including:

- Salmon species, including sockeye, pink, chinook, coho, and chum, originating in the Nass Area;
- Steelhead, both winter and summer runs, originating in the Nass Area; and
- Eulachon (also known as oolichan) within the Nass Area (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

These Treaty rights are regardless of past or current use in the area.

Eulachon are traditionally harvested on the Nass at the end of winter (February to April) (Halpin & Seguin, 1990), and their arrival coincides with Nisga'a Hobiye, the new year (LGL Limited and Nisga'a Fisheries). Eulachon are dried, smoked, or processed to produce eulachon grease, which Nisga'a citizens trade with other Tsimshian groups for herring eggs. Grease was also used to preserve berries, which were highly valued (Halpin & Seguin, 1990).

Nass River Eulachon, which account for approximately 90% of all Eulachon in BC, are a critical food course for Nisga'a citizens and have high social and cultural value (LGL Limited and Nisga'a Fisheries).

Salmon begin to enter the rivers in early summer and, traditionally, Nisga'a citizens moved to house-managed fishing sites where seasonal camps were maintained (Halpin & Seguin, 1990). Each house would control and manage their own fishing sites (Halpin & Seguin, 1990). Chum salmon move up the rivers in early autumn (September and October) and are smoked; its low fat content makes it ideal for preservation (Halpin & Seguin, 1990).

Shellfish, such as cockles, clam, mussels, and abalone, are traditionally harvested in winter on beaches at very low tides (Halpin & Seguin, 1990).

Non-salmon fish, aquatic plants, and marine mammals harvest by Nisga'a Nation include intertidal bivalves, seaweed, halibut, freshwater fish, and sea lion (Prince Rupert Gas Transmission Project, 2014).

IDM biologists have conducted Fish and Fish Habitat baseline surveys to compile baseline aquatic data. Surveys were initiated in 2014 and conducted seasonally through 2016. The scope of the baseline surveys included fish habitat, sediment quality, tissue metal burdens of the invertebrate community, periphyton, benthic macroinvertebrates, and fish communities. Detailed information on the fisheries and aquatics baseline studies conducted can be found in Appendix 18-A. The Fish and Fish Habitat Effects Assessment can be found in Chapter 18.

Hunting

Nisga'a Nation holds Treaty rights to manage and harvest wildlife in the Nass Wildlife Area.

The NFA identifies three species as "designated species" where a Nisga'a wildlife allocation of that species is established and Nisga'a citizens have the right to harvest that designated species in accordance with that Nisga'a wildlife allocation. These designated species are:

- Grizzly bear;
- Moose; and
- Mountain goat (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

These Treaty rights are regardless of past or current use in the area.

Hunting is traditionally undertaken in autumn, when the supply of preserved salmon had been secured and stored (Halpin & Seguin, 1990). Hunters would ask permission of the house chief before hunting on that house's land and taking that house's resource (Halpin & Seguin, 1990).

IDM conducted surveys of key wildlife species, including bird species, from 2015 to 2017. Surveys focused on species presence and, where possible, relative abundance. A combination of ground and aerial surveys were used depending on the focal species. Detailed information on the wildlife baseline studies conducted can be found in Appendix 16-A. The Wildlife and Wildlife Habitat Effects Assessment can be found in Chapter 16.

Migratory Birds

Nisga'a Nation holds Treaty rights to manage and harvest migratory birds for domestic purposes in the Nass area. In the NFA, "migratory birds" are defined as having the same meaning "set out in any federal legislation that is enacted further to international conventions and that is binding on British Columbia, and includes the eggs of migratory birds," (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

PRGT found that waterfowl encompass the majority of migratory birds culturally harvested by Nisga'a Nation, with species including ducks, geese, swans, loons, and grebes previously cited as other important game species (Prince Rupert Gas Transmission Project, 2014). The PRGT 8(e) assessment included waterfowl (diving and dabbling ducks, geese, swans, loons, and grebes), including those species that use freshwater (e.g., lakes, rivers, and wetlands) and marine environments (Prince Rupert Gas Transmission Project, 2014). The PRGT 8(e) assessment also included sooty grouse and ruffed grouse as representative of upland game birds that are harvested by Nisga'a citizens (PRGT Ltd., 2014).

These Treaty rights are regardless of past or current use in the area.

Access

Nisga'a Nation holds Treaty rights to access to lands other than Nisga'a Lands as follows:

- Agents, employees, and contractors of Nisga'a Nation, Nisga'a Villages, Nisga'a Corporations, members of the Nisga'a Police Service, and of Nisga'a Institutions have access to Nass Wildlife Area to carry out their responsibilities; and
- Nisga'a citizens have reasonable access to Crown lands to allow for the exercise of Nisga'a Treaty rights and for the normal use and enjoyment of Nisga'a interests set out in the NFA.

These Treaty rights are regardless of past or current use in the area.

Existing access to the Nass Wildlife Area and to Crown lands is available using public roads and highways, including:

- Highway 113, which connects Terrace to the Nass Valley;
- Nass Road, which connects Laxgalts'ap to Highway 113;
- Gingolx Road, which connects Gingolx to Nass Road;
- The Nass Forest Service Road (colloquially known as the Cranberry Connector), a gravel road that connects Gitlaxt'aamiks directly to Highway 37;
- Highway 37, which runs north from Terrace towards the BC-Yukon border; and
- Highway 37A, which connects Stewart to Highway 37 at Meziadin Junction.

27.2.2.4 Language

The Nisga'a language is mutually intelligible with Gitxsanimaax, the Gitksan language. (Halpin & Seguin, 1990). Both are related to Coast and Southern Tsimshian although the latter two might not have been mutually intelligible (Halpin & Seguin, 1990). Nisga'a and Gitksan peoples may once have spoken Coast Tsimshian for ceremonial purposes (Halpin & Seguin, 1990).

Language revitalization efforts seem to be a priority of the NLG. The Ayuukhl Nisga'a Department of the NLG has been "established to protect, preserve, and promote Nisga'a language, culture, and history. The department works to ensure Nisga'a people are politically, economically, socially, and spiritually healthy and empowered by a thorough understanding of Nisga'a Culture" (Nisga'a Lisims Government, no date).

Nisga'a is taught to all students in the Nass Valley (School District #92) and Nisga'a language courses for adults are available through Wilp Wilxo'oskwhl Nisga'a Institute (WWNI) (Nisga'a Lisims Government, no date). There is also a Nisga'a language app archived at the Online Aboriginal Database, available at FirstVoices.com, which contains 3,875 words and 1,041 phrases in a media-rich, bilingual dictionary (Nisga'a Lisims Government, no date).

The number of Nisga'a language speakers is summarized in Table 27.2-1.

Table 27.2-1: Nisga'a Language Characteristics (2011)

Language Characteristics	Number of People (% of Population)			
	Gingolx	Gitwinksihlkw	Laxgalts'ap	Gitlaxt'aamiks
Total Registered Population	2,008	396	1,798	1,853
English Only	410 (20%)	175 (44%)	380 (21%)	not available
Pop. with Aboriginal languages first learned	273 (13.6%)	90 (22.9%)	519 (28.9%)	not available
Pop. with Aboriginal spoken at home	371 (18.5%)	90 (22.9%)	568 (31.6%)	not available
Pop. with knowledge of Aboriginal lang.	421 (21%)	113 (28.6%)	686 (38.2%)	not available

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

27.2.3 Nisga'a Nation Social Setting

27.2.3.1 Population

Nisga'a citizens live primarily in one of the four Nisga'a Villages in the Nass Valley (Gingolx, Gitwinksihlkw, Laxgalts'ap, and Gitlaxt'aamiks), and citizens also live in Terrace, Prince Rupert/Port Edward, Greater Vancouver, and across North America (Nisga'a Lisims Government, no date).

The four Nisga'a Villages in the Nass Valley are the result of consolidations of other villages following contact with European missionaries (Inglis, Hudson, Rigsby, & Rigsby, 1990). The Village of Aiyansh was established in the late 1800s, but was relocated to Gitlaxt'aamiks (formerly New Aiyansh) in the 1960s after a flood. Anglican missionaries established Laxgalts'ap (formerly Greenville) and Gingolx (formerly Kincolith) in 1864 and 1967, respectively. Gitwinksihlkw (formerly Canyon City) was the last village established and was associated with the Salvation Army Church (Inglis, Hudson, Rigsby, & Rigsby, 1990).

The population of Nisga'a Nation is shown in Table 27.2-2 and the age structure in Table 27.2-3.

Table 27.2-2: Nisga'a Nation Population (Dec 2016)

Residency	Number of People				Total
	Gingolx	Gitwinksihlkw	Laxgalts'ap	Gitlaxt'aamiks	
On Nisga'a Lands	410	182	585	867	2,044
On Other Reserves	70	30	64	47	211
Not on Nisga'a Lands	1,526	184	1,148	939	3,797
Total Registered Population	2,008	396	1,798	1,853	6,055

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

The ethnicity of the Nisga'a Villages in the Nass Valley is homogeneous: in 2006, 92.7% of the population identified as being Aboriginal and 0.5% identified as being a visible minority (BC Stats, 2012b)¹.

¹ Statistics from BC Stats consider individuals who live in the Nisga'a Villages and do not consider Nisga'a citizens who live in other communities, such as Vancouver, Terrace, or Prince Rupert/Port Edward. Disaggregated statistics for Nisga'a citizens in those communities is not publically available to IDM.

Table 27.2-3: Age Characteristics of Nisga'a Nation (2011/2006)

Characteristic	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)	Total
Total All persons	410	175	375	905	1,865
Age 0-19 (%)	155 (38%)	50 (29%)	95 (25%)	305 (34%)	605 (32%)
Age 20-64 (%)	220 (54%)	110 (63%)	235 (63%)	525 (58%)	1,090 (59%)
Age 65 and over (%)	30 (7%)	15 (8%)	45 (12%)	75 (8%)	165 (9%)
Median Age	32.1	35.9	38.9	34	35.2

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

27.2.3.2 Migration

According to available data from Indigenous and Northern Affairs Canada and recent EA Applications, both the Nisga'a Nation population and the population living on Nisga'a Lands have increased very marginally between 2012 and 2016 (Table 27.2-4). In 2016, approximately one-third of Nisga'a citizens lived on Nisga'a Lands (Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d).

Table 27.2-4: Nisga'a Population 2012 - 2016

Residency	Number of People			Percent Increase (2012 to 2016)
	2012	2013	2016	
On Nisga'a Lands	2,014	2,035	2,044	1.5%
On Other Reserves	201	211	211	5%
Not on Nisga'a Lands	3,689	3,718	3,797	3%
Total Registered Population	5,904	5,964	6,055	3%

(Westcoast Connector Gas Transmission Project, 2014; Rescan, 2013; Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016, 2016d)

Data recorded in the 2011 National Household Survey and the 2006 Census (Table 27.2-5) indicate that while most residents within the Nisga'a Villages had not moved within the past year, internal mobility among the Nisga'a Villages was common (Statistics Canada, 2011). In 2011, 90 residents of Gingolx (22% of the community's population) had moved to the community from another Nisga'a village within the past year. In the three other Nisga'a Villages, migration within Nisga'a Lands comprised between 5 and 11% of the population. Residents who had moved from outside of Nisga'a Lands to the Nisga'a Villages did not make up a large proportion of residents (between 3 and 5%) (Statistics Canada, 2011).

Table 27.2-5: Mobility Characteristics of Nisga'a Villages

Mobility Characteristic	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)
Total Population	395	175	370	895
Lived at the same address 1 year ago (non-movers)	290 (73%)	155 (89%)	325 (88%)	780 (87%)
Moved within Nisga'a Lands in the past year	90 (22%)	10 (5%)	40 (11%)	90 (10%)
Moved from within BC in the past year	20 (5%)	10 (5%)	0 (0%)	25 (3%)

(Statistics Canada, 2011)

When residents of the Nass Valley were surveyed in 2011 for the Kitsault Project regarding their likelihood of moving away from the Nass Valley in the next five years, 52% of respondents said they were not at all likely to leave, while 13.1% reported they were very likely to leave (Rescan, 2012). When asked why they would leave the Nass Valley, the largest reason was employment or lack of jobs (42.4%), followed by education (33.3%), and other reasons (10.6%) (Rescan, 2012).

The greatest influence on immigration and emigration in the Nisga'a Villages may be whether several proposed projects, such as the Kitsault Mine, PRGT, or the Westcoast Connector Gas Transmission Project, proceed. Employment opportunities associated with the construction of pipelines and mines may result in Nisga'a citizens currently living off Nisga'a lands to return to their communities (Westcoast Connector Gas Transmission Project, 2014; Rescan, 2012). In the case of proposed mining projects, employment could continue from construction through operations and would result in a long-term increase in population in the Nisga'a Villages (Westcoast Connector Gas Transmission Project, 2014).

Surveys of Nisga'a citizens have shown mixed views regarding immigration to the Nisga'a Villages. Many Nisga'a citizens believe immigration would boost the local economy and increase the available funds for health, social, and education services (Rescan, 2012). Others expressed concern regarding the capabilities of existing infrastructure to handle increased

capacity, increased pressure on a limited amount of housing stock, and loss of community cohesion (Rescan, 2012).

Some Nisga'a citizens might choose to emigrate because of potential negative effects of proposed projects. Focus group and online surveys conducted in support of PRGT indicate it would be unlikely that potential effects such as emissions, discharges, and wastes from the project would result in a measurable change in emigration from the Nisga'a Villages (PRGT Ltd., 2014).

27.2.3.3 Housing and Community Infrastructure

Housing

Each Nisga'a Village Government and their village-based housing committee manage housing in the Nisga'a Villages (Rescan, 2012; PRGT Ltd., 2014). The Villages are responsible for housing management, financing, repair, renovations, maintenance, and new construction (ERM Rescan, 2014b). Under the Nisga'a Landholding Project, Nisga'a citizens are able to own their own homes and use the property to raise capital at banks (Nisga'a Lisims Government, no date).

Information on the programs and services provided by each Village Government and housing committee is not publically available; however, the Gingolx Village Government website notes that the village provides 34 rental units (Gingolx Village Government, no date). In contrast, the Gitlaxt'aamiks Village Government does not provide rental or social housing; rather it provides renovation grants to homeowners (Gitlaxt'aamiks Village Government, 2016).

Shortages of housing, overcrowding, and poor condition of housing are issues in the Nisga'a Villages (ERM Rescan, 2014b). In 2011, there were a total of 690 private dwellings in the Nisga'a Villages, 590 of which were occupied (Westcoast Connector Gas Transmission Project, 2014). Of the 590 occupied dwellings, 490 were single detached homes, 75 were row houses, and 25 were moveable homes (Westcoast Connector Gas Transmission Project, 2014). In 2011, there were 272 units of temporary capacity accommodation in Gitlaxt'aamiks and Gitwinksihlkw comprised of motels, bed and breakfasts, and an RV campground (Rescan, 2012).

In 2006, the rate of housing in need of major repairs was higher in the Nisga'a Villages, ranging from 33.3% to 45.5%, than the provincial rate of 7.4% (Rescan, 2012). Table 27.2-6 shows that of the two Nisga'a communities covered by the 2011 National Household Survey (Gingolx and Laxgalts'ap), approximately 48% and 40% of homes, respectively, were in need of major repair.

Table 27.2-6: Condition of Housing in Gingolx and Laxgalts'ap (2011)

Community	Total number of private dwellings occupied by condition of dwelling	Only regular maintenance or minor repairs needed	Major repairs needed	Total number of private Aboriginal households by housing suitability ⁽¹⁾	Suitable	Not suitable
Gingolx	125	70 (56%)	60 (48%)	125	115 (90%)	10 (8%)
Laxgalts'ap	125	65 (52%)	50 (40%)	120	115 (96%)	10 (8%)

⁽¹⁾ Housing suitability refers to whether a private household is living in suitable accommodations according to the National Occupancy Standard (NOS); that is, whether the dwelling has enough bedrooms for the size and composition of the household. A household is deemed to be living in suitable accommodations if its dwelling has enough bedrooms, as calculated using the NOS. (Statistics Canada, 2011)

In surveys and focus group interviews conducted in support of the Kitsault Mine Project, anecdotal information indicated that housing in the Nisga'a Villages was at or near capacity, and that overcrowding was a problem (Rescan, 2012). According to these interviews, the rate of individuals per household in the Nisga'a Villages was between 4-8 persons per household; much higher than the average of 3.4 reported for the three Nisga'a Villages where data was available in the 2006 Census (Rescan, 2012). In 2012, waiting lists for new housing existed in Gitlaxt'aamiks, Gitwinksihlkw, and Gingolx (Rescan, 2012). A Gitlaxt'aamiks community newsletter in July 2016 noted that a shortage of affordable homes continues to be an issue for the community (Gitlaxt'aamiks Village Government, 2016).

Community Infrastructure

NLG and the Nisga'a Village Governments supply community utilities in the Nass Valley, including domestic water supply, sewer, garbage collection, and landfill services (Westcoast Connector Gas Transmission Project, 2014).

Water in Gitlaxt'aamiks is sourced from a glacier behind the community and is filtered. The sewer system uses three lagoons approximately 1.5 km from the community (Rescan, 2012). Both the water and sewer systems were established in 1963 and are currently operating below capacity, however community members believe the water system would need to be upgraded to accommodate an increased population (Rescan, 2012; Prince Rupert Gas Transmission Project, 2014).

In Gitwinksihlkw, a new water system drawing from the Nass River was completed in 2012 (Rescan, 2012). The water system includes an advanced filtration system and has a large capacity (Rescan, 2012). The sewer system was established in the 1980s and is reportedly in good condition (Rescan, 2012).

The water and sewer systems in Gingolx were both upgraded in 2011. The water source is a reservoir. (Rescan, 2012).

Laxgalts'ap sources its water from a well (Prince Rupert Gas Transmission Project, 2014).

Solid waste is deposited from the four Nisga'a Villages at the Nass Valley Landfill, located near Gitlaxt'aamiks (Rescan, 2012). The Regional District of Kitimat Stikine (RDKS) contributes financially to the operation of the landfill (Rescan, 2012).

Electricity is provided to the Nass Valley through the provincial electrical grid (Prince Rupert Gas Transmission Project, 2014).

27.2.3.4 Transportation Services and Infrastructure

The Nisga'a Highway (Highway 113) is the main route that connects the Nisga'a Villages to Terrace and Highway 16. The Nass Forest Service Road, a gravel road, provides seasonal connection between Gitlaxt'aamiks and Highway 37. The BC Ministry of Transportation and Infrastructure maintains Highway 113, and the Ministry of Forests, Lands and Natural Resource Operations (FLNRO) is responsible for the Nass Forest Service Road. FLNRO discontinued basic maintenance of the Nass Forest Service Road in 2011 due to budget constraints (Terrace Standard, 2011b). Gitlaxt'aamiks and Laxgalts'ap Village Governments provide road maintenance to the village roads throughout the year (Prince Rupert Gas Transmission Project, 2014).

Gitwinksihlkw has a boat launch and dock that service the Nass River salmon fishery (Westcoast Connector Gas Transmission Project, 2014). Laxgalts'ap and Gingolx are tidal communities and both have boat launches. Gingolx maintains a large breakwater facility, a helipad, and a marine tenure for a Prince Rupert-based floatplane company (Westcoast Connector Gas Transmission Project, 2014).

While there is no official transit system between the Nass Valley and Terrace, each Nisga'a Village Government maintains a bus (Terrace Standard, 2013). In Gitlaxt'aamiks, a bus travels to Terrace two to three times per month, depending on demand (Terrace Standard, 2013). The Gitwinksihlkw Village Government uses a 24-passenger bus to provide transportation to scheduled events for youth and elders (Terrace Standard, 2013). Laxgalts'ap's bus can seat between 20 and 24 passengers and can make daily trips to Terrace. Laxgalts'ap provides the transportation service free to elders and youth (Terrace Standard, 2013). Gingolx Village government owns two busses, one of which is primarily used for school trips, but both can be rented for group trips. Gingolx charges a \$50 fee per passenger for a return trip between the community and Terrace (Terrace Standard, 2013). A Nisga'a-owned business, 113 Taxi and Transportation, provides taxi service throughout the Nass Valley, to Terrace, transportation for tourists, and transportation for special events (Terrace Standard, 2011a).

Terrace is a regional transportation hub. The Terrace Regional Airport provides flights to Vancouver, Victoria, Prince Rupert, Prince George, and Kelowna. Greyhound bus service offers scheduled trips throughout BC, including to Stewart and Prince Rupert. From Terrace, BC Transit, in collaboration with the Northern Health Authority (NHA) and RDKS, provide a combined medical and passenger bus route between Kitimat and Terrace from Monday to

Friday (Terrace Standard, 2013). The NHA also runs the Northern Connections health transportation service for medical passengers between Burns Lake and Terrace, and Prince Rupert and Prince George (Terrace Standard, 2013).

27.2.3.5 Health Care, Education, Social, and Emergency Services

Health Care Services

NLG has law-making authority over health and social programs for Nisga'a citizens within Nisga'a Lands (Rescan, 2012).

NLG manages the delivery of healthcare through the Nisga'a Valley Health Authority (NVHA), which provides health care services in the Nisga'a Villages. The NVHA is based in Gitlaxt'aamiks and has satellite clinics in the other Nisga'a Villages (Rescan, 2012). The NVHA provides physician services, public health services, mental health services, dental services, home care for the elderly, and an emergency phone service (Nisga'a Valley Health Authority, no date; Prince Rupert Gas Transmission Project, 2014; Rescan, 2012). The NVHA also operates a weekday bus service that provides transportation assistance when a health service is not available in a patient's home community (Nisga'a Valley Health Authority, no date; Terrace Standard, 2013).

Terrace is a hub of health care services in the region. In addition to the advanced care services provided at Mills Memorial Hospital, there is a mental health services unit, a sexual health clinic, a residential rehabilitation home for adults with severe mental illnesses, homecare for adults and seniors with disabilities, and a long-term care home.

Education Services

Elementary and secondary schools in the Nisga'a Villages are managed by Nisga'a Nation School District #92, part of BC's public school system (Rescan, 2012). School District #92 is a unique district in BC in that it is run by both the BC Ministry of Education and NLG (Rescan, 2012). The majority of students and staff in the Nisga'a Nation School District are either Nisga'a citizens or members of other First Nations, and the district provides culturally relevant education, integrating the Nisga'a language and the *Ayuukhl Nisga'a* into the curriculum (School District No. 92, no date; Rescan, 2012). The district operates four schools:

- Nathan Barton Elementary School in Gingolx;
- Gitwinksihlkw Elementary School in Gitwinksihlkw;
- Alvin A. McKay Middle School in Laxgalts'ap; and
- Nisga'a Elementary Secondary School in Gitlaxt'aamiks (School District No. 92, no date).

Each Nisga'a Village has an elementary school, but all students must travel to Gitlaxt'aamiks to attend secondary school. The Nisga'a Economic, Social, and Cultural Impact Assessment Report for the Kitsault Project stated that between 2006/2007 and 2010, there had been a 21% decline in student enrolment in School District No. 92, and, in 2014, the Brucejack Application also reported that enrolment had declined over the previous 5 years (Rescan, 2012; ERM Rescan, 2014b).

Post-secondary education services are available in the Nass Valley through WWNI, the Nisga'a House of Wisdom. WWNI was established by NLG in 1993 with the mandate to ensure that Nisga'a citizens have equitable access to quality adult and post-secondary education in the Nass Valley (WWNI, no date). The school provides academic, vocational, technical, and continuing education for adults and is affiliated with the University of Northern British Columbia, Northwest Community College, and Royal Roads University. WWNI partners with these educational institutions to offer Bachelor of Arts, Master of Arts, and other educational programs (WWNI, no date).

NLG provides career counseling and skills training through Nisga'a Employment, Skills & Training (NEST). NEST provides employment advisement and coaching services, including support in accessing training programs, resume writing workshops, interview skill counseling, or financial support to purchase work-gear (NEST, no date). NEST also works with employers to provide wage subsidies, workplace training, and skills upgrading for Nisga'a citizens (NEST, no date). NEST has offices in Gitlaxt'aamiks, Terrace, and Prince Rupert (NEST, no date).

Social Services

The social service or social development department of each Nisga'a Village Government provides social services to the community (Rescan, 2012). Services offered by the Villages include pre-school, daycare, youth programs, home care for seniors and or the disabled, domestic violence prevention, community preventative services, and training and education support (Rescan, 2012; Westcoast Connector Gas Transmission Project, 2014; Nisga'a Lisims Government, no date; ERM Rescan, 2014b).

NLG also provides social services through Nisga'a Child and Family Services (NCFS) (Nisga'a Lisims Government, no date). NCFS has offices in Gitlaxt'aamiks, Terrace, and Prince Rupert and works with the BC Ministry of Children and Family Development to ensure the protection of and wellbeing of Nisga'a children is consistent with *Ayuukhl Nisga'a* and provincial laws (Nisga'a Lisims Government, no date). NCFS provides a range of services and programs, including:

- Counseling on parenting practices;
- Respite care to provide temporary relief to parents;
- In-home family support and assistance;
- Budgeting and life skills services;
- An infant development program;
- A family group conference program that offers dispute resolution; and
- A supported child care development program that advocates for children with special needs (Nisga'a Lisims Government, no date).

In addition to their programs and services, NCFS provides financial support for NLG's youth worker program, a recreation program, community workshops, and family support services (Nisga'a Lisims Government, no date). NCFS also provides funding to community-based recreation programs (ERM Rescan, 2014b).

Emergency Services

The level of emergency services available in the Nisga'a Villages has been described as being equal to those available in other remote communities in BC (Rescan, 2012). The Royal Canadian Mounted Police (RCMP) Lisims/Nass Valley detachment is located in Gitlaxt'aamiks and provides policing services to the other Nisga'a Villages (Rescan, 2012). Five constables, one corporal, and one sergeant are based in the Lisims/Nass Valley detachment (Prince Rupert Gas Transmission Project, 2014).

The BC Ambulance Service provides service to the Nisga'a Villages; however, no ambulances are based in the Nisga'a Villages. Land-based ambulances are located in Terrace, and air ambulances are based in Prince Rupert (PRGT Ltd., 2014).

Gitlaxt'aamiks and Laxgalts'ap both have volunteer fire departments (ERM Rescan, 2014b).

27.2.3.6 Community Well-Being, Family, and Crime

Community Well-being

Community well-being can be measured by information on levels of education (Section 27.2.4.2), housing conditions (Section 27.2.3.3), employment and income (Section 27.2.4.3), all of which are discussed in the noted sections of this chapter. Community well-being in the Nisga'a Villages is influenced by their rural location and limited access to services (Prince Rupert Gas Transmission Project, 2014).

Indigenous and Northern Affairs Canada has combined socio-economic data, including education, labour force activity, income, and housing into the Canadian Community Well-Being (CWB) index. The CWB index provides a source of quantitative data on community well-being and allows for the comparison of well-being between Canadian communities (Indigenous and Northern Affairs Canada, 2006). The CWB is a range from 0 (low community well-being) to 100 (high community well-being).

The most recent CWB data available from the Nisga'a Villages are from 2006 and do not include Laxgalts'ap (Table 27.2-7). The average CWB score among the Nisga'a Villages is 65, higher than the average CWB score in BC Aboriginal communities (57), but lower than the average in non-Aboriginal communities in BC (77) (Indigenous and Northern Affairs Canada, 2006).

Table 27.2-7: CWB Score in Nisga'a Villages and Aboriginal and Non-Aboriginal Communities

	Gitlaxt'aamiks	Gitwinksihlkw	Gingolx	Average in BC Aboriginal Communities	Average in BC non-Aboriginal Communities
CWB Score	67	70	58	57	77

(Indigenous and Northern Affairs Canada, 2006; Prince Rupert Gas Transmission Project, 2014)

Family

The Local Health Area (LHA) is an administrative area defined by the Northern Health Authority and used by BC Statistics to summarize social and economic data (BC Stats, 2012b; Westcoast Connector Gas Transmission Project, 2014). Indicators of children at risk (Table 27.2-8) found that the rate of children in care in the Nisga'a LHA (13.6/1,000 children) was higher than the provincial average (9.1/1,000 children) (BC Stats, 2012b). The Nisga'a LHA has a higher average rate of lone parent families (32.9%) compared to the provincial average of 25.7% (BC Stats, 2012b).

Indicators relating to education in the Nisga'a LHA were well below provincial averages. 73.9% of Grade 4 and Grade 7 students in the Nisga'a LHA were reading below standard levels in 2012, compared with 20.5% of students province-wide (BC Stats, 2012b). In the Nisga'a LHA, 78.1% of 18 year-old had not graduated high school in 2012, compared with 26.2% in BC (BC Stats, 2012b). Participants in focus groups conducted in 2011 for the Kitsault Project, noted perceived differences between Nisga'a Village schools and schools in larger communities, such as Terrace or Vancouver (Rescan, 2012).

Table 27.2-8: Children at Risk Indicators (2012)

Characteristic	Nisga'a LHA	Terrace LHA	Prince Rupert LHA	BC
Children in Care (per 1,000 Pop ages 0-18)	13.6	18.9	25.2	9.1
Grade 4 and 7 Reading Levels (% below standard)	73.9%	28%	38.1%	20.5%

(BC Stats, 2012b)

Table 27.2-9: Youth at Risk Indicators (2012)

Characteristic	Nisga'a LHA	Terrace LHA	Prince Rupert LHA	BC
Percent of Youth, Age 15-24, on Income Assistance	Not Available	5.6%	7.5%	2.1%
Percent of 18 year olds who did not Graduate	78.1%	33.4%	40.3%	26.2%
Total Serious Juvenile Crime (Charges per 1,000 Pop ages 12-17)	5.6	5.5	9.1	3.8

(BC Stats, 2012b)

Information on the rates of gambling or drug and alcohol addiction are not available in the Nisga'a LHA, although in focus group interviews conducted in 2013 for PRGT, drug and alcohol use were frequently discussed as topics of social concern (PRGT Ltd., 2014).

Crime

Between 2009 and 2011, the Nisga'a LHA had the highest rate of serious violent crime of all LHAs in BC (BC Stats, 2012b). Serious violent crimes are defined as homicide, attempted murder, sexual or non-sexual assault that result in bodily harm, robbery, and abduction. The rate of serious violent crime declined in the Nisga'a LHA by 22.7% between 2006 and 2008 (BC Stats, 2012b).

Juvenile (ages 12 to 17) serious crime rates (5.6 offences per 1,000 people) were found to be higher than the provincial average of 3.5 offences per 1,000 people (BC Stats, 2012b). The rate of non-cannabis drug offences in the Nisga'a LHA was lower than the provincial average (51.3 and 170.3 offences per 100,000 people, respectively) (BC Stats, 2012b).

Data on the rates of cannabis-related crimes, driving offences, assault, sexual assault, and domestic violence are unavailable for the Nisga'a LHA (PRGT Ltd., 2014).

27.2.3.7 Occupational and Non-Occupational Accident Risks

Information on the existing conditions of occupational and non-occupational accident risks in the Nass Valley is limited.

Occupational Accident Risks

No specific data on job-related accidents in the Nisga'a Villages is available. Based on surveys and focus group interviews associated with environmental assessments for other projects in the Nass Area, many Nisga'a citizens are trained to work in or are employed in the natural resource sectors (Prince Rupert Gas Transmission Project, 2014). In 2015, the rate of serious injury in the primary resource sector (agriculture, fishing, forestry, oil and gas, and mineral resources) was 0.69 per 100 person-years of employment (Work Safe BC,

2015). This rate was the second highest in BC following construction (0.83 serious injury claims per 100 person-years of employment) (Work Safe BC, 2015).

Non-Occupational Accident Risks

Non-occupational accident risks rates can be inferred through the rate of traffic accidents and the rate of years of life lost through accidental causes. As shown in Table 27.2-10, the Nisga'a LHA has a higher rate of potential years of lost life, 20.6 per 1,000 people, than the provincial average of 7.0 per 1,000 people (BC Stats, 2012b).

Unpaved road surfaces, wildlife, and seasonal degradation of roads are all sources of non-occupation accident risks associated with car crashes (Prince Rupert Gas Transmission Project, 2014). From 2008 to 2012, ICBC reported 11 car crashes in the Nass Area, two of which were in Stewart (PRGT Ltd., 2014). Four of the reported accidents were fatal (PRGT Ltd., 2014).

From 2008 to 2012, the Nisga'a LHA had the lowest average life expectancy at birth of all LHAs in BC; however, the rate is comparable to the average life expectancies in the Terrace and Prince Rupert LHAs, as seen in Table 27.2-10, as well as the life expectancy rates for Aboriginal people in BC (PRGT Ltd., 2014; BC Stats, 2012b).

Table 27.2-10: Indicators of Health Problems in the Nisga'a LHA and Surrounding Areas

Area	Life Expectancy ⁽¹⁾	Potential Years of Lost Life ⁽²⁾⁽³⁾		
		Natural Cause	Accidental Cause	Suicides or Homicides
Nisga'a LHA	75.4	34.5	20.6	41.5
Terrace LHA	77.8	56.0	15.5	8.5
Prince Rupert LHA	78.9	43.4	6.8	9.4
British Columbia	82.3	29.7	7.0	4.0

(1) Average rate per 1,000 people between 2008 and 2012.

(2) Average rate per 1,000 people between 2007 and 2011.

(3) Potential years of life lost is the sum, over all persons dying from a particular cause, of the years that these persons would have lived had they experienced normal life expectation.

(BC Stats, 2012b; PRGT Ltd., 2014)

27.2.3.8 Occupational and Non-Occupational Health Risks

The potential human health effects of the Project's Construction and Operation Phases are assessed in Chapter 22 of this Application/EIS. The Health Effects Assessment undertakes a thorough evaluation of the potential effects of changes to air quality, soil quality, noise, groundwater quality, surface water quality, country foods, and visual quality on human health. The Project is not located within Nisga'a Lands and therefore is not anticipated to effect occupation or non-occupational health risks to Nisga'a citizens.

27.2.4 Nisga'a Nation Economic Setting

27.2.4.1 Governance

As set out in the NFA, Nisga'a Nation is governed by NLG (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000). Chapter 11 of the NFA outlines Nisga'a Nation's right to self-government and authority to make laws (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000). Chapter 11 also outlines:

- The recognition and roles of NLG and the Nisga'a Village Governments;
- The legal status and capacity of NLG and the Nisga'a Village Governments;
- The Nisga'a Constitution;
- The structure of NLG;
- NLG elections; and
- Other relevant aspects to the governance of Nisga'a Nation (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

WSN, the legislative body of NLG, is responsible for considering and passing NLG laws (Nisga'a Lisims Government, no date). The WSN is comprised of the following roles:

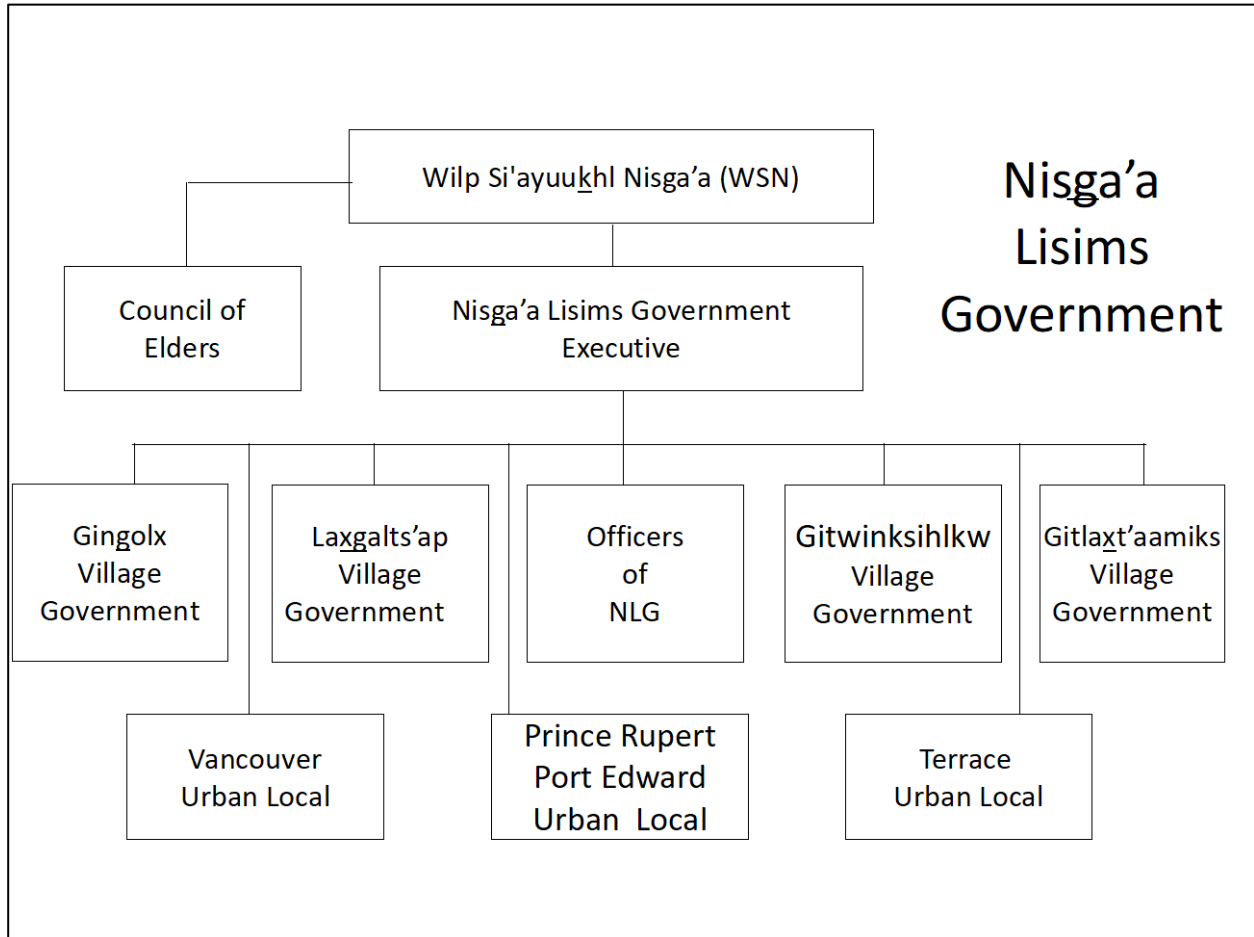
- President;
- Chairperson;
- Secretary-Treasurer;
- Chairperson of the Council of Elders;
- The Chief Councillor of each of the four Nisga'a Villages;
- The councillors from each of the four Nisga'a Villages; and
- The three Nisga'a urban local representatives (Vancouver, Prince Rupert/Port Edward, and Terrace) (Nisga'a Lisims Government, no date).

Elections for WSN positions are held every four years, with the most recent one being on November 2, 2016 (Nisga'a Lisims Government, no date).

The Council of Elders is appointed by NLG in accordance with Nisga'a law and the NFA. It provides guidance and interpretation of the *Ayuukhl Nisga'a* to the WSN (Prince Rupert Gas Transmission Project, 2014; Nisga'a Lisims Government, no date).

The structure of NLG is shown in Figure 27.2-2, and the individuals holding positions within the WSN are summarized in Table 27.2-11, Table 27.2-12, Table 27.2-14, Table 27.2-14, and Table 27.2-15.

Figure 27.2-2: Structure of Nisga'a Lisims Government



(Nisga'a Lisims Government, no date)

Table 27.2-11: WSN Positions (Jan 2017)

Position	Name	Date Elected
President	Eva Clayton	November 2, 2016
Executive Chairperson	Brian Tait	November 2, 2016
Secretary-Treasurer	Corinne McKay, Bilaam Neek'hl	November 2, 2016
Chairperson of the Council of Elders	Willard Martin, Sim'oogit Ni'isyuus	November 2, 2016
Chief Councillor, Gitlaxt'aamiks	Keith Tait	November 2, 2016
Chief Councillor, Gitwinksihlkw	Charles Morven	November 2, 2016
Chief Councillor, Laxgalts'ap	Henry Moore	November 2, 2016
Chief Councillor, Gingolx	George Moore	November 2, 2016
Village Councillors ()	listed by their respective villages in Table 27.2-12 to Table 27.2-15	
Executive Representative, Vancouver Urban Local	Sheldon Martin	November 2, 2016
Executive Representative, Prince Rupert/Port Edward Urban Local	Cliff Morgan	November 2, 2016
Executive Representative, Terrace Urban Local	Keith Azak	November 2, 2016

(Nisga'a Lisims Government, no date)

Table 27.2-12: Gitlaxt'aamiks Village Government

Position	Name	Date Elected
Chief Councillor	Keith Tait	November 2, 2016
Councillor	Keith Clayton	November 2, 2016
Councillor	Floyd Davis	November 2, 2016
Councillor	Denise Eli	November 2, 2016
Councillor	Claude Morven	November 2, 2016
Councillor	Noah Guno	November 2, 2016
Councillor	Taron Scott	November 2, 2016
Councillor	Edmond Wright	November 2, 2016

(Nisga'a Lisims Government, no date)

"Gitlaxt'aamiks" means "the people of the ponds" (Personnal Communication with M. Griffin, 2016).

Table 27.2-13: Gitwinksihlkw Village Government

Position	Name	Date Elected
Chief Councillor	Charles Morven	November 2, 2016
Councillor	Clyde Azak	November 2, 2016
Councillor	Drae Azak	November 2, 2016
Councillor	Christina Bolton	November 2, 2016
Councillor	Tina Bolton	November 2, 2016
Councillor	Bruce Haldane	November 2, 2016

(Nisga'a Lisims Government, no date)

"Gitwinksihlkw" means "the people of the place of lizards" and refers to the black and yellow salamanders traditionally found there (Personnal Communication with M. Griffin, 2016).

Table 27.2-14: Laxgalts'ap Village Government

Position	Name	Date Elected
Chief Councillor	Henry Moore	November 2, 2016
Councillor	Matthew Bright, Jr.	November 2, 2016
Councillor	Wallace Clark	November 2, 2016
Councillor	Charles Leeson	November 2, 2016
Councillor	Peter Leeson	November 2, 2016
Councillor	Craig McKay (non-voting)	November 2, 2016
Councillor	William Moore	November 2, 2016

(Nisga'a Lisims Government, no date)

"Laxgalts'ap" means "on the village" because it was built on the site of an older village (Personnal Communication with M. Griffin, 2016).

Table 27.2-15: Gingolx Village Government

Position	Name	Date Elected
Chief Councillor	George Moore	November 2, 2016
Councillor	Claude Barton	November 2, 2016
Councillor	Steven Doolan	November 2, 2016
Councillor	John Moore	November 2, 2016
Councillor	Henry Stephens	November 2, 2016
Councillor	Vern Stephens	November 2, 2016

(Nisga'a Lisims Government, no date)

"Gingolx" means "to feed skulls" in reference to the Nisga'a practice of raising the heads of their enemies on pikes at the mouth of the Nass during wars with the Haida over eulachon grease (Personnal Communication with M. Griffin, 2016).

27.2.4.2 Education Characteristics

Table 27.2-16 summarizes the educational characteristics of the Nisga'a Villages for the most recent years available: 2011 for Gingolx, Gitwinksihlkw, and Laxgalts'ap and 2006 for Gitlaxt'aamiks.

Table 27.2-16: Education Characteristics for Nisga'a Villages (2011/2006)

Highest Degree or Certificate	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)	Total
Population 15 years and over	290	135	305	690	1,420
No degree, certificate or diploma (%)	140 (48%)	35 (26%)	115 (38%)	245 (35%)	535 (38%)
High school diploma or equivalent only (%)	65 (22%)	35 (26%)	85 (28%)	170 (25%)	355 (25%)
Trades/apprenticeship or other non-university certificate (%)	65 (22%)	60 (44%)	95 (31%)	175 (25%)	395 (28%)
University certificate below bachelor level (%)	15 (5%)	0 (0%)	0 (0%)	30 (4%)	45 (3%)
University degree (bachelor level or higher) (%)	0 (0%)	0 (0%)	0 (0%)	65 (9%)	65 (5%)

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

High school completion in the Nisga'a Villages is relatively low compared to the rest of the province: in 2006, 54.0% of Nisga'a citizens aged 25 to 54 had not completed high school credentials, compared with a provincial average of 37.2% (BC Stats, 2012b). 78.1% of 18 year olds in the Nisga'a Villages did not graduate (2009 through 2012), compared to the provincial average of 26.2% (BC Stats, 2012b).

The average grade 12 provincial English exam non-completion rate (i.e., did not write or pass the provincial English exam) in the Nisga'a Villages for 2009-2012 was 92.7%, compared to the provincial average of 35.8% (BC Stats, 2012b).

Assessment results of Nisga'a citizens in the Nass Valley schools are similarly low. On average (2009 through 2012), Nisga'a students in grades 4 and 7 perform below provincial standards: 73.9% perform below standards in Reading (compared to 20.5% provincially), 44.5% perform below standards in Writing (compared to 14.2% provincially), and 78.1% perform below standards in Math (compared to 23.8% provincially) (BC Stats, 2012b).

27.2.4.3 Employment and Income

Employment

The workforce characteristics of Nisga'a Nation are summarized in Table 27.2-17. While the participation rate (i.e., the proportion of the population who are members of the labour force) of Nisga'a Nation is comparable to the provincial rate, the employment rate is much lower than the provincial rate and the unemployment rate is much higher. Employment in the health and education industries are higher than the provincial average, while employment in the manufacturing, construction, wholesale, retail, finance, and real estate industries are lower (Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d).

According to the 8(f) assessment conducted for PRGT, "the Nisga'a Sustainable Employment Plan reported that 25% of 329 respondents cited the lack of job opportunities as the main reason for unemployment. Other reasons included lack of education, skills, and training," (Prince Rupert Gas Transmission Project, 2014). PRGT also noted that seasonal employment, including pine mushroom harvesting, forestry, and fishing, made up 26% of the full-time employment (Prince Rupert Gas Transmission Project, 2014). PRGT found that seasonal employment was lowest in Gingolx (11%) and highest in Laxgalts'ap (36%) (PRGT Ltd., 2014).

Table 27.2-17: Nisga'a Nation Workforce Characteristics

	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)	Nisga'a Nation Average	British Columbia (2011)
Labour Force Indicators						
Participation rate	54.4%	67.9%	49.2%	67.2%	59.7%	64.6%
Employment rate	28.1%	57.1%	39.3%	51.1%	43.9%	59.5%
Unemployment rate	45.2%	15.8%	20%	22.8%	26.0%	7.8%
Industry						
Population 15 years and over	285	140	305	690	355 (100%)	3,646,840 (100%)
Agriculture, resource based	25	10	25	55	28 (8%)	97,020 (3%)
Manufacturing, construction	10	10	15	40	18 (5%)	358,320 (10%)
Wholesale, retail	10	0	0	20	7 (2%)	392,970 (11%)
Finance, real estate	0	0	0	0	0 (0%)	157,985 (4%)
Health, education	30	20	35	165	62 (18%)	453,345 (12%)
Business services	0	0	10	20	7 (2%)	308,935 (8%)
Transportation, warehousing	0	0	0	10	2 (1%)	127,505 (3%)
Other services	90	45	95	180	102 (29%)	633,660 (17%)

	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)	Nisga'a Nation Average	British Columbia (2011)
Occupation						
Population 15 years and over	285	140	305	690	355 (100%)	3,646,840 (100%)
Management	30	20	30	Not available	27 (8%)	683,090 (19%)
Natural sciences, health	0	0	10	Not available	3 (1%)	322,565 (9%)
Social sciences, gov't	30	20	35	Not available	28 (8%)	291,750 (8%)
Sales and service	30	20	30	Not available	27 (8%)	626,345 (17%)
Trades and related	35	25	45	Not available	35 (10%)	364,585 (10%)
Primary industry	30	0	20	Not available	17 (5%)	70,175 (2%)
Other Occupations	0	0	15	Not available	5 (1%)	171,245 (5%)

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

Collectively, NLG and the Village Governments are the largest employers in the Nass Valley, employing 236 people (Nisga'a Lisims Government and RDKS, no date), over a third of the total Nisga'a Nation population aged 15 years and over. The remaining largest employers of Nisga'a citizens in the Nass Valley include the Nisga'a Valley Health Board and School District 92 (Nisga'a Lisims Government and RDKS, no date), consistent with the findings above that health and education are popular industries. The top employers of Nisga'a citizens living on Nisga'a Lands are summarized in Table 27.2-18.

Table 27.2-18: Top Employers of Nisga'a Citizens Living on Nisga'a Lands

Employer	# of Employees	Ownership
Nisga'a Lisims Government	130	Public
Nisga'a Valley Health Board	60	Public
School District 92	15	Public
Nisga'a Commercial Group	62	Private
Greenville Enterprises Inc.	40	Private
Laxgalts'ap Village Government	18	Public
Gingolx Village Government	25	Public
Gitlaxt'aamiks Village Government	50	Public
Gitwinksihlkw Village Government	13	Public

(Nisga'a Lisims Government and RDKS, ND)

Income

In 2005, 75.7% of Nisga'a citizens' income came from employment revenue, with 22.1% of total income coming from government transfers. This proportion has increased to an average of 26.25% of total income coming from government transfers across all Nisga'a Villages (Table 27.2-19) (BC Stats, 2012b).

In 2005, 67% of Nisga'a citizens worked in the public sectors, with only 9.8% dependent on forestry, mining, and fishing (BC Stats, 2012b). 16% were dependent on government transfers for income, slightly higher than the provincial average of 15% (BC Stats, 2012b).

Table 27.2-19: Income Characteristics for Nisga'a Villages (2011/2006)

Characteristic	Gingolx (2011)	Gitwinksihlkw (2011)	Laxgalts'ap (2011)	Gitlaxt'aamiks (2006)	Total
Persons 15 years of age and over with income	250	225	280	640	1,395
Avg. total income (all persons with income)	\$18,584	\$26,305	\$17,515	\$21,674	\$21,019
Government transfer percent of income	34	17	34	20	26.25

(Indigenous and Northern Affairs Canada, 2016a, 2016b, 2016c, 2016d)

27.2.4.4 Labour Capacity

The Social, Economic, Resource Use and Cultural survey conducted by Rescan for the KSM Project found that 379 respondents in the Nass Valley reported having specific labour force skills: most reported general labour skills (35.9%) and vocational skills (30.9%), followed by management skills (14.8%), technical skills (10.3%), and professional skills (Rescan, 2011).

Research conducted in support of the Brucejack Gold Mine Project in 2012 found that a weak economic base and a lack of job opportunities were the primary causes of high unemployment. Other contributing factors included a lack of education, skills, and training; seasonally restricted employment; limited local funding; nepotism; and lack of incentive due to dependency on social services (ERM Rescan, 2014a).

27.2.4.5 Business Activities

There are two primary modes of business activity related to Nisga'a Nation:

- Economic development managed through public economic development corporations related to NLG or the Village Governments; and
- Businesses owned privately by Nisga'a citizens.

27.2.4.5.1 Public Economic Development

Nisga'a Pacific Ventures LP

Nisga'a Pacific Ventures LP (NPVLP) is the economic development arm of NLG, and NLG is the sole shareholder of NPVLP (Nisga'a Lisims Government, no date). NPVLP's mission is "to improve and sustain the economic wealth and well-being of the Nisga'a Nation and its citizens by being well managed, profitable, and having a reputation for excellence" (Nisga'a Lisims Government, no date). NPVLP is managed by an independent Board of Directors, which is comprised of the 4 Nisga'a Village Government Chief Administrative Officers and 2 other Directors appointed by the NLG Executive (Nisga'a Lisims Government, no date). NPVLP oversees the management and operation of at least seven divisions:

- Lisims Forest Resources LP, which manages the harvesting, marketing, and sale of Nisga'a forest resources, including hemlock, balsam fir, cedar, spruce, and several deciduous species and the harvest and sale of non-timber botanical forest products, such as pine mushrooms (Nisga'a Lisims Government, no date);
- Nisga'a Fisheries LP, which purchases and markets salmon caught by licensed Nisga'a fishers. The fresh and fresh-frozen fish are sold primarily in the Greater Vancouver area. Custom processing has been contracted out the past three years to the Canadian Fishing Company (Canfisco), which also supplies Nisga'a Fisheries Ltd. with insulated fish totes and ice as part of the service contract. In 2012 and 2013, Nisga'a Fisheries Ltd employed a minimum of 81 Nisga'a citizens (Nisga'a Lisims Government, no date);
- K'ali Aks Construction, which serves as the partnership holder for contracting opportunities associated with resource development projects operating and seeking to operate in the Nass Area (Nisga'a Pacific Ventures LP, n.d.);
- Nass Area Properties LP;
- Nisga'a Tourism LP, whose mission is "to foster and promote culturally appropriate and environmentally sustainable tourism in Nisga'a Lands and the Nass Area, increase awareness of Nisga'a culture and heritage, and create jobs for Nisga'a people." Nisga'a Tourism LP offers a variety of tourism opportunities, including cultural Circle Tours of Nisga'a communities and heliskiing (Nisga'a Pacific Ventures LP, n.d.);
- Nisga'a Guide Outfitters LP (NGO), which guides hunting trips for grizzly bear, black bear, and mountain goat as well as taxidermy services for animals acquired through the hunts (Nisga'a Pacific Ventures LP, n.d.). NGO acquired the guide outfitting license that overlaps with the Project area in September 2015; and
- Lisims Communications LP, which has overseen the installation and manages the operation of fiber optic cable in the Nass Valley and provides internet connectivity sales and technical support. Lisims Communications has recently (November 2016) brought cell service to the Nass Valley and is currently working to bring cable television, as well (Nisga'a Pacific Ventures LP, n.d.).

In addition to NPVLP, NLG operates an Economic Development Department to actively support and facilitate new initiatives to improve employment opportunities in the Nass Valley (Nisga'a Lisims Government, no date).

Nisga'a Village Government Economic Development

In addition to the economic development services provided by NLG and its related entities, “the four Nisga'a Village Governments each receive an allocation of funding for economic development purposes as part of the Nisga'a Nation annual budget” (Nisga'a Lisims Government, no date). These funds can be used employ an economic development officer and/or to provide contributions towards various economic development initiatives at the Nisga'a Village level (Nisga'a Lisims Government, no date).

27.2.4.5.2 Private Businesses

Research to support the Brucejack Gold Mine Application in 2012 found approximately 32 Nisga'a- or NLG-owned businesses in the Nisga'a Villages, Terrace, and Prince Rupert (ERM Rescan, 2014b). Of the 22 businesses surveyed, “over half were single proprietorships and more than a third were owned and operated by one of the four Village Governments. The majority (75%) reported fewer than five employees, while the top four reported 129, 42, 40, and 21 employees respectively. Over two-thirds (68%) reported that at least half of their earnings came from either or both levels of Nisga'a government” (ERM Rescan, 2014b).

Research to support PRGT's EA in 2014 found a report of 63 businesses located in the Nisga'a Villages (PRGT Ltd., 2014), as summarized in Table 27.2-20.

Table 27.2-20: Businesses Located in Nisga'a Villages (2006)

Nisga'a Village	Privately Owned	Communally Owned	Artists	Total
Gitlaxt'aamiks	12	11	7	30
Gingolx	4	1	No data	5
Gitwinksihlkw	6	4	3	13
Laxgalts'ap	5	3	7	15
Total	27	19	17	63

(Prince Rupert Gas Transmission Project, 2014)

NLG Support

NLG provides support and funding for Nisga'a citizens to start their own businesses through Nisga'a Business Incubator and Coaching Services (Nisga'a Lisims Government, no date). The Business Incubator is a free service to all Nisga'a citizens that provides coaching, planning, and business resources tools (Nisga'a Lisims Government, no date).

NLG is unique in the province for its emphasis on the importance of fostering and developing businesses owned by Nisga'a citizens, as opposed to economic development being managed through bands, as is often the case with most other Aboriginal groups. This supports self-sufficient citizens of the independent, self-governing Nisga'a Nation.

27.2.4.6 Natural Resource Activities and Related Earnings or Values

The Project is outside of Nisga'a Lands, where Nisga'a Nation holds Treaty rights to timber and mineral resources. The Land Use Plan for Nisga'a Lands (December 2002) is not applicable. The Bitter Creek Valley is outside of the Nass Timber Supply Area.

Fish, Wildlife, Aquatic Plants, and Migratory Birds

The Project is within the Nass Wildlife Area, where Nisga'a Nation holds Treaty rights to harvest and manage wildlife, fish, aquatic plants, and migratory birds. There is no commercial fishery in the vicinity of the Project. The consolidated financial statements for NLG for the 2015-2016 financial year (ending March 2016) state that a reasonable valuation of these natural resources is not available (Nisga'a Lisims Government, 2016).

Guide Outfitting License

Nisga'a Nation holds the guide-outfitting license over the Project area. The license was purchased from the previous license holder, Coast Mountain Outfitters, in September 2015, and journalists have speculated that the certificate is worth millions of dollars (Dhillon, 2016).

Pine Mushrooms

Pine mushroom harvesting is a relatively significant source of revenue for the Nisga'a economy, and is also socially significant (Pierce Lefebvre Consulting, 2008). Research conducted in support of the KSM Project found that, in 2008, Nisga'a citizens harvested 11,656 kg of mushrooms, which generated over \$43,000 in revenue (Rescan, 2013). In a good year, harvesting pine mushrooms may produce a harvest of 40,000 kg and involve approximately 50 or 60 person years of direct employment (Pierce Lefebvre Consulting, 2008). NLG has not informed IDM of any pine mushroom harvesting areas in the Project area. The South Nass Sustainable Resource Plan (SRMP) outlines the ecologies where pine mushrooms generally grow:

- Rapidly drained and generally coarse soils with a high coarse fragment content and a thin forest floor;
- Associated with Western hemlock, lodgepole pine, and sparse herb and shrub layers with a high coverage of mosses; and
- Low-productivity forests typical of rocky ridges and hill tops, as well as on coarse textured soils near rivers (Ministry of Forests, Lands, and Natural Resource Operations, 2012b).

Further research conducted for the Northwest Transmission Line Project indicate that pine mushroom habitat is often associated with gentle slopes and open canopy that allows light to penetrate to the forest floor (Rescan Environmental Services Ltd., 2010).

Based on the current lack of access infrastructure to the Bitter Creek valley, it is unlikely that pine mushroom harvesting occurs in the valley. Increased access to the valley as a result of the construction of the Project's Access Road may increase pine mushroom harvesting opportunities if pine mushroom habitat exists.

27.2.4.7 NLG Government Expenditures

NLG revenues for the 2015-2016 financial year (ending March 31, 2016) were approximately \$96.2 million. Expenses for the same period, including NLG expenses and transfers and operating grants for Nisga'a Village Governments, Nisga'a Valley Health Authority, Nisga'a School Board no. 92, Nisga'a Urban locals, and Wilp Wilxo'oskwhl Nisga'a, were approximately \$96.7 million, resulting in a net deficit of approximately \$400,000. NLG's accumulated surplus from the 2014-2015 financial year was approximately \$245 million, resulting in an accumulated surplus in 2015-2016 of approximately \$244 million (Nisga'a Lisims Government, 2016).

Expenses in NLG's commercial interests exceeded revenues in all areas listed in NLG's consolidated financial statements:

- Fisheries expenses exceeded revenues by \$70,000;
- Nass Area Properties expenses exceeded revenues by \$1.4 million;
- Telecommunication expenses exceeded revenues by \$275,000;
- Tourism expenses exceeded revenues by \$27,000; and
- NPVLP expenses exceeded revenues by \$456,000 (Nisga'a Lisims Government, 2016).

K'ali Aks Construction showed a net income of \$756,000 while Lisims Forest Resources LP earned a loss of \$110,000 during the financial year in question (Nisga'a Lisims Government, 2016).

27.2.4.8 Future Economic Opportunities and Economic Development

There are significant future economic opportunities for Nisga'a Nation and individual Nisga'a citizens:

- Increased quality and quantity of infrastructure in the Nass Valley may bring more business investment and, more importantly, may encourage Nisga'a citizens to start their own businesses;
- NLG programs and funding may also encourage Nisga'a citizens to start their own businesses; and
- Resource development projects may proceed in the region, bringing employment and contracting opportunities.

Notably, NPVLP's recent acquisition of the guide outfitter license may bring increased employment opportunities for Nisga'a citizens. During a discussion between IDM representatives and NGO, Harry Nyce Jr., Chief Executive Officer of NVPLP, stated that NVPLP's intention in purchasing the license is to train as many Nisga'a citizens as possible as guides, even if the enterprise only breaks even, to provide as many employment opportunities as possible (Personal Communication with NGO, 2016). This increase might represent a six-fold increase in guided hunts as were previously offered (Personal Communication with NGO, 2016).

27.3 Consultation and Engagement

IDM believes that consultation with Nisga'a Nation should be conducted in the spirit of mutual respect, integrity, and transparency. IDM aspires to develop a mutually beneficial relationship with Nisga'a Nation for the life of the Project. IDM recognizes that honest and open engagement and consultation during the EA process is an important step in establishing that relationship. Beyond the procedural aspects of consultation that have been delegated to IDM by EAO through the Section 11 Order and the 8(e) and 8(f) assessments required under Chapter 10 of the NFA, IDM has been proactively engaging with Nisga'a Nation on potential benefits of the proposed Project. Such benefits may include: training programs, employment and career development opportunities, and business or contracting opportunities. These engagement and consultation activities will help to build and establish a sincere relationship with Nisga'a Nation that facilitates dialogue regarding issues, concerns, and potential benefits through the life of the Project.

27.3.1 Goals and Objectives of Consultation

It is IDM's goal that consultation activities enable Nisga'a Nation to participate fully in the EA review process, provide feedback, and identify concerns regarding the potential effects of the proposed Project on Nisga'a Nation Treaty rights. IDM is committed to providing substantive opportunities for Nisga'a Nation to participate in the EA process, in a manner that both meets the requirements of consultation outlined in the NFA and enables meaningful and effective relationships to be established.

IDM notes that the NFA broadly defines consultation as providing notice in sufficient detail and over a reasonable time period to allow a party to prepare its views, allowing that party to present its views, and conducting a full and fair consideration of the views presented. IDM intends to continue conducting consultation activities in accordance with this definition. The primary objectives of IDM's consultation efforts are to:

- Determine how the proposed Project may potentially affect Nisga'a Nation Treaty rights;
- Ensure that Nisga'a Nation is consulted on the potential Project effects on the environment and Nisga'a Nation Treaty rights;
- Address matters of concern or interest raised by Nisga'a Nation;

- Develop, discuss, and consider, in collaboration with Nisga'a Nation, measures to avoid, minimize, mitigate, or otherwise accommodate any potential adverse effects of the proposed Project on Nisga'a Nation Treaty rights;
- Communicate how IDM will respond to issues and concerns raised by Nisga'a Nation; and
- Solicit Nisga'a Nation participation in Project planning and the assessments to be conducted under Chapter 10, paragraphs 8(e) and 8(f) of the NFA.

27.3.2 Nisga'a Consultation Plan

In accordance with paragraph 12.3.1 of the Section 11 Order, IDM prepared a Nisga'a Consultation Plan in order to outline how it would meet the procedural aspects of consultation delegated to it by EAO. A draft version of the plan was provided to NLG for review and comment prior to finalization. All comments and feedback received from Nisga'a Nation were incorporated into the final version, which is publically available on EAO's ePIC website. The Nisga'a Consultation Plan is reflective of IDM's commitment to proactively engage with the Nisga'a Nation. NLG's comments included:

- Requesting that the document be titled the Nisga'a Consultation Plan, as opposed to the Aboriginal Consultation Plan as outlined in the Section 11 Order;
- Requesting that the plan include a reference to the federal environmental assessment under CEAA 2012;
- Requesting that a reference to the Nass Wildlife Area and the assessments required under paragraphs 8(e) and 8(f) of the NFA be added to the Introduction;
- Requesting a specific listing of the EA documents that IDM and NLG would communicate and consult on;
- Requesting language to ensure that the unique position of Nisga'a Nation in respect to environmental assessments of projects that have the potential to result in effects on Nisga'a Nation Treaty interests be reflected; and
- Requesting that reference be added to IDM's future consultation with NLG on measures proposed to avoid, minimize, mitigate, or otherwise address potential effects to Nisga'a Nation Treaty interests.

27.3.3 Aboriginal Consultation Reports

Pursuant to the Section 11 Order, and consistent with the approved Nisga'a Consultation Plan on file, IDM is required to provide the EAO Project Assessment Lead with three Aboriginal Consultation Reports for the proposed Project.

Paragraph 13.1 of the Section 11 Order states that IDM must submit the Aboriginal Consultation Reports to the Project Assessment Lead at the following times:

- Within 30 days of the deadline for Nisga'a Nation to provide comments on the draft Application Information Requirements (dAIR);
- At the time of submission of the Application/EIS;
- 120 days after the commencement of the Application Review stage; and
- At any other time specified by the Project Assessment Lead.

As outlined in paragraph 13.3 of the Section 11 Order, the Aboriginal Consultation Reports must include, with respect to Nisga'a Nation:

- A summary of the efforts undertaken by IDM to consult with Nisga'a Nation in accordance with the approved Nisga'a Consultation Plan;
- Identification of feedback and information received by IDM from Nisga'a Nation during consultation;
- Identification of the rights and interests of Nisga'a Nation under the NFA;
- Identification of how the potential adverse effects of the proposed Project on the rights and interests of Nisga'a Nation under the NFA will be avoided, mitigated, or addressed; and
- An outline of the next steps or future consultation activities, other than those outlined in the approved Nisga'a Consultation Plan.

To date, IDM has submitted two Aboriginal Consultation Reports. The first, submitted in December 2016 and available on EAO's ePIC website, details IDM's consultation efforts with Nisga'a Nation from the commencement of engagement in May 2014 to December 13, 2016. The second Aboriginal Consultation Report, dated September 15, 2017, details IDM's consultation efforts from December 14, 2016, through to September 15, 2017, the time of submission of this Application/EIS, and is available in Appendix 27-A.

27.3.4 Phases of Aboriginal Consultation and Engagement

The Nisga'a Consultation Plan divides Aboriginal consultation and engagement into four temporal phases, each being characterized by milestones in the EA process (Table 27.3-1).

Table 27.3-1: Phases of Aboriginal Consultation and Engagement

Phase	Description of Activities	Dates and Status
Early Engagement	<p>Engagement activities conducted during the exploration phase of Project development, up to and including the submission of the Project Description to EAO and EAO's issuance of the Section 10 Order.</p> <p>Engagement activities conducted during this phase included engagement with Nisga'a Nation on exploration permits and the draft Project Description required for the initiation of the EA.</p>	<p>May 2014 – Oct 2015 Complete</p>
Pre-Application	<p>Consultation activities conducted subsequent to the issuance of the Section 10 Order and prior to IDM's submission of the Application/EIS.</p> <p>Consultation activities during this phase include consultation on the Nisga'a Consultation Plan, on the selection of Valued Components (VCs), on the dAIR, on the first two Aboriginal Consultation Reports, and on the drafting of the Application/EIS, particularly the sections specific to Nisga'a Nation Treaty rights. In addition, IDM will consult on how to avoid, mitigate, and address the potential effects of the Project on Nisga'a Nation's Treaty rights.</p> <p>During this phase, IDM will also consult with Nisga'a Nation regarding the 8(e) and 8(f) assessments under Chapter 10 of the NFA that will be incorporated into the Application/EIS.</p>	<p>Nov 2015 – Sep 2017 Complete</p>
Application Review	<p>Consultation activities conducted subsequent to the submission of the Application/EIS, during the Application Review Phase of the EA process.</p> <p>Consultation activities during this phase are focused on the Application/EIS, the assessment of the potential adverse effects on Nisga'a Nation Treaty rights, proposed steps to avoid, mitigate, and address those potential effects, and Environmental Assessment Certificate (EAC) conditions.</p>	<p>Oct 2017 – Mar 2018 Pending</p>
Post-EA	<p>Engagement activities conducted subsequent to the issuance of an EAC.</p> <p>Engagement activities during this phase are focused on the permitting process to allow Project construction to proceed and implementing the mitigation measures, management plans, and other commitments made by IDM to Nisga'a Nation during the previous phases of consultation.</p>	<p>Beginning Apr 2018 Upcoming</p>

27.3.5 Summary of Early Engagement

IDM commenced engagement with Nisga'a Nation, as represented by NLG, with a formal introductory letter in May 2014, shortly after acquiring the Project. Meetings and discussions during the early engagement phase focused on:

- Introductory discussions, including:
 - IDM and NLG’s goals and aspirations related to the Project;
 - Early discussions regarding capacity funding to support NLG’s meaningful engagement in the EA process; and
 - Preliminary discussions regarding potential measures to mitigate or manage the potential social and cultural effects of the Project on Nisga’a citizens;
- Information sharing regarding exploration activities at the Red Mountain Property;
- The scope of the EA and dialogue regarding the draft Project Description;
- Preliminary discussions regarding the selection of VCs; and
- Information sharing regarding the progress of baseline environmental studies.

The early engagement phase concluded at the end of October 2015 with the submission of the final Project Description and the issuance of the Section 10 Order on November 2, 2015, which confirmed that the Project is reviewable under BCEAA.

27.3.6 Summary of Pre-Application Engagement and Consultation

The Pre-Application Phase commenced in November 2015 and continued until September 15, 2017, when IDM submitted this Application/EIS.

27.3.6.1 Information Sharing

IDM acknowledges that in order to fully understand and discuss the potential effects of the Project on Nisga’a Nation’s Treaty rights, Nisga’a Nation must be given the opportunity to fully understand the development and design of the proposed Project. To that end, IDM has made Project information, including progress updates and overviews, available to NLG employees and representatives. IDM has provided Project information in a timely and honest manner when responding to requests and when reaching out to NLG representatives.

IDM’s information sharing has included:

- Providing information regarding the Project’s anticipated transportation requirements;
- Engaging in dialogue with NLG representatives regarding the proposed design for the tailings management facility;
- Site tours for NLG’s technical representatives and executive members;
- Introductory letters to the NLG representatives elected during the Nisga’a Nation general election in November 2016;
- Providing copies of environmental baseline reports to support NLG’s understanding of the potential effects of the Project on existing conditions and to understand the Project’s potential effects on Nisga’a Nation Treaty rights;

- Providing opportunities to discuss the environmental baseline reports in order to respond to any questions or clarifications NLG's representatives may have;
- Distributing community newsletters to the Nisga'a Village Government offices, Nisga'a Urban Locals, and NLG's headquarters; and
- Maintaining a project website to provide information to Nisga'a citizens about the Project.

To date, there have been no changes made to the Project's design and implementation directly as a result of discussions with NLG.

27.3.6.2 Capacity Funding

IDM recognizes the importance of providing capacity funding to NLG in order to support their meaningful participation in the EA process. On July 7, 2015, IDM sent a letter to NLG that included a request to initiate capacity funding negotiations. IDM and NLG discussed capacity funding during the September 9, 2015, Project update meeting. On October 28, 2015, NLG provided IDM with a draft Capacity Funding Agreement. IDM replied with comments on the draft on March 2, 2016. Throughout April and May 2016, IDM and NLG discussed the terms of the Agreement by phone and email. The Capacity Funding Agreement was executed on May 24, 2016, and remains in place.

27.3.6.3 Valued Components Selection

IDM initiated discussions with NLG regarding VC selection in November 2014 and continued through the finalization of the AIR in March 2017. IDM's consultation with NLG on VC selection included a workshop to discuss preliminary VC selection, opportunities for NLG to provide written comments on the Project's draft VC selection document, and conversations between IDM and NLG representatives to ensure that the Project's selected VCs are appropriate and adequate to assess the potential effects of the Project on Nisga'a Nation's Treaty rights.

As a result of IDM's consultation with NLG regarding preliminary VC selection, IDM made the following changes to its selection of VCs and Intermediate Components (ICs):

- Commercial, Recreational, and Aboriginal (CRA) Fisheries has been included as a VC;
- Eulachon has been included as a VC (within Fish and Fish Habitat);
- Water Quality has been included as a VC, instead of an IC; and
- Project-Related Traffic has been included as an IC.

IDM continued to consult with NLG regarding the final selection of VCs during the review of the dAIR. Further feedback from NLG and IDM's responses are recorded in the comment-tracking table for the VC Selection Document.

27.3.6.4 Draft Application Information Requirements

IDM's consultation with Nisga'a Nation on the dAIR was initiated in July 2016 when NLG received a preliminary version of the Project's dAIR through the EAO-led Working Group. NLG submitted written comments through the Working Group in August 2016, and these were discussed in a series of conference calls that month. Feedback received as a result of these discussions was incorporated into a revised version of the dAIR that was provided to NLG through the Working Group in September 2016.

In order to encourage Nisga'a citizens to familiarize themselves with the proposed Project and to review the dAIR, IDM provided electronic or hardcopy versions of the dAIR (depending on stated preference) during the public comment period (October 5 to November 4, 2016) at the following locations:

- Gingolx Village Government Office;
- Nisga'a Lisims Government Office;
- Gitlaxt'aamiks Village Government Office;
- Gitwinksihlkw Village Government Office; and
- Laxgalts'ap Village Government Office.

NLG provided a second round of written comments in November 2016, which were further discussed during a conference call that month and incorporated into a revised version of the dAIR.

On January 30, 2017, NLG provided IDM with further comments on the dAIR. NLG requested that a conceptual site model (CSM) be developed. NLG also raised concern regarding the assessment of changes to stream hydrology and the amount of baseline hydrological and climate data. On February 3, 2017, IDM and NLG discussed these comments during a conference call. IDM confirmed that a CSM, with both ecological and human receptors, would be produced as part of the Application/EIS, that hydrology would be considered a VC in the assessment, and that additional hydrological baseline data would continue to be collected in 2017 to address NLG's concerns. On March 3, 2017, IDM, NLG, EAO, and the Canadian Environmental Assessment Agency representatives met by conference call to discuss NLG's final comments on the dAIR. During that conference call, IDM and NLG collaborated to finalize the wording of the assessment endpoints for fish- and wildlife-related VCs.

The dAIR was accepted as final by EAO on March 30, 2017, and was published on the EAO's ePIC website as the Red Mountain Underground Gold Project Application Information Requirements on April 3, 2017.

As a result of IDM's consultation with NLG regarding the dAIR, IDM made changes to its proposed effects assessments, including the following:

- IDM has used predictive air quality modeling, instead of an adaptive management approach, to estimate air emissions dispersion as part of the Air Quality effects assessment and the Air Quality management plan;

- IDM has used a conceptual site exposure model (CSEM) in the Human Health Risk Assessment (HHRA) to identify sources, release mechanisms, exposure pathways, and human receptors for chemical contaminants released as a result of mine activities;
- IDM has conducted a Screening Level Ecological Risk Assessment with an ecological conceptual site model to identify the potential interactions between Project activities and the environment;
- IDM has conducted an effects assessment of Aquatic Resources as a VC, with an emphasis on periphyton and benthic Invertebrates;
- Bats (Little Brown Myotis, Northern Myotis, and Keen's Myotis) have been included as a Wildlife VC;
- IDM has conducted a best available technology (BAT) assessment of the proposed design for the tailings management facility (TMF), which will be reviewed by an independent engineer;
- IDM has conducted a tailings dam breach and inundation assessment that will be presented in the Accidents and Malfunctions Section of the Application/EIS and in Appendix 23-A;
- IDM has conducted additional late-winter mountain goat surveys in March 2017;
- Sediment Quality has been assessed as a VC rather than an IC; and
- Hydrology has been assessed as a VC rather than an IC.

NLG's written comments and IDM's responses can be found in the comment-tracking table for the dAIR.

27.3.6.5 Community Open Houses

IDM organized community open houses in two Nisga'a Villages during the public comment period on the dAIR: in Gitwinksihlkw on October 13 and in Gitlaxt'aamiks on October 19, 2016. Both open houses were advertised to Nisga'a citizens through the following methods:

- Flyers posted online to NLG's main website, Facebook, and Twitter;
- Hardcopies of flyers posted at the Gitwinksihlkw and Gitlaxt'aamiks Village Government offices;
- Flyers posted online to IDM's Project website; and
- In Gitwinksihlkw, hardcopies of the flyers delivered to every post office box and announced over the community radio system.

At both open houses, IDM engaged local caterers to prepare dinner for open house attendees. In Gitwinksihlkw, volunteer community members prepared dishes in exchange

for a donation to the Four Crest Dancers who will be performing at Hobiye and at an event in Ottawa in 2017. In Gitlaxt'aamiks, IDM engaged three caterers in order to distribute the catering opportunity throughout the community.

Approximately 50 people attended the open house in Gitwinksihlkw and approximately 70 people attended the open house in Gitlaxt'aamiks. The majority of people at both events expressed a primary interest in training and employment opportunities related to the Project.

In addition to sharing information on the Project, the baseline studies being conducted, and the VCs and ICs selected for the assessment, IDM provided feedback forms at both open houses to solicit input from Nisga'a citizens on the potential environmental, social, economic, and cultural effects of the Project. Feedback received through these forms has been considered in the assessment of potential economic, social, and cultural effects on Nisga'a citizens that is required under Chapter 10, paragraph 8(f) of the NFA.

IDM will hold community open houses in the other two Nisga'a Villages (Gingolx and Laxgalts'ap) during the Application Review public comment period.

27.3.6.6 Baseline Studies

IDM provided NLG with information regarding baseline studies throughout the Early Engagement and Pre-Application Phases of the Project, including:

- Providing workplans and information on the methodology and implementation of environmental baseline surveys;
- Participation of Nisga'a citizens in environmental and archaeological baseline surveys; and
- Providing copies of discipline-specific baseline reports to support NLG's meaningful understanding of the potential effects of the Project on Nisga'a Nation's Treaty rights.

27.3.6.7 Application for an Environmental Assessment Certificate / Environmental Impact Statement

27.3.6.7.1 Nisga'a Work Plan

Part 2, section 5.1.1 of the EIS Guidelines issued by the Agency for the Project requires that IDM "develop a Nisga'a Work Plan, in consultation with the Nisga'a Nation, that describes how the proponent will complete the ... 8(e) and 8(f) assessments." IDM consulted with NLG on the development of the Nisga'a Work Plan, and during that consultation NLG suggested that the dAIR should contain sufficient detail on the 8(e) and 8(f) assessments that an additional Work Plan would be unnecessary. In response to that feedback, IDM proceeded with including detail on the approach and methodology to be used for the 8(e) and 8(f) assessment in sections 12.3 and 12.4 of the dAIR. The Agency has informed IDM that it has no opposition to superceding the requirement for a Nisga'a Work Plan with the information contained in the dAIR.

27.3.6.7.2 8(f) Assessment

During consultation with NLG regarding the methodology for the 8(f) assessment, NLG communicated to IDM that there have been significant 8(f) assessment studies completed within the past four years, including for the Kitsault, KSM, Brucejack, Westcoast Connector Gas Transmission, and PRGT projects, and that additional Project-specific, primary data collection is not a priority for NLG and is not necessary for the completion of the 8(f) assessment. NLG suggested that IDM use the information contained in the previous assessments as a basis for the 8(f) assessment of the Project. One reason given by NLG is that there is a measure of research and/or engagement “fatigue” among Nisga’a citizens with respect to resource development projects in the region.

NLG and IDM are in agreement that this approach will limit the need for redundant and repetitive fieldwork and research. The proposed approach will simultaneously meet Nisga’a Nation’s needs and expectations with respect to the 8(f) assessment and management of social, economic, and cultural effects of the Project on Nisga’a Nation and support the Agency’s obligations under the NFA.

In order to support the 8(f) assessment, IDM prepared a matrix that outlined each Nisga’a Nation Treaty interest listed in the “Economic, Social, and Cultural Impact Assessment Guidelines” produced by NLG in 2010, IDM’s anticipated interaction(s) and effect(s) between that interest and the Project, and how IDM intended to address each potential effect in the narrative of the 8(f) assessment. IDM provided this table to NLG in March 2017 in order to solicit any feedback, questions, or concerns NLG may have so that NLG’s guidance could be incorporated into the assessment and to ensure that the assessment meets NLG’s needs and expectations. IDM followed-up with NLG on multiple occasions regarding any feedback they may have but did not receive a response.

A draft version of the 8(f) assessment was provided to NLG on May 17, 2017. NLG provided comments on July 4, 2017, which were discussed with more context during a conference call that day. NLG provided some further feedback on the 8(f) assessment during the meeting of July 18 (discussed more below) and in written comments provided on August 3, 2017. It is IDM’s understanding that NLG will discuss the results of the 8(f) assessment in more detail during the Application Review phase of the EA.

27.3.6.7.3 8(e) Assessment

On May 25, 2017, IDM provided a draft version of the 8(e) assessment to NLG for review and comment prior to finalization and submission to regulators. On June 26, 2017, NLG provided detailed comments. IDM has considered all feedback received from NLG and has provided a record outlining its response, including how feedback has been incorporated into the final assessment or providing a rationale as to why feedback resulted in no change.

On July 18, 2017, IDM and NLG representatives met in person to review the 8(e) assessment in detail. NLG’s comments were useful to strengthen the methodology and conclusions of the 8(e) assessment. Revisions to the 8(e) assessment continued through email exchanges between IDM and NLG representatives in late July 2017. IDM appreciates the time and effort of NLG’s representatives and consultants in making the 8(e) assessment as strong and as useful for Nisga’a Nation as possible.

IDM and NLG discussed IDM's approach to the 8(e) assessment further on August 29, 2017, and IDM provided NLG with a revised version of the 8(e) assessment on September 8, 2017.

NLG's feedback on the 8(e) assessment and IDM's responses are included in see Table 27.4-2.

27.3.6.7.4 Application/EIS in General

EAO provided all Working Group members, including NLG, with a copy of the full Application/EIS on July 17, 2017. NLG provided further feedback on the entirety of the Application/EIS on August 3, 2017. The majority of NLG's comments focused on issues relating to the Water and Load Balance Model and related comments on effects assessment chapters that flow from the model, including Surface Water Quality, Sediment Quality, Aquatic Resources, and Fish and Fish Habitat. In addition, NLG's comments identified certain clarifications and perceived gaps relating to the effects assessment methodology, Wildlife and Wildlife Habitat, Accidents and Malfunctions, and Management Plans.

In response to NLG's comments, IDM and NLG representatives held conference calls on August 10 and 29, 2017, to discuss NLG's comments and IDM's proposed changes to address those comments in more detail.

Revised versions of relevant chapters were provided to NLG on September 4, 2017, and discussed during a conference call on September 7, 2017. NLG provided further written feedback on September 7. The feedback was focused on the water quality-related chapters and was intended to make the effects assessments as clear as possible. IDM's changes in response to this feedback has been incorporated.

27.3.6.8 Training, Employment, and Business Opportunities

IDM has ensured that Nisga'a citizens have been involved in training, employment, and business opportunities related to the Project since 2014. This has included:

- Employment for Nisga'a citizens at the Red Mountain Property's exploration camp;
- Camp services provided by a joint-venture between K'ali Aks Construction, a division of NPVLP, and Matrix Aviation Solutions;
- Employment for Nisga'a citizens through participation in environmental and archaeological baseline surveys;
- A driller's assistant training course for eight Nisga'a citizens with on-the-job experience at the Red Mountain Property; and
- Targeted employment and training for Nisga'a citizens working at Red Mountain who are interested in pursuing relevant trade certifications.

IDM continues to work with NEST, NPVLP, and NLG to maximize training, employment, and business opportunities for Nisga'a citizens. This will include participation in NEST's upcoming Employment and Information fair in Laxgalts'ap on September 20, 2017.

27.3.6.9 Engagement on Exploration Permitting

IDM has continued to engage and communicate with NLG regarding IDM's exploration activities at the Red Mountain Property. This has included:

- Communicating with NLG regarding planned exploration activities;
- Engaging with NLG on exploration permit applications; and
- Providing technical planning and monitoring documents to NLG.

IDM believes that early engagement with NLG at the outset of exploration in 2014 has helped to build a strong foundation for a mutually respectful relationship with NLG.

27.3.6.10 Benefits Agreement Negotiations

IDM is committed to reaching a benefits agreement with Nisga'a Nation regarding effects mitigation and benefit sharing in relation to the proposed Project.

IDM and NLG signed a Mutual Confidentiality Agreement on June 6, 2016. The Agreement protects the sensitive information of both parties while allowing IDM and NLG to share important Project-related information that will support the negotiation of a benefits agreement.

NLG and IDM continue to meet to discuss the Project, potential effects to Nisga'a Nation Treaty rights, and topics for the proposed benefits agreement.

IDM met with the newly elected NLG Executive team in February 2017. IDM provided an introduction of its executive team and an overview of the Project and the Bitter Creek valley. NLG stated that they are still very interested in training, employment, and contracting opportunities related to the Project and look forward to negotiating a Project agreement with IDM; however, they are cautious to enter into an agreement too early.

IDM and NLG met again in early May 2017 to discuss the next steps and timeline towards a benefits agreement.

Benefits agreement discussions are ongoing.

27.3.7 Upcoming and Future Engagement and Consultation

IDM will continue to proactively engage and consult with NLG during the upcoming Application Review Phase and for the remainder of the life of the Project. IDM anticipates that activities during the Application Review Phase will include:

- Consultation with NLG on the results of the effects assessment;
- Consultation with NLG on the development of measures to mitigate, minimize, avoid, or otherwise address the potential effects of the Project on Nisga'a Nation's Treaty rights;
- Making copies of the Application/EIS available to Nisga'a citizens for their review and consideration;

- Community open houses during the Application Review public comment period;
- Consultation with NLG on the third Aboriginal Consultation Report;
- Engagement with NLG on the Project's Construction and Operation Phase permit applications;
- Continued discussions towards a benefits agreement; and
- Continued work towards maximizing the employment, training, and business opportunities for Nisga'a citizens and businesses related to the Project.

27.4 Environmental Effects Assessment (Pursuant to Chapter 10 Paragraph 8(e) of the NFA)

27.4.1 Introduction

The following section provides an assessment of the potential environmental effects of the Project, as described in Chapters 6 through 24 of this Application/EIS, on residents of Nisga'a Lands, Nisga'a Lands, or Nisga'a interests, as required under Chapter 10, paragraph 8(e) of the NFA. The assessment of potential effects on Nisga'a Lands, Nisga'a Lands, or Nisga'a interests is based on a comparison between the predicted future conditions with the Project and the predicted future conditions without the Project.

In particular, the following chapters have been considered in this 8(e) assessment:

- Wildlife and Wildlife Habitat Effects Assessment (Chapter 16);
- Fish and Fish Habitat Effects Assessment (Chapter 18);
- Economic Effects Assessment (Chapter 19), including
 - Contemporary Land and Resource Use and CRA Fisheries; and
- Social Effects Assessment (Chapter 20), including
 - Social and Health Services and Infrastructure.

To avoid unnecessary duplication, only relevant VCs have been selected to inform the 8(e) assessment. For example, while changes to Water Quality may have effects on Fish, the linkage between Water Quality and Fish has already been considered in the Fish and Fish Habitat Effects Assessment; therefore, the inclusion of Fish and Fish Habitat in the 8(e) assessment considers any indirect effects resulting from changes to Water Quality.

IDM is preparing a separate memo based on the Tailing Dam Breach Analysis (Appendix 23-A) to discuss the potential consequences of a hypothetical tailings dam breach on fisheries resources.

No additional information is being used to inform the assessment of potential adverse environmental effects on Nisga'a Nation Treaty rights.

27.4.2 Scope of Assessment

27.4.2.1 Regulatory and Policy Setting

Pursuant to Chapter 10, paragraph 8(e), of the NFA and as outlined in Section 12.3 of the AIR, this chapter of the Application/EIS will present an analysis of whether the Project can reasonably be expected to have adverse environmental effects on residents of Nisga'a Lands, Nisga'a Lands, or Nisga'a interests set out in the NFA, including any measures to prevent or mitigate such effects. As the Project is not anticipated to have any environmental effects on Nisga'a Lands due to their distance from the Project, this section focuses on the potential effects of the Project on Nisga'a interests due to environmental effects.

This assessment is based on specific guidance provided in the AIR by NLG and EAO for the assessment of potential project effects on Nisga'a 8(e) interests (Table 27.4-1).

Table 27.4-1: Nisga'a Nation 8(e) Interests to be Assessed

NFA Reference	Nisga'a Nation Interest	Related Chapters of Application/EIS
Chapter 8	Nisga'a Treaty right to manage and harvest Fish, including, specific allocations for: <ul style="list-style-type: none"> Nass salmon (i.e., sockeye, pink, chinook, coho, and chum salmon originating in the Nass Area); Nass steelhead (i.e., winter run and summer run steelhead originating in the Nass Area); and Eulachon (also known as Oolichan) within the Nass Area. 	<ul style="list-style-type: none"> Chapter 2: Nisga'a Final Agreement Chapter 18: Fish and Fish Habitat Effects Assessment Chapter 19: CRA Fisheries under the Economic Effects Assessment
Chapter 8	Nisga'a Treaty right to harvest non-salmon species of Fish and aquatic plants, including marine mammals, for domestic purposes in the Nass Area.	<ul style="list-style-type: none"> Chapter 2: Nisga'a Final Agreement Chapter 18: Fish and Fish Habitat Effects Assessment Chapter 19: CRA Fisheries under the Economic Effects Assessment
Chapter 9	Nisga'a Treaty right to manage and harvest wildlife, for domestic purposes in the Nass Wildlife Area, with specific allocations for: <ul style="list-style-type: none"> Grizzly bear; Moose; Mountain goats; and Other species as designated through annual management plans. 	<ul style="list-style-type: none"> Chapter 2: Nisga'a Final Agreement Chapter 16: Wildlife and Wildlife Habitat Effects Assessment
Chapter 9	Nisga'a Treaty right to manage and harvest migratory birds for domestic purposes in the Nass Area.	<ul style="list-style-type: none"> Chapter 2: Nisga'a Final Agreement Chapter 16: Wildlife and Wildlife Habitat Effects Assessment

NFA Reference	Nisga’a Nation Interest	Related Chapters of Application/EIS
n/a	Guide Outfitting License.	<ul style="list-style-type: none"> • Chapter 2: Nisga’a Final Agreement • Chapter 16: Wildlife and Wildlife Habitat Effects Assessment • Chapter 19: Contemporary Land and Resource Use, under the Economic Effects Assessment • Section 27.4.8.4: 8(f) Assessment
Chapter 6	<p>Nisga’a Treaty right to access to other lands:</p> <ul style="list-style-type: none"> • Agents, employees, and contractors of Nisga’a Nation, Nisga’a Villages, Nisga’a Corporations and members of the Nisga’a Police Service and Nisga’a Institutions access to Nass Wildlife Area to carry out their responsibilities; and • Nisga’a citizens’ reasonable access to Crown lands to allow for the exercise of Nisga’a Treaty rights and for the normal use and enjoyment of Nisga’a interests set out in the NFA. 	<ul style="list-style-type: none"> • Chapter 2: Nisga’a Final Agreement • Chapter 19: Contemporary Land and Resource Use, under the Economic Effects Assessment

27.4.2.2 Input from Consultation

IDM and NLG worked closely in the development of this 8(e) assessment.

As required by the EIS Guidelines issued for the Project, IDM prepared a Work Plan that described how it would complete the 8(e) and 8(f) assessments. However, when IDM provided the draft Work Plan to NLG, NLG expressed a preference for all methodological details to be included in the dAIR. In response to this feedback, IDM consulted with NLG on the methodology of the 8(e) and 8(f) assessments through the dAIR review process let by EAO.

NLG, as an active member of the EAO-led Working Group, also contributed substantial feedback on the assessment methodologies of the VCs that inform this assessment, such as fish and wildlife. NLG’s feedback has been considered in the completion of those pathway assessments and the results have been brought forward to this 8(e) assessment.

On May 25, 2017, a draft version of this 8(e) assessment was provided to NLG for their review. On June 26, 2017, NLG provided detailed comments. These comments were further discussed during a meeting on July 18, 2017, and during follow-up email exchanges in late July 2017. IDM and NLG discussed IDM’s approach to the 8(e) assessment further on August 29, 2017, and IDM provided NLG with a revised version of the 8(e) assessment on September 8, 2017.

IDM has considered all feedback received from NLG and has provided a record outlining its response, including how feedback has been incorporated into the final assessment or providing a rationale as to why feedback resulted in no change. This feedback and IDM’s responses are listed in Table 27.4-2.

Table 27.4-2: NLG Feedback on 8(e) Assessment and IDM Responses

Date Comment Received	Source (meeting, etc.)	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	In Sections 27.1 and 27.3, it appears that there is incomplete understanding of the spatial extent of Nisga’a rights to fish and aquatic plants versus wildlife versus migratory birds (see Section 27.2.2.3 where it states that “Nisga’a Nation holds Treaty rights to manage and harvest fish species in the Nass Wildlife Area” – completely wrong). In many instances, the document refers to the project being located within the Nass Wildlife Area. The project is within both the Nass Wildlife Area and the Nass Area and not everyone will know that the Nass Wildlife Area is nested inside the Nass Area. This is critically important as Nisga’a rights to fish and aquatic plants extend throughout the Nass Area, not just the Wildlife Area. Perhaps the authors understand this but the chapter, as written, is confusing.	IDM has revised wording throughout the document to clarify the relationship between the Nass Area and the Nass Wildlife Area and to be clearer regarding Nisga’a Nation Treaty rights in each of these areas.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Tighter adherence to the requirements of section 12.3.3 of the AIR is required. We did not see in the document where or how effects under 8e were actually assessed, or the confidence of those predictions rated. There is a vague mention of spatial- and logic-based approaches to assessing impacts under 8(e) in section 27.4.3.6. Conclusions later in the document lead one to believe that the absence of a significant residual effect on a given VC itself meant that a residual adverse effect on Nisga’a interests was unlikely. While effects on the VCs themselves are qualified, it seems that potential effects on Nisga’a rights and interests are categorized simply as 'yes' or 'no' depending on the nature of the adverse effect on the VC. If this is the basis of the logic-based approach, we submit that the approach is incomplete and inadequate. We all know that a reaching the conclusion of a significant effect is unlikely for the most part; however, it is not appropriate to infer that a significant effect is required in order that a residual effect on Nisga'a interests occur. Moreover, it is not clear to us how the conclusion of a 'moderate potential residual effect' is determined or what it actually means (e.g., see the assessment for mountain goat). Presumably, a moderate effect on a VC such as mountain goat could have an adverse effect on Nisga'a citizens. We submit that further explanation is required before reaching a conclusion of no expected effects on Nisga’a interests. Further, there needs to be some discussion about the pre-mitigation impacts before the term 'residual' effects on Nisga'a interests can be reached, as the term 'residual' implies that mitigation has been considered as a means of lessening the effect.	Section 27.4.7 has been added to the 8(e) assessment to directly and explicitly address the assessment of potential Project effects on Nisga’a Nation 8(e) interests and to provide the residual effect characterization, likelihood, and confidence rating. Pre-mitigation effects are discussed in the “Project Interactions” sub-section of each 8(e) interest: Section 27.4.3.3 for Fish, Aquatic Plants, and Marine Mammals; Section 27.4.4.3 for Wildlife and Migratory Birds; Section 27.4.5.3 for the Guide Outfitting License; and Section 27.4.6.3 for Access to Other Lands.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Beyond the impacts to wildlife species themselves, there needs to be an assessment of how the project might affect Nisga'a opportunity to hunt (Treaty right) considering such factors as implications for total allowable harvest, opportunity to harvest, and whether restrictions concerning the discharge of firearms in the vicinity of mine infrastructure might alter the area available in which to hunt.	Section 27.4.7.5 has been added to the 8(e) assessment in response to this comment. Implications for total allowable harvest are considered under effects to hunted species. Opportunity to harvest and restrictions on discharging firearms are considered under access restrictions.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	The chapter makes considerable reference to mitigation measures that will be applied to sensitive habitats and habitat features, yet it is not clear whether or not the locations of such are known or if more information gathering is planned. Clarity here would be helpful.	Prior to construction, IDM will utilize the baseline survey results for Vegetation and Ecosystems and Wildlife and Wildlife Habitat VCs to develop an environmental sensitivities map. Sensitive features may include bear dens or SARA-listed vegetation species. This map will be refined on an ongoing basis and will be used as a tool to inform final modifications to design and construction plans.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	As stated in section 27.4.3.6.1, “The specific methodologies used to determine and characterize residual effects are presented in those respective chapters.” Until we have access to that information, it is not practical to conduct a full and meaningful review of the information presented in this chapter.	IDM recognizes the importance of providing NLG with the opportunity to review the full Application/EIS, particularly the bio-physical chapters that have informed the 8(e) assessment. As part of the screening/conformity review process, IDM has provided NLG with copies of the full Application/EIS. IDM looks forward to discussing the full Application/EIS, including biophysical effects assessments and the 8(e) assessment, during the Application Review phase of the provincial EA process.

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Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	There does not appear to be any discussion of potential effects to Nisga'a citizen's ability to harvest salmon or Eulachon in the Bear River. Table 27.7-1 is the only mention of eulachon and states "The Fish and Fish Habitat Effects Assessment, which informed the assessment of potential effects to Nisga'a Nation Treaty rights considered the potential effects of the Project on eulachon in the lower Bear River." Although the effects may be fully mitigated, there still needs to be a discussion in this chapter about these very important resources. Without seeing the chapter on the effects assessment for eulachon, we cannot comment further here.	Section 27.4.7.3 has been added to the 8(e) assessment, which explicitly addresses the potential effect of the Project on Nisga'a Nation Treaty right to manage and harvest eulachon.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.1.1 The description of Chapter 8 of the Nisga'a Treaty is too brief to be of use and does not capture the most important and relevant features for the effects assessment (i.e. spatial extent of the right, nature of the right which is NOT based on traditional use, co-management provisions, economic harvest agreement). Suggest this be completely re-written.	The description of Chapter 8 of the NFA in Section 27.2.1.1 has been revised.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.1.1 The description of Chapter 9 needs improvement. For example, although percentages are a part of the allocation process, it is not entirely correct to state that the Nisga'a allocation of wildlife can be expressed as a percentage (rather, it is in accordance with a formula set out in the Treaty).	The description of Chapter 9 of the NFA in Section 27.2.1.1 has been revised.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.1.1 There are no commercial harvests of wildlife when it comes to designated species. The only harvests that might be considered commercial are those associated with the trapping of furbearers.	This wording has been revised.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.1.1 In the paragraph for Chapter 10, note that there is no such thing as "Treaty lands" under the Treaty (the correct term is Nisga'a Lands).	Wording has been revised to "lands identified under the NFA." It is IDM's understanding that "Nisga'a Lands" specifically refers to the 1,992 km ² of land in the Nass Valley that Nisga'a Nation owns in fee simple.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 There are quite a few paragraphs in this section about environmental (biophysical) conditions. Presumably this is duplicated from other chapters of the application. Suggest deleting as it detracts from the discussion of cultural activities and practices. In addition, this section reads more like a discussion of pre-treaty, traditional use. The section needs to clearly emphasize that the Nisga'a have rights to fish and hunt in the project area regardless of past use or current use in the area. Any degradation of a VC to which Nisga'a have a treaty right will result in an effect on that right.	The description of biophysical environmental conditions has been removed. Wording has been added throughout Section 27.2.2.3 that Nisga'a Nation Treaty rights are regardless of past or current use in the area.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 Why is there a table of Wildlife Baseline studies in this section?	This was provided to supplement the baseline information being provided to NLG in order to support their review of the draft 8(e) assessment. This table has been removed.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 The text under the sub-heading 'Hunting' has little to do with hunting (as a Treaty right) aside from a brief mention in the second paragraph of the section. There needs to be some mention of the harvest of migratory birds in the Nass Area.	IDM finds that the description of hunting is adequate. Migratory birds are discussed in the section following Hunting.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 Regarding the three species listed here (i.e., Moose, Mountain Goat, Grizzly Bear), the only thing that separates these species from all others that are hunted is the fact that they are 'designated species' under the Treaty. We suggest that unless this qualification is added, this list be deleted as it suggests a range of hunted species far narrower than is the case.	Wording has been revised to clarify that moose, mountain goat, and grizzly bear are designated species under the NFA.

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Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 Mapping references would be helpful when spatial areas are mentioned in this section.	Figure 27.2-1 shows the relevant areas mentioned in this section, including the Nass Area, the Nass Wildlife Area, and the Nisga'a Villages.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 Even though the section is supposed to be about hunting and not wildlife habitat, why is only summer habitat for goats mentioned? Goats use the area year-round.	The description of biophysical environmental conditions has been removed. The description of mountain goat habitat use in Chapter 16 (Wildlife and Wildlife Habitat) covers year-round usage.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.2.2.3 Wording of the first sentence of the last paragraph on page 14 is poorly constructed as it suggests that high snow packs at low elevations are the reason for use by bears there.	The description of biophysical environmental conditions has been removed.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.3.6.4, page 7 Bats are listed here, but are not listed in the previous section regarding VC selection.	The selection of Bats as a VC was not part of NLG's preliminary VC selection guidance in 2014. Wording has been added to this section to clarify.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.3.6.7.3, page 10 Sentence is written in future tense. Is this appropriate? This was the AIR commitment, but the assessment itself is presented below, no?	EAO has expressed a preference that IDM use the future tense for commitments such as this one regarding the provision of consultation materials. This sentence has been changed to the past tense as the draft 8(e) assessment was provided.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.2.3, page 15/16 The methods described in this section do not appear to have been followed closely or the application of the method is not clear.	Please see IDM's response to comment #2 regarding Section 27.4.7.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.3, page 16 The statement that 'LGL Limited and Nisga'a Fisheries found anecdotal evidence of eulachon runs in the Bear and Rainy rivers near Stewart' is wrong. We found solid, document, confirmed evidence on eulachon in the Bear River. The report was provided to IDM.	IDM apologizes for this mistake. The wording in Section 27.4.3 has been revised.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.3.5.1, second bullet, page 20 If something has moderate effectiveness, does IDM consider this adequate?	IDM has defined mitigation measures that are "moderately effective" as measures that result in a moderate improvement in the condition of the VC or indicator. IDM feels that it is important to include moderately effective mitigation measures as the overall effectiveness of a combination of mitigation measures may be adequate to address a potential effect.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.3.6.1, third paragraph, page 23 The spatial- and logic-based approach that is referred to here as the basis for determining the biophysical residual effects on Nisga'a Nation Treaty rights needs to be described in detail (i.e., what is meant by spatial, and what constitutes the logic framework/rules applied here).	IDM acknowledges that this sentence was misleading and it has been removed. The full methodology is outlined in Section 27.4.2.3.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.3.6.3, Table 27.4-5, page 25 This table appears to be for likelihood ratings for the VC effects assessment and not the effects on Nisga'a Treaty rights. Regardless, the thresholds for each likelihood rating need further explanation and justification. Perhaps these are explained in the VC effects chapter but we cannot comment without seeing more.	The reviewer is correct: this table describes the likelihood rating for the VC effect assessment. Professional judgement has been employed concurrent with the effects assessment analysis for a given VC. Narrative descriptions and justifications for the likelihood assessment are provided along with the valuation of these attributes in each effects assessment chapter. The quantitative thresholds (i.e., >P80, P40-P80, and < P40) have been applied consistently across the Application/EIS.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.3.6.5, Table 27.4-6, page 26 This table appears to be for confidence ratings for the VC effects assessment and not the effects on Nisga'a Treaty rights. Regardless, the thresholds for each confidence rating need further explanation and justification. Perhaps these are explained in the VC effects chapter but we cannot comment without seeing more.	Please see IDM's response to comment #24.

Date Comment Received	Source (meeting, etc.)	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4, page 30 As stated earlier in the chapter, the wildlife assessment work presented here is based on work presented in other chapters of the Application. That said, we find the qualitative nature of the assessments presented here and the absence of reference to literature to guide and interpret the assessment rather hollow.	The quantitative elements and guiding literature are included in the Wildlife and Wildlife Habitat Effects Assessment chapter (Chapter 16).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3, first paragraph, page 30 The statement implies that the project infrastructure will be removed and reclaimed. Does this also apply to the TSF?	The post-closure Project landscape is expected to be comparable to existing conditions, with the additional of a permanent post-TMF landform, deactivated roads, and contoured development area (revegetated, where feasible). The objective is to re-establish a landscape that will be physically and chemically stable in the long term.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3.1, last paragraph, page 31 Habitat availability is a condition of the environment; it is not a potential residual effect. Proximate effects could be the change in habitat suitability/effectiveness or amount through direct means such as project infrastructure and/or a result of human activities. Ultimate effects pertain to population levels and health.	IDM has chosen habitat availability as a measurement indicator, defined as the changes to the amount of habitat available as a result of habitat loss or alteration and sensory disturbance. This is defined further in Chapter 16 (Wildlife and Wildlife Habitat Effects Assessment).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3.2, first paragraph, page 31 Regarding the statement: "Project activities and infrastructure may create physical or sensory barriers or filters to movement between daily or seasonal habitats, which could have implications for the long-term persistence and viability of wildlife populations." This is at the extreme end of the spectrum. Ahead of this are concerns about animal behaviour, health, and reduced population levels (which themselves may be deemed 'viable and persistent').	Sensory disturbance, which includes the potential for Project-related noise, light, dust, or human presence to elicit behavioural changes in wildlife, has been used to describe these effects. Please see Chapter 16 (Wildlife and Wildlife Habitat Effects Assessment) for more information.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3.2, last paragraph, page 31 By 'habitat disruption', do you mean disruption to goat movement (as per the section heading)? This is the first and only time the term 'habitat disruption' is mentioned. 'Habitat availability' is listed as an effect in the tables, but as mentioned above, is not an effect per se; it is simply a condition that can cause adverse effects on wildlife such as mountain goats.	Habitat availability includes changes to the amount or quality of available habitat as a result of habitat alteration or sensory disturbance. Clarification regarding IDM's use of habitat availability is addressed in IDM's response to comment #28.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3.3, second paragraph, page 32; first paragraph page 33 States that "Once production is completed, all Project components will be removed and reclaimed and the potential effects of indirect mortality should cease." Please confirm the veracity of this statement. Can IDM confirm that the Access Road will be removed and reclaimed regardless of the status of other industrial developments in the valley (e.g., Bitter Creek Hydro)? Perhaps some qualifying text is required(?)	IDM's intention is to permanently deactivate the Access Road in accordance with BC Ministry of Forestry (2002) guidelines. Watercourse crossings will be removed and natural draining conditions restored. The roadbed will remain a permanent indication of the former road. The Application/EIS and all effects assessments within it operate under the assumption that the Red Mountain Project is the only project in the Bitter Creek valley.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.3.3, last paragraph, page 33 Text states 'mortality', while tables refer to 'mortality risk'. Should standardize this as one is absolute and the other is probabilistic.	The text has been revised throughout the 8(e) assessment to refer to "mortality risk" as opposed to "mortality".
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.4, first paragraph, page 33 While the listing of the three designated species is a good start, there needs to be an assessment of the potential effects of the project on the Nisga'a right to harvest wildlife and migratory birds. This can be accomplished, in part by examining the designated species, but there also needs to be an assessment of impacts to the right to harvest, with wildlife and migratory birds being defined by the Treaty. This need not be a detailed exercise involving every species (and we note that many of the mitigation measures for the species listed in this section will apply to a wide range of others), but rather an examination of whether there is any evidence to suggest that any species that can be harvested by Nisga'a might be adversely affected by the project or that opportunities for Nisga'a hunters to exercise their Treaty rights might be adversely affected.	Please see IDM's response to comment #2 regarding Section 27.4.7.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.5, page 33 It is mentioned in the table in this section, but the text should cover the process of environmental management planning. Presumably, a number of EMPs will be developed for construction, operations, reclamation phases of the project. Worth noting this here.	Yes, the reviewer can look forward to a number of environmental management plans. References to these have been added to Section 27.4.4.8 (Follow-up Measures).

Date Comment Received	Source (meeting, etc.)	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Please clarify what is meant by the mitigation that blasting will be restricted to certain times of the day. How would a contractor adopt this vague recommendation into a construction EMP?	Blasting schedules will be determined prior to construction.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ What is meant by: "Instantaneous charge per delay will be minimized to suit the blast"?	IDM will optimize the amount of explosives used for each charge, will meet regulatory guidelines related to blasting, and will address human and animal safety.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Will there be any blasting for snow avalanche control during operations? If so, need to address potential impacts to goats and denning bears, and approaches to mitigation.	Yes, if required. Wildlife mitigation will be considered concurrent to avalanche control.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Seems odd to include bats here as part of an 8e assessment. Can we assume that the table covers all wildlife regardless of 8e implications? Have any 'valuable bat habitat features' been identified? (as per the mitigation to stay 300 m away from such)	The wildlife mitigation measures provided in Table 27.4-9 cover all wildlife species, regardless of 8(e) implications. IDM has included this reference to bats in order to maintain consistency throughout the Application/EIS. The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ When will the Wildlife Management Plan be developed? Who will approve it?	A preliminary Wildlife Management Plan is included in Chapter 29 of the Application/EIS. This plan will be further developed as the Project progresses (i.e., permitting and pre-construction planning). IDM understands that Working Group members and Mine Review Committee members will have the opportunity to review and comment on the plan as it develops.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Good to hear there will be a mountain goat monitoring plan. The design and execution of such will be important and should involve NLG.	IDM will invite NLG to participate in the development and implementation of the mountain goat monitoring plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Regarding Road access management, what is the plan for managing access into the valley? Will the road be gated and manned at the highway?	An Access Management Plan is included in Chapter 29 of the Application/EIS, which outlines the access restrictions. There will be a locked gate at the start of the Access Road (i.e., the turnout from Highway 37A).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ On page 35 is the first use of the term 'wildlife sensitive areas'. How will these be identified? Have they been identified already via baseline work? If the intent is to provide the info to project design engineers (as stated), this tells me that the information exists unless there are plans for additional baseline work pre-construction and mine design is still early enough to be sufficiently flexible. Would be good to see mapping of such.	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Designing and maintaining buildings to exclude wildlife should have 'high' effectiveness (not moderate, as listed) if done correctly.	Operational experience has shown that even with the effective implementation of this measure, wildlife seeking refuge, shelter, nesting, or roosting opportunities cannot be 100% excluded from Project infrastructure.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the last item on page 35, where are things at with regard to this? Has all the necessary investigative work been done to avoid impacts? E.g., have the sensitive vegetation communities been mapped? What is meant by 'growth forms'? Glad to hear the plans will be implemented ;)	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4. "Growth forms" is a way of describing the physical structure of a vegetation type.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ First mitigation on top of page 36, an effectiveness rating of 'High' seems rather speculative and optimistic at this early point in time.	IDM has revised the effectiveness of this to moderate. When coupled with other wildlife protection protocols, IDM maintains that the effectiveness is high.

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Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Fifth mitigation on page 36, what are the access restrictions?	Please see IDM's response to comment #41 regarding the Access Management Plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the first mitigation on page 37, we suggest that the COS be notified about problem bears before they are shot as well.	IDM has revised this mitigation measure in response to NLG's suggestion.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the third mitigation on page 37, we don't think it is appropriate (or possible) to define or monitor a local population. We suggest that effects monitoring be at the level of individual nests.	IDM has revised this mitigation measure in response to NLG's suggestion.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Fifth mitigation on page 37, please reference the guidelines that will be used. When will measures be taken to discourage birds from nesting on infrastructure? During design?	The referenced guideline is: Avian Power Line Interaction Committee (2006): Suggested Practices for Avian Protection on Power Lines. IDM will begin implementing measures to discourage birds from nesting on infrastructure during detailed design.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the seventh mitigation on page 37, considering the definition of wildlife in the Treaty, this commitment is impractical and unworkable.	For the purpose of wildlife mitigation measures, IDM is not using the definition of wildlife used in the NFA.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the eighth mitigation on page 37, please specify the roads and sensitive areas to which these limits will apply.	Please see IDM's response to comment #41 regarding the Access Management Plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the ninth mitigation on page 37, if roadside pools do form, will they be dewatered? What if they are found to contain amphibian adults, eggs or larvae?	If such a pool is noted, an onsite QEP will assess and determine appropriate follow-up actions.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the second mitigation on page 38, native species should be used.	IDM has revised this mitigation measure in response to NLG's suggestion.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the fifth mitigation on page 38, what kind of deterrent methods might be employed?	Deterrents may include fencing and noisemakers.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the second mitigation on page 39, what does this mean?	Dust mitigation measures will be applied at locations and frequencies as defined in the Air Quality Management Plan (Chapter 29).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the third mitigation on page 3[9], will there be targeted monitoring for toad migration during summer?	IDM will further refine wildlife monitoring programs prior to the start of construction.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the fifth mitigation on page 3[9], Have any roosts been detected? Were bat detectors set up by the portal entrance during the baseline program?	Bat detectors were deployed at two sites along the east bank of Bitter Creek and one along the forested edge of Clements Lake. No roosts have been detected.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the seventh mitigation on page 3[9], are wildlife habitat features currently known?	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.

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Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the eighth mitigation on page 3[9], seems that access would not be built unless the project needed it. Does this mean that some areas are off limits to access development?	The avoidance of environmentally sensitive areas is a factor in determining the final design and placement of Project components. The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the twelfth mitigation on page 3[9], again, are these features already identified?	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6, page 40 Presumably, impacts in accordance with 8e are the focus here, yet the section reads as an assessment of impacts to VCs with a brief concluding statement regarding 8e impacts. Impacts to the VCs are the focus of other chapters in the Application; should be referenced here. Impacts in accordance with 8e should be front-and-center here.	Please see IDM's response to comment #2 regarding Section 27.4.7.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.2, page 42 There should be discussion in the context of the Stewart Grizzly Bear Population unit.	Context regarding the Stewart Grizzly Bear Population unit has been added to Section 27.4.4.6.2.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.2, Table 27.4-11 'Habitat Availability' is not a residual effect. This comment applies to following tables.	Clarification regarding IDM's use of habitat availability is addressed in IDM's response to comment #28.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.2, page 42 What is the purpose of the first sentence after the table? Is this supposed to be a recap of what is in the table? 'Habitat distribution' is not listed in the table. How is habitat distribution measured (let alone the manner in which impacts to it are interpreted)? What about mortality? Similar comment for following tables.	The three potential residual effects identified for grizzly bear are habitat availability, mortality risk, and habitat distribution. Following the analysis and the application of mitigation measures, IDM does not anticipate that the Project will have a residual effect on grizzly bear habitat distribution, which is why it was not included in the table. Details regarding the assessment of potential effects to habitat distribution and mortality risk are available in Chapter 16 (Wildlife and Wildlife Habitat Effects Assessment).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.3, page 42 It doesn't change things, but based on the fact that no Moose were seen and it is likely that there are few if any Moose in the LSA, we suggest that it could be argued that a full effects assessment isn't necessary. This has some bearing on the mechanics of the effects assessment (e.g., a High likelihood of a residual effect seems overly cautious).	IDM appreciates this feedback. IDM proceeded with a full effects assessment analysis because it was prudent to do so based on the importance of Moose to Nisga'a Nation and provincial and federal regulators.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.4, page 43 Presumably the wildlife chapter of the Application looks at the matter of adverse effects on mountain goats in a quantitative manner. That is, it examines the distribution and abundance of goats and goat habitat in light of proposed project infrastructure and activities then attempts to understand how the goats might be affected by such changes. The qualitative approach taken here is highly speculative and not particularly informative. We trust that the wildlife chapter of the Application will contain a quantitative approach to assessment for this important VC that considers goat distribution and abundance (pre-impact) as well as seasonal habitat by suitability class and how that might be affected by the project. This will require reference to the literature (eg. http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/research_pdfs/wrr_2016_2_mountain_goat_resource_selection_mining_disturbance_kensington_southeast.pdf). If this is contained in the wildlife chapter, we'll need to see it in order to complete this review of effects under 8(e).	Yes, the Wildlife and Wildlife Habitat Effects Assessment Chapter (Chapter 16) contains the quantitative information relevant to the assessment of effects on mountain goats.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.4, Table 27.4-13 As with Habitat Availability, Habitat Distribution is not a residual effect per se. It is the pathway by which an adverse effect might manifest.	Similar to IDM's use of habitat availability (please see IDM's response to comment #28), habitat distribution is defined as changes to habitat distribution as a result of Project components or activities that could disrupt habitat connectivity and wildlife movements, making otherwise suitable habitats unavailable or unusable (i.e., a measurement of the disruption to movement).

Date Comment Received	Source (meeting, etc.)	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.4, page 43 Why is there no mention of the role of Block 25 and how it fits into the process of wildlife management in the NWA (including total allowable harvest and Nisga'a allocation), and how the project might or might not affect such? We see this as an essential aspect of an assessment under 8(e). This approach applies to all analyses of impacts under Chapter 10 8(e), but is only commented on here.	IDM reviewed the mountain goat management unit spatial information and concluded the RSA adequately captures the regional habitat and population. A species-specific aerial survey was conducted within Block 25.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.4.6.4, page 43 Does this conclusion (not likely to have residual effects on Nisga'a) imply that the presence of people and equipment will in no way alter the ability of Nisga'a to exercise their Treaty rights? We would think that, for safety purposes, the discharge of firearms, for example, will be restricted in some areas. Beyond the Project's impacts to goats themselves (and thus, their availability to Nisga'a hunters), a question that needs to be addressed is, "Does the loss of some portion of the huntable area in the NWA constitute an adverse effect on Nisga'a?" As stated earlier in the document, IDM is not prepared to assess the significance of such effects, yet it should be prepared to identify where such effects have potential to occur.	Please see IDM's response to comment #2 regarding Section 27.4.7.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.5.6, page 46 Last sentence is a non sequitur. It does not take a 'significant' effect in order to alter the availability of goats for the GO.	This sentence has been removed. Section 27.4.7.6 has been added to address the potential residual effect on the guide outfitting license, including consideration of ecological effects and changes to access.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.6.3, second paragraph, page 48 What does it mean to say "...IDM will limit access to the Bitter Creek valley at or near the turnoff from Highway 37A." How will this be achieved?	Please see IDM's response to comment #41 regarding the Access Management Plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Section 27.4.6.3, last paragraph, page 48 Where is Nass Road? Gingolx Road? Note that the proper name for the road sometimes referred to as the 'Cranberry Connector' is Nass Forest Service Road.	Wording has been clarified to state that the Nass Road and Gingolx Road are in the Nass Valley. IDM appreciates NLG's clarification regarding the name of the Nass Forest Service Road and has revised the document to include this name.
Jul 18, 2017	Meeting with NLG Representatives	Regarding IDM's response to Comment #24: NLG suggests revising the likelihood ratings to be subjective (i.e., high, moderate, or low), as they are not currently based on any quantified measurements.	Quantitative likelihood ratings that have been drawn from the Wildlife and Fish Effects Assessments, respectively, are based on information and details included in the relevant chapters. IDM has added wording to Section 27.4.7 to clarify that the likelihood ratings used for discussing potential residual effects to Nisga'a Nation 8(e) interests are qualitative.
Jul 18, 2017	Meeting with NLG Representatives	NLG suggested adding a table showing interactions between the 8(e) interests and each Project component. An example is included in PRGT's Application.	IDM has included a master Project Interaction Matrix in Chapter 6 (Effects Assessment Methodology), see Table 6.5-1. This table includes the component VCs that inform the 8(e) assessment. VC-specific interactions are also included in each of the relevant chapters and in the relevant sub-sections of the 8(e) assessment.
Jul 18, 2017	Meeting with NLG Representatives	Section 27.4.7.7 NLG suggests strengthening this section.	IDM has revised this section to strengthen the conclusion provided.
Jul 18, 2017	Meeting with NLG Representatives	Sockeye salmon are present in the Bear River. NLG requests confirmation that Sockeye are not present in the LSA.	The Bear River is not included in the LSA, which includes the Bitter Creek valley and its associated tributaries up to the confluence with the Bear River. Sockeye salmon are present in the Bear River, which is included in the RSA, but are not present in the LSA. Please see Chapter 18, Section 18.4.4.2.1 for more information.
Jul 18, 2017	Meeting with NLG Representatives	Section 27.4.2.3, first bullet: NLG suggests revising the paragraph to more closely reflect the information presented in the 8(e) assessment.	IDM is confident that the 8(e) assessment's methodology concerning spatial boundaries is accurately described in the cited paragraph. IDM has revised the wording in each of the 8(e) subsections to clarify the relationship between the spatial boundary of Nisga'a Nation Treaty rights and the assessment boundaries relevant to the Project's EA.
Jul 18, 2017	Meeting with NLG Representatives	Table 27.5-2, "Effects of environmental impacts on the cultural activities and practices of Nisga'a citizens": The wording under "Potential Interactions and Effects" should be revised to acknowledge that the current level of use is not relevant.	IDM has made this change.

Date Comment Received	Source (meeting, etc.)	Comment Received	IDM Response
Jul 24, 2017	Email from Mike Demarchi (LGL) to Claire Backus (Catana Consulting)	<p>Regarding IDM’s response to Comment #68: IDM's response to comment #68 did not address NLG’s interest in seeing an analysis of how the goats in block 25 might/might not be affected by the project, and by extension, for the purpose of the 8(e) assessment, how the effects (or lack thereof) might or might not translate to an effect on the Nisga'a allocation of goats. Similarly, NLG cannot locate any language in the EAC application (Vol 4, Ch 27) that addresses this.</p> <p>NLG is looking for a series of statements as they apply to the VCs of interest to Nisga'a for consumptive purposes. There are two key elements of interest here. First is an assessment of the ability of Nisga'a citizens to exercise their Treaty right (i.e., harvest wildlife). This essentially addresses the question of whether or not the project might alter the ability of Nisga'a citizens to be successful in their attempts to harvest wildlife or migratory birds. Change in success could stem from a number of factors, not all of which necessarily entail an impact to the VC. There are several factors that could contribute to altered success, such as a reduced VC population size, a reduction in the area of the huntable land base (e.g., for conservation or safety purposes), or improved access (in this case, having a positive effect—at least, initially). Second is an assessment of impacts to the Treaty-defined Nisga'a allocation of designated species. This effect would manifest in the event that the total allowable harvest was somehow affected by the Project (e.g., through population-level effects on the VC or notable changes to the area available for hunting). In NLG’s view, the requirements of 8(e) can be met only if both of these elements are addressed.</p> <p>For a description of what NLG is after, refer to the PRGT assessment of 8(e) effects; for example (Part C, Section 34, Page 34-310). [Example cited.]</p> <p>Please note that NLG’s goal in raising this is not because NLG holds preconceived notions of concern about 8(e) impacts (in fact, NLG has not delved into the assessment deep enough yet to reach such a conclusion), but rather that NLG wants to ensure that the 8(e) assessment is done in a robust and comprehensive fashion that accounts for the key ways in which Nisga'a rights and interests under 8(e) might be affected. In addition, and as stated at our meeting last week, NLG is also keen to see a final EAC Application on-file with EAO that covers the full scope of 8(e) in a manner consistent with other applications deemed adequate in this regard.</p> <p>NLG feels that it will not be onerous for IDM to satisfy this request, as NLG suspects that IDM has already done the bulk of the work necessary to be in a position to draw conclusions about both elements.</p>	<p>In consultation with NLG, IDM has added wording to section 27.4.7 to address potential effects on the NFA-defined Nisga'a allocations of Nass salmon, Nass steelhead, non-salmon fish species, aquatic plants, grizzly bears, moose, and mountain goats.</p>
Jul 27, 2017	Email from Mike Demarchi (LGL) to Claire Backus (Catana Consulting)	<p>Regarding clarification of Comment #85: NLG suggests listing, by name, the allocations that are not expected to change as a result of the project rather speak to NFA-defined allocations in general. The potential effects on allocations need to be addressed separately for each species' allocation, as the risk to the allocation of moose is quite different (much lower) than to grizzly bears or mountain goat. Kindly refer to the PRGT assessment language.</p>	<p>IDM has revised Section 27.4.7 to be organized by species in order to address each species' allocation separately.</p>
Jul 27, 2017	Email from Mike Demarchi (LGL) to Claire Backus (Catana Consulting)	<p>I gather that moose are essentially absent from the area affected by the Project. If this is the case, perhaps they should be dropped from the assessment of residual effects.</p>	<p>IDM appreciates NLG’s suggestion, however feels that it is appropriate to include moose for completeness.</p>
Jul 27, 2017	Email from Mike Demarchi (LGL) to Claire Backus (Catana Consulting)	<p>I suggest that the presence of mine infrastructure and personnel has the potential, for safety reasons, to change the area in which Nisga'a hunters can discharge firearms in pursuit of game. As a result, this potential effect on hunting opportunity needs to be assessed.</p>	<p>IDM has included this potential effect in Sections 27.4.5.7.2 and 27.4.8.5.</p>
Jul 27, 2017	Email from Mike Demarchi (LGL) to Claire Backus (Catana Consulting)	<p>Regarding the relationship between effects to effect on Nisga’a citizens’ ability to manage and harvest wildlife and migratory birds in the Nass Area and the Nass Wildlife Area and effects to the Nisga’a allocation: “[One paragraph} predicts a low-magnitude effect, yet the last paragraph predicts no changes to the Nisga'a allocation. I see these two statements as discordant in that the only way there can be any effect (even if only 'low') on the allocation is if it changes.”</p>	<p>IDM has ensured that residual effects on Nisga’a citizens’ ability to manage and harvest wildlife and migratory birds in the Nass Area and the Nass Wildlife Area and effects to the Nisga’a allocation are consistent.</p>

27.4.2.2.1 Consultation on Mitigation Measures

The draft version of this 8(e) assessment that was provided to NLG on May 25, 2017, included several measures to avoid, minimize, mitigate, or otherwise address potential effects on Nisga’a Nation Treaty interests. The feedback provided by NLG on June 26, 2017, did not include additional measures to the ones proposed by IDM. NLG’s feedback did include a few comments on the measures proposed by IDM. These, along with IDM’s responses, are summarized in Table 27.4-3.

Table 27.4-3: NLG Feedback on Mitigation Measures

Date Comment Received	Source	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Please clarify what is meant by the mitigation that blasting will be restricted to certain times of the day. How would a contractor adopt this vague recommendation into a construction EMP?	Blasting schedules will be determined prior to construction.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ What is meant by: “Instantaneous charge per delay will be minimized to suit the blast”?	IDM will optimize the amount of explosives used for each charge, will meet regulatory guidelines related to blasting, and will address human and animal safety.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Will there be any blasting for snow avalanche control during operations? If so, need to address potential impacts to goats and denning bears, and approaches to mitigation.	Yes, if required. Wildlife mitigation will be considered concurrent to avalanche control.

Date Comment Received	Source	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Seems odd to include bats here as part of an 8e assessment. Can we assume that the table covers all wildlife regardless of 8e implications? Have any 'valuable bat habitat features' been identified? (as per the mitigation to stay 300 m away from such)	The wildlife mitigation measures provided in Table 27.4-9 cover all wildlife species, regardless of 8(e) implications. IDM has included this reference to bats in order to maintain consistency throughout the Application/EIS. The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ When will the Wildlife Management Plan be developed? Who will approve it?	A preliminary Wildlife Management Plan is included in Chapter 29 of the Application/EIS. This plan will be further developed as the Project progresses (i.e., permitting and pre-construction planning). IDM understands that Working Group members and Mine Review Committee members will have the opportunity to review and comment on the plan as it develops.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Good to hear there will be a mountain goat monitoring plan. The design and execution of such will be important and should involve NLG.	IDM will invite NLG to participate in the development and implementation of the mountain goat monitoring plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Regarding Road access management, what is the plan for managing access into the valley? Will the road be gated and manned at the highway?	An Access Management Plan is included in Chapter 29 of the Application/EIS, which outlines the access restrictions. There will be a locked gate at the start of the Access Road (i.e., the turnoff from Highway 37A).

Date Comment Received	Source	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ On page 35 is the first use of the term ‘wildlife sensitive areas’. How will these be identified? Have they been identified already via baseline work? If the intent is to provide the info to project design engineers (as stated), this tells me that the information exists unless there are plans for additional baseline work pre-construction and mine design is still early enough to be sufficiently flexible. Would be good to see mapping of such.	The mapping of environmentally sensitive areas is discussed in IDM’s response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Designing and maintaining buildings to exclude wildlife should have ‘high’ effectiveness (not moderate, as listed) if done correctly.	Operational experience has shown that even with the effective implementation of this measure, wildlife seeking refuge, shelter, nesting, or roosting opportunities cannot be 100% excluded from Project infrastructure.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the last item on page 35, where are things at with regard to this? Has all the necessary investigative work been done to avoid impacts? E.g., have the sensitive vegetation communities been mapped? What is meant by ‘growth forms’? Glad to hear the plans will be implemented ;)	The mapping of environmentally sensitive areas is discussed in IDM’s response to comment #4. “Growth forms” is a way of describing the physical structure of a vegetation type.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ First mitigation on top of page 36, an effectiveness rating of ‘High’ seems rather speculative and optimistic at this early point in time.	IDM has revised the effectiveness of this to moderate. When coupled with other wildlife protection protocols, IDM maintains that the effectiveness is high.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Fifth mitigation on page 36, what are the access restrictions?	Please see IDM’s response to comment #41 regarding the Access Management Plan.

Date Comment Received	Source	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the first mitigation on page 37, we suggest that the COS be notified about problem bears before they are shot as well.	IDM has revised this mitigation measure in response to NLG's suggestion.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the third mitigation on page 37, we don't think it is appropriate (or possible) to define or monitor a local population. We suggest that effects monitoring be at the level of individual nests.	IDM has revised this mitigation measure in response to NLG's suggestion.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ Fifth mitigation on page 37, please reference the guidelines that will be used. When will measures be taken to discourage birds from nesting on infrastructure? During design?	The referenced guideline is: Avian Power Line Interaction Committee (2006): Suggested Practices for Avian Protection on Power Lines. IDM will begin implementing measures to discourage birds from nesting on infrastructure during detailed design.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the seventh mitigation on page 37, considering the definition of wildlife in the Treaty, this commitment is impractical and unworkable.	For the purpose of wildlife mitigation measures, IDM is not using the definition of wildlife used in the NFA.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the eighth mitigation on page 37, please specify the roads and sensitive areas to which these limits will apply.	Please see IDM's response to comment #41 regarding the Access Management Plan.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the ninth mitigation on page 37, if roadside pools do form, will they be dewatered? What if they are found to contain amphibian adults, eggs or larvae?	If such a pool is noted, an onsite QEP will assess and determine appropriate follow-up actions.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the second mitigation on page 38, native species should be used.	IDM has revised this mitigation measure in response to NLG's suggestion.

Date Comment Received	Source	Comment Received	IDM Response
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the fifth mitigation on page 38, what kind of deterrent methods might be employed?	Deterrents may include fencing and noisemakers.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the second mitigation on page 39, what does this mean?	Dust mitigation measures will be applied at locations and frequencies as defined in the Air Quality Management Plan (Chapter 29).
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the third mitigation on page 3[9], will there be targeted monitoring for toad migration during summer?	IDM will further refine wildlife monitoring programs prior to the start of construction.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the fifth mitigation on page 3[9], Have any roosts been detected? Were bat detectors set up by the portal entrance during the baseline program?	Bat detectors were deployed at two sites along the east bank of Bitter Creek and one along the forested edge of Clements Lake. No roosts have been detected.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the seventh mitigation on page 3[9], are wildlife habitat features currently known?	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the eighth mitigation on page 3[9], seems that access would not be built unless the project needed it. Does this mean that some areas are off limits to access development?	The avoidance of environmentally sensitive areas is a factor in determining the final design and placement of Project components. The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.
Jun 26, 2017	Technical Review Comments (Memo from LGL to NLG)	Table 27.4-9, page 33+ For the twelfth mitigation on page 3[9], again, are these features already identified?	The mapping of environmentally sensitive areas is discussed in IDM's response to comment #4.

27.4.3 Effects Assessment Methodology

Each Nisga'a Nation 8(e) interest in Table 27.4-1 will be addressed in the following sections. For each interest (or group of interests), the assessment will:

- Identify the geographic extent of the Treaty right as set out in the NFA, and establish whether or not the geographic extent of the Treaty right differs in any way from the spatial boundaries applicable to any related VC or indicator discussed elsewhere in the Application/EIS. If a difference is identified, determine the relevance to assessing potential environmental effects to the Nisga'a Nation Treaty right;
- Provide a narrative that clearly describes assumptions and limitations in understanding the full extent of potential adverse environmental effects on residents of Nisga'a Lands, Nisga'a Lands, and Nisga'a interests, as set out in the NFA, and identifies any empirical evidence or professional opinion that has been relied upon;
- Describe the measurable parameters by which IDM has quantified or described the potential effect(s);
- Identify any additional information being used to inform the assessment of potential adverse environmental effects on the Nisga'a Nation Treaty right;
- Determine whether there is the potential for an adverse environmental effect on the Nisga'a Nation Treaty right;
- Provide descriptions of any actions proposed for the purpose of effect prevention or mitigation of potential adverse environmental effects on the Nisga'a Nation Treaty right;
- Determine whether a residual adverse environmental effect, after mitigation, is reasonably expected, having a regard to the likelihood of an impact on the Nisga'a Nation Treaty right and confidence level of such predictions;
- Describe any residual adverse environmental effect on the Nisga'a Nation Treaty right in terms of its magnitude, duration, frequency, reversibility, context, and confidence level of such predictions;
- Describe any follow-up or monitoring measures IDM has proposed to ensure that mitigation measures are implemented and managed; and
- Provide a summary of any NLG feedback on the above-noted information requirements.

The description of existing conditions relevant to this 8(e) assessment is included in Section 27.2.2.3 (Cultural Activities and Practices) of this chapter. The information sources used to inform this assessment are listed in Section 27.1.1 (Information Sources).

In addition, for each 8(e) interest, the assessment will outline the consideration of the three bullets listed in the EIS Guidelines issued by the Agency for the proposed Project:

- **Ecological Effects:** The extent that a given component of the ecosystem could be altered by the Project so as to cause an adverse effect on that component of the ecosystem;
- **Treaty Right to Use:** The extent that a given component of the ecosystem which is currently used or could be used in the future by Nisga'a citizens (regardless of actual levels of past or current use) could be altered by the Project so as to cause an adverse effect on the use of that component of the ecosystem by Nisga'a citizens (or Nisga'a entity); and
- **Human Health:** The extent that a given component of the ecosystem could be altered by the Project so as to cause an adverse effect to the health of Nisga'a citizens and other residents of Nisga'a Lands who use that component of the ecosystem.

27.4.3.1 Methods

This section presents the methods used to determine potential residual effects on Nisga'a Nation Treaty rights. As this section draws on the result of other chapters of the Application/EIS (notably Wildlife and Wildlife Habitat (Chapter 16), Fish and Fish Habitat (Chapter 18), and Vegetation and Ecosystems (Chapter 15), the specific methodologies used to determine and characterize residual effects are presented in those respective chapters.

27.4.3.2 Residual Effects Criteria

Each residual effect has been characterized based on the following aspects:

- **Magnitude:** Magnitude is a measure of the intensity of a residual effect or the degree of change caused by the proposed Project (and other developments, if applicable) relative to baseline conditions, guidelines, or threshold values. Depending on the VC or IC, the characterization of magnitude may be numerical (e.g., absolute or relative effect size) or qualitative (e.g., low, moderate, and high).
- **Geographic Extent:** This is the spatial scale of the effect and is different from the spatial boundary (i.e., study area) for the residual effects characterization. The spatial boundary for the residual effects characterization represents the maximum area used for the assessment and is related to the spatial distribution and movement of VCs and ICs. However, the geographic extent of residual effects can occur on several scales within the spatial boundary of the assessment. Geographic extent refers to the area affected and is characterized according to the scale of the effect and the properties of the component or the measurement indicator.
- **Duration:** Duration is defined as the length of time the residual effect persists (usually in years) and is expressed relative to Project phases. The duration of an effect will typically be described as short-term, long-term, or permanent; definitions of short- and long-term would vary by VC or IC and consider VC- or IC-specific temporal characteristics.

- **Frequency:** Frequency refers to how often a residual effect will occur. Frequency is explained more fully by identifying when the residual effect occurs (e.g., once at the beginning of the Project). If the frequency is sporadic or regular, then the length of time between occurrences and the seasonality of occurrences (if present) is discussed.
- **Reversibility:** After removal of the Project activity or stressor, reversibility is the likelihood that the Project will no longer influence a VC or IC in a future predicted period. The period is provided for reversibility (i.e., duration) if a residual effect is reversible. Permanent residual effects are considered irreversible.
- **Context:** Context refers to the sensitivity and resilience of the VC or IC indicator to further changes in the environment that may be caused by the Project. For example, an ecologically sensitive site is likely to have little resilience to additional imposed stresses. Context draws heavily on an understanding of existing conditions that reflect cumulative effects of other projects, activities that have been carried out, and information about the effect of natural and human-caused trends on the condition of the VC or IC. Project effects may have a higher effect if they occur in areas or regions that have already been adversely affected by human activities or exhibit ecological fragility and have little resilience to imposed stresses.

27.4.3.3 Assessment of Likelihood

Likelihood is determined per the attributes listed in Table 27.4-4, where possible.

Table 27.4-4: Attributes of Likelihood

Likelihood Rating	Threshold
High	Effect has > 80% chance of effect occurring.
Moderate	Effect has 40-80% chance of effect occurring.
Low	Effect has < 40% chance of effect occurring.

27.4.3.4 Significance Determination

The significance of each biophysical residual effect has been brought forward to this section. The definition of “significant” or “not significant” for each residual effect is defined in its particular chapter.

Due to the unique nature of Treaty rights, IDM has made no determination of the significance of residual adverse effects for Nisga’a Nation Treaty rights. It would be inappropriate for IDM to make such a statement of determination.

27.4.3.5 Confidence and Risk

Confidence definitions are provided in Table 27.4-5.

Table 27.4-5: Confidence Ratings and Definitions

Confidence Rating	Threshold
High	There is a good understanding of the cause-effect relationship between the Project and a VC, and all necessary data are available to support the assessment. The effectiveness of the selected mitigation measures is moderate to high. There is a low degree of uncertainty associated with data inputs and/or modeling techniques, and variation from the predicted effect is expected to be low. Given the above, there is high confidence in the conclusions of the assessment.
Moderate	The cause-effect relationships between the Project and a VC are not fully understood (e.g., there are several unknown external variables or data for the Bitter Creek valley are incomplete). The effectiveness of mitigation measures may be moderate or high. Modeling predictions are relatively confident. Based on the above, there is a moderate confidence in the assessment conclusions
Low	Cause-effect relationships between the Project and a VC are poorly understood. There may be several unknown external variables and/or data for the Bitter Creek valley is incomplete. The effectiveness of the mitigation measures may not yet be proven. Modeling results may vary considerably given the data inputs. There is a high degree of uncertainty in the conclusions of the assessment.

27.4.3.6 Mitigation Measures

IDM has identified measures to avoid, minimize, mitigate, or otherwise address potential adverse effects to Nisga'a Nation Treaty rights.

Approaches considered to manage, mitigate, and/or monitor potential effects may include:

- Optimizing Alternatives;
- Design Mitigation;
- Best Available Technology;
- Best Management Practices;
- Restoration; and
- Offsetting.

27.4.3.6.1 Effectiveness of Mitigation Measures

The anticipated effectiveness of mitigation measures to minimize the potential for significant adverse effects is evaluated and classified as follows:

- Low effectiveness: After implementation of the mitigation measure, the effect is largely unchanged (i.e., little to no improvement in the condition of the VC or indicator).

- Moderate effectiveness: After implementation of the mitigation measure, the effect is moderately changed (i.e., a moderate improvement in the condition of the VC or indicator).
- High effectiveness: After implementation of the mitigation measure, the effect is significantly improved (i.e., major improvement in the condition of the VC or indicator), or the effect is eliminated.
- Unknown effectiveness: The mitigation measure has not been employed elsewhere in similar circumstances, and its effectiveness is unknown.

27.4.4 Fish, Aquatic Plants, and Marine Mammals

Chapter 8 of the NFA outlines Nisga'a Nation's Treaty rights to harvest fish and aquatic plants. Nisga'a Nation Treaty rights include Nass salmon (sockeye, pink, chinook, coho, and chum salmon originating in the Nass Area), Nass steelhead (i.e., winter and summer run steelhead originating in the Nass Area), eulachon (also known as oolichan) within the Nass Area, non-salmonid species of fish, aquatic plants, and marine mammals.

90% of the spawning population of eulachon in BC occurs in the Nass River (LGL Limited and Nisga'a Fisheries). Other eulachon populations in BC occur in in the Columbia, Fraser, Cowlitz, Kingcome, Bella Colla, Kemano, Skeena, Esctall, Klinaklini, Khyex, Bear, Kitimat, and Unuk watersheds (LGL Limited and Nisga'a Fisheries).

Eulachon have been reported in the upper estuary and in the lower parts of Bear River, downstream of the Bitter Creek Bridge (Cleugh 1979; Noble and Challenger 2015). Although anecdotal information indicates large Eulachon runs up until the mid-2000s, there has been a substantial decline in the past decade which some suspect is a result of gravel extraction and beaver activity on the Bear and Rainy rivers, respectively (Noble and Challenger 2015).

According to comments received during consultation with NLG, Nisga'a citizens are not known to currently pursue salmon or eulachon in the lower parts of the Bear River watershed nor in the estuary or upper reaches of the Portland Canal. The reason is largely to do with location, as the Nisga'a Villages are all situated along or near the Nass River, which has abundant runs of salmon actively harvested for food, social, and ceremonial purposes. There is also a commercial Nisga'a salmon fishery on the Nass and several well-established eulachon camps, where families gather on a seasonal basis to harvest and process eulachon grease. Currently there is no evidence to suggest that there are any Aboriginal fisheries on the lower reaches of the Bear River. Nonetheless, the Bear River lies within the Nass Area where Nisga'a Nation retains Treaty rights to harvest and manage fish.

27.4.4.1 Spatial Boundaries

The Project may affect Fish and Fish Habitat within the LSA and RSA determined for those VCs. These boundaries were selected based on the footprint of the mine and watershed-based potential effects. The LSA includes watercourses that have the greatest potential to be directly affected by mining activities. The LSA is located entirely within the Bitter Creek watershed, up to the glacial extent in its headwaters. The RSA includes those areas that may

be influenced by the indirect effects from the mine. The RSA includes the Bitter Creek watershed (including the glacial extent), the Bear River watershed (from American Creek to Stewart), and the northern end of the Portland Canal.

IDM recognizes that NLG has concern regarding potential effects to Nisga'a Nation Treaty rights throughout the Nass Area; however, no effects (either direct or indirect) are anticipated beyond the LSA delineated for Fish and Fish Habitat. The Nass Area is significantly larger than the Fish and Fish Habitat LSA; the Fish and Fish Habitat LSA represents approximately 0.4% of the Nass Area (111 km² compared to 28,838 km²).

27.4.4.2 Temporal Boundaries

The temporal boundary for this assessment includes the Construction, Operation, and Closure and Reclamation phases of the Project.

27.4.4.3 Project Interactions

As described in Chapters 15 (Vegetation and Ecosystems Effects Assessment), 16 (Wildlife and Wildlife Habitat Effects Assessment), and 18 (Fish and Fish Habitat Effects Assessment), the Project is not anticipated to have any significant adverse residual environmental effects within Nisga'a Lands.

Marine mammals are absent from the Bitter Creek valley, and the Project is not anticipated to affect marine mammals. Therefore, marine mammals have not been brought forward in this assessment.

It is IDM's understanding that Nisga'a Nation's primary interest in aquatic plants is seaweed (Prince Rupert Gas Transmission Project, 2014). Seaweed is absent from the Bitter Creek valley, and the Project is not anticipated to affect seaweed. Therefore, aquatic plants have not been brought forward in this assessment.

The Project may have effects on Fish and Fish Habitat, including direct mortality risk, reduction in fish health, and changes in fish habitat quantity or quality. Three primary Project components will interact with Fish and Fish Habitat:

- Underground mining;
- The TMF; and
- The Access Road, which will involve Bitter Creek infill during construction.

The only direct loss of fish habitat is anticipated through construction of the Access Road parallel to Bitter Creek. Instream works as a part of this activity could affect the availability of instream habitat features (such as pools and substrates) that could affect overwintering, spawning, and rearing habitat availability for fish. Aquatic resources (benthic invertebrates and periphyton) habitat may also be affected. Potential effects to aquatic resources have been considered as a pathway in the summary of potential effects to Fish and Fish Habitat.

The Fish VC in this assessment is represented by Dolly Varden, Bull Trout, Eulachon, and Salmonid species. Note that Salmonid species consist of all salmonids present in the LSA and

RSA, except for Dolly Varden and Bull Trout, since the latter were identified as separate sub-components early in the VC selection process.

Goldslide Creek is a non-fish bearing watercourse that discharges more than 5 km upstream from any fish-bearing waters in Bitter Creek. Goldslide Creek is not fish habitat due to its discharge into Bromley Glacier. It does not contribute to fish habitat in the form of food due to its distance from fish habitat below downstream fish barriers. It does make a minor contribution to Bitter Creek flow.

The potential interactions between proposed Project components and Fish and Fish Habitat are summarized in Table 27.4-6.

Table 27.4-6: Potential Project Interactions and Effects on Fish and Fish Habitat

Project Component/Activity	Dolly Varden	Bull Trout	Eulachon	Salmonid Species	Fish Habitat	Potential Effect / Pathway of Interaction with Fish and Fish Habitat
Construction Phase						
Workforce (including employment of staff and contractors)	X	X				Potential increased fishing pressure due to increased access and increased presence in the Bitter Creek valley.
Construct Access Road and Haul Road from Hwy 37A to the Upper Portal	X	X	X	X	X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition; direct mortality from mine footprint and associated infrastructure; habitat loss from mine footprint development and associated infrastructure; habitat loss from changes to streamflow and channel morphology; direct mortality from increased fishing pressure.
Install powerline from substation tie-in to the Lower Portal laydown area	X	X			X	Changes to surface water quality as a result of erosion and sedimentation, dust deposition.
Discharge of water from underground workings at the Mine Site	X	X	X	X	X	Changes to surface water quality as a result of mine water discharge; habitat loss from changes in streamflow.
Water withdrawal for the purposes of dust suppression and construction use (primarily contact water management ponds; secondarily Bitter Creek, Goldslide Creek, and Otter Creek) and to meet freshwater needs (Otter Creek, Goldslide Creek)	X	X			X	Habitat loss from changes to streamflow.
Clear and prepare the TMF basin and Process Plant site pad	X	X			X	Direct mortality and habitat loss due to mine footprint development and associated infrastructure; changes to water and sediment chemistry from erosion, sedimentation and dust deposition.
Excavate rock and till from the TMF basin and local borrows / quarries for construction activities (e.g. dam construction for the TMF)	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.

Project Component/Activity	Dolly Varden	Bull Trout	Eulachon	Salmonid Species	Fish Habitat	Potential Effect / Pathway of Interaction with Fish and Fish Habitat
Establish water management facilities including diversion ditches for the TMF and Process Plant	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Construct the TMF	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Construct the Process Plant and Run of Mine Stockpile location	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Construct water treatment facilities and test facilities at Bromley Humps	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Construct Bromley Humps ancillary buildings and facilities	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Commence milling to ramp up to full production	X	X			X	Changes in water and sediment chemistry from erosion, sedimentation and dust deposition.
Operation Phase						
Workforce (including employment of staff and contractors)	X	X				Potential increased fishing pressure due to increased access and increased presence in the Bitter Creek valley.
Use Access Road for personnel transport, haulage, and delivery of goods	X	X	X	X	X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Maintain Access Road and Haul Road, including grading and plowing as necessary	X	X	X	X	X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Maintain powerline right-of-way from substation tie-in to portal entrance, including brushing activities as necessary	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Discharge of water from underground facilities	X	X	X	X	X	Changes in surface water and sediment chemistry from mine discharge; habitat loss from changes to streamflow.
Extract ore from the underground load-haul-dump and transport to Bromley Humps to Run of Mine Stockpile (ore transport and storage)	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.

Project Component/Activity	Dolly Varden	Bull Trout	Eulachon	Salmonid Species	Fish Habitat	Potential Effect / Pathway of Interaction with Fish and Fish Habitat
Freshwater for the Process Plant will be obtained through water withdrawal from Bitter Creek	X	X			X	Habitat loss from changes to streamflow.
Treat and discharge, as necessary, excess water from the TMF	X	X	X	X	X	Changes in hydrology, and water and sediment chemistry from TMF discharges.
Progressively reclaim disturbed areas no longer required for the Project	X	X			X	Changes in surface water and sediment chemistry from erosion and sedimentation.
Closure and Reclamation Phase						
Workforce (including employment of staff and contractors)	X	X				Potential increased fishing pressure due to increased access and increased presence in the Bitter Creek valley.
Use and maintain Access Road for personnel transport, haulage, and removal of decommissioned components until road is decommissioned and reclaimed.	X	X	X	X	X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Decommission underground infrastructure	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Flood underground	X	X	X	X	X	Changes in hydrology, and water and sediment chemistry from mine discharges.
Decommission and reclaim Lower Portal Area and Powerline	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Decommission and reclaim Haul Road	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition.
Decommission and reclaim all remaining mine infrastructure (Mine Site and Bromley Humps, except TMF) in accordance with Closure Plan	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition
Construct the closure spillway	X	X			X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition
Treat and discharge water from the TMF	X	X	X	X	X	Changes to surface water quality as a result of discharge, erosion and sedimentation, and dust deposition

Project Component/Activity	Dolly Varden	Bull Trout	Eulachon	Salmonid Species	Fish Habitat	Potential Effect / Pathway of Interaction with Fish and Fish Habitat
Conduct maintenance of mine drainage, seepage, and discharge	X	X	X	X	X	Changes in hydrology, and water and sediment chemistry from discharges
Remove discharge water line and water treatment plant	X	X			X	Changes in surface water and sediment chemistry (due to filling of the TMF and discharge via the closure spillway)
Decommission and reclaim Access Road	X	X	X	X	X	Changes in surface water and sediment chemistry from erosion, sedimentation and dust deposition
Post-Closure Phase						
Flood underground	X	X	X	X	X	Changes to surface water quality as a result of ML/ARD and groundwater interaction

No effects of the Project are anticipated on salmonid species, eulachon, or coastrange sculpin as they are not found in the mainstem of Bitter Creek. Sockeye, pink, and chum salmon are absent from the LSA, and the Project is not anticipated to affect these species of salmon.

No effects of the Project are anticipated on steelhead. Steelhead only occur in the Bear River, and the Project is not anticipated to result in residual effects outside of the extent of Bitter Creek.

Measures to avoid, minimize, mitigate, or otherwise address the potential effects of the Project on fish and fish habitat are listed in Section 27.4.4.5.

Some residual effects on fish habitat and Dolly Varden are anticipated due to the interactions between the Project and Bitter Creek. These are detailed in Section 27.4.4.6.

27.4.4.4 Measurable Parameters

Based on the anticipated interactions discussed above, this assessment will consider:

- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest Nass salmon (pink, chinook, coho, and chum salmon originating in the Nass Area);
- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest eulachon within the Nass Area;
- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest Nass steelhead (i.e., winter and summer run steelhead originating in the Nass Area); and
- Potential changes in the ability to of Nisga'a citizens to exercise their Treaty right to harvest non-salmon species of fish (i.e., Dolly Varden, rainbow trout, and coastrange sculpin).

27.4.4.5 Mitigation Measures

The potential effects, proposed mitigation measures, and their effectiveness are summarized using Table 27.4-7.

Following the application of mitigation measures, IDM anticipates that there may be residual effects on fish habitat and Dolly Varden in Bitter Creek.

Table 27.4-7: Proposed Mitigation Measures for Fish and Fish Habitat

VC/IC	Potential Effects	Mitigation Measures	Rationale	Applicable Phase(s)	Effectiveness ¹	Uncertainty ²	Residual Effect	
Fish (as represented by dolly vardon, bull trout, eulachon and Oncorhynchus salmonids)	Increased fishing pressure	No fishing policy for Project employees and guests	Staff training and awareness plus monitoring and enforcement of company policies are key components of many of IDM's management plans.	Construction, Operation, Closure and Reclamation	High	Low	No	
		Existing DFO regulations will be followed.	IDM is committed to lawful operation of the Project.					
		All Project roads will be closed to the public, including private vehicles (snowmobile, all-terrain vehicles, etc.) and all foot traffic, with the possible exception of individuals with existing rights to access the Bitter Creek valley. Project road use will be restricted only to Persons required for Project construction, operation, and maintenance.	Public awareness is a key component of IDM's management plans.					
	Changes in aquatic resources	All implemented mitigation measures for Aquatic Resources will serve as mitigation for Fish and Fish Habitat relative to this effect (Chapter 17, Section 17.6).						No
	Changes in surface water quality	All implemented mitigation measures for Surface Water Quality will serve as mitigation for Fish and Fish Habitat relative to this effect (Chapter 13, Section 13.6).						Yes
	Changes in sediment quality	All implemented mitigation measures for Sediment Quality will serve as mitigation for Fish and Fish Habitat relative to this effect (Chapter 14, Section 14.6).						No
	Changes in stream flow	All implemented mitigation measures for Hydrology will serve as mitigation for Fish and Fish Habitat relative to this effect (Chapter 12, Section 12.6.3).						Yes
		Water withdrawal will follow provincial regulatory requirements and standard best practices to avoid adverse impacts to streamflows, fish and fish habitat.	IDM is committed to lawful operation of the Project.	Operation, Closure and Reclamation	High	Low		
	Effects of blasting	All implemented mitigation measures for Surface Water Quality will serve as mitigation for Fish and Fish Habitat relative to this effect (Chapter 13, Section 13.6).						No
		Blasting activities will be limited to the Mine Site during operations; there is no potential for effects on fish from explosive shockwaves as the blasting zone will not be near any fish-bearing watercourses.	Avoidance of blasting activities within fish-bearing watercourses.	Construction, Operation, Closure and Reclamation	High	Low		
Capture surface runoff and diverting it to the Portal Collection Pond in the Mine Site or the TMF in Bromley Humps for treatment prior to discharge.		Minimizes the potential for increased nitrogen loading to streams	High					
Fish Habitat	Habitat loss	Infrastructure (including the Access Road) shall be designed in a manner that minimizes or avoids habitat loss to Fish and Fish Habitat, including minimize the number of stream crossings.	Directly avoids and minimizes the amount of habitat loss to fish and fish habitat	Construction	Moderate (Some habitat loss will occur)	Low	Yes	
		Road crossings have been designed to avoid unnecessary impact on fish-bearing streams.						

¹Effectiveness: Low = measure unlikely to result in effect reduction; Moderate = measure has a proven track record of partially reducing effects; High = measure has documented success (e.g., industry standard; use in similar projects in substantial effect reduction)

²Uncertainty: Low = proposed measure has been successfully applied in similar situations; Moderate = proposed measure has been successfully implemented, but perhaps not in a directly comparable situation; High = proposed measure is experimental, or has not been applied in similar circumstances

27.4.4.6 Potential Residual Effects

Characterizations of residual effects for the Fish and Fish Habitat Effects Assessment are summarized in Table 27.4-8.

Table 27.4-8: Residual Effect Characterization Definitions for Fish and Fish Habitat

Criteria	Characterization for Fish and Fish Habitat
Magnitude	<ul style="list-style-type: none"> • Low (L): The magnitude of effect is within the range of natural variation and is unlikely to affect the existing productive capacity of fish habitat. • Moderate (M): The magnitude of the effect is at the limits of natural variation or habitat changes affect up to 10% of the available habitat in a watercourse, such that the productive capacity of the habitat may be reduced and affect fish populations in the entire watercourse; and/or the value of the measurement indicator is up to 30% greater than guideline or threshold value for the protection of aquatic life. • High (H): The magnitude of effects exceeds natural variation, or habitat changes affect more than 10% of the available habitat in a watercourse, such that the productive capacity of the habitat may be reduced and affect an entire fish population, or more than one fish population; and/or the value of a measurement indicator is more than 30% greater than guideline or threshold value for the protection of aquatic life.
Geographical Extent	<ul style="list-style-type: none"> • Discrete (D): Effect is limited to the immediate receiving environment in Goldslide Creek watershed (mine area) or the immediate freshwater environment in Bitter Creek (TMF area, Access Road) • Local (L): Effect is limited to the immediate receiving environment in Goldslide Creek watershed (Mine Site) or the immediate freshwater environment in Otter Creek (Bromley Humps) or the immediate receiving environment in Bitter Creek (Access Road). • Regional (R): Effect extends across the RSA • Beyond Regional (BR): Effect extends beyond the RSA and beyond the province (transboundary effects)
Duration	<ul style="list-style-type: none"> • Short term (ST): Effect lasts less than 18 months (during the Construction Phase of the Project). • Long term (LT): Effect lasts greater than 18 months and less than 22 years (encompassing Operation, Reclamation and Closure, and Post-Closure Phases) • Permanent (P): Effect lasts more than 22 years
Frequency	<ul style="list-style-type: none"> • One time (O): Effect is confined to one discrete event (month). • Sporadic (S): Effect occurs rarely and at sporadic intervals. • Regular (R): Effect occurs on a regular basis. • Continuous (C): Effect occurs constantly.
Reversibility	<ul style="list-style-type: none"> • Reversible (R): Effect can be reversed. • Partially reversible (PR): Effect can be partially reversed. • Irreversible (I): Effect cannot be reversed, is of permanent duration.

Criteria	Characterization for Fish and Fish Habitat
Context	<ul style="list-style-type: none"> • High (H): the receiving environment has a high natural resilience to imposed stresses, and can respond and adapt to the effect. • Neutral (N): the receiving environment has a neutral resilience to imposed stresses and may be able to respond and adapt to the effect. • Low (L): the receiving environment has a low resilience to imposed stresses, and will not easily adapt to the effect.

27.4.4.6.1 Potential Residual Effects to Fish Habitat

There will be no fish habitat loss under the mine infrastructure in Bromley Humps or the Mine Site because there are no fish bearing watercourses within these areas. Loss of non-fish bearing aquatic habitat is described in the assessment for Aquatic Resources (Chapter 17).

No residual effects are anticipated on Bull trout, Eulachon or Salmonid Species as they do not occur in the LSA or mainstem of Bitter Creek where road access is proposed.

There will be no instream fish habitat loss at watercourse crossings along the Access Road, because only two crossings, Roosevelt Creek and Hartley Gulch, are fish bearing and these will be facilitated using clearspan bridges. No instream fish habitat loss is associated with clearspan bridges, as there is no instream infrastructure required for this type of crossing. Riparian habitat loss at clear span bridges is expected where the road right of way intersects with the riparian buffer zone.

There is potential for fish habitat loss where infilling for the Access Road is required within the Bitter Creek channel. The proposed road alignment along the North/North East bank of Bitter Creek follows an abandoned existing road at the toe of steep hillside on the North side of Bitter Creek. To avoid destabilizing sensitive slopes and putting road users and workers in an unsafe position, portions of the Access Road will encroach on the Bitter Creek channel.

Sections of the existing road were washed away during a flood event in 2011, and therefore upgrading of the road along its original alignment requires construction within the channel formed during the 2011 flood. However, the 2011 flood was 1-in-25 to 1-in-100-year event, and therefore some of the areas where the road construction is proposed are very rarely wetted and well above the annual high water mark.

One 150 m section of the Access Road requires re-alignment of Bitter Creek at the toe of a weak fractured bedrock face. The works involve realignment of the Bitter Creek channel towards the South/South East bank, construction of a road prism along North/North East bank, with bank armoring. Approximately 1.14 ha of habitat will be altered; however, no net loss of habitat is expected, because the existing channel can accommodate the annual range of flows, and realignment of the creek will not reduce average channel width.

Approximately 2.7 ha of riparian habitat will be disturbed adjacent to fish bearing streams (e.g. earthworks, armouring, slope cut and fill, roadway surface, crossings), the majority of this occurs where the road right of way intersects with the Bitter Creek riparian buffer zone. Some of the disturbed riparian area will be re-vegetated post construction, although maintenance of a maximum canopy height will be necessary to maintain slight lines along the road. The road will be deactivated prior to the end of the Closure and Reclamation Phase, using forestry practices, and therefore riparian vegetation will revert to near baseline conditions.

The characterization of residual effects on fish habitat is summarized in Table 27.4-9.

Table 27.4-9: Characterization of Residual Effects on Fish Habitat

Criteria	Interaction with Fish Habitat
Magnitude	Low: The area of habitat loss is limited to the LSA and to less than 150 m stretch along the Access Road/Bitter Creek.
Geographical Extent	Discrete: The areas of total habitat loss are limited to a short section of Bitter Creek from the road.
Duration	Short-term: Habitat loss occurs once during the Construction Phase; fish populations will recover once conditions return to their pre-disturbance state.
Frequency	One time: Habitat loss will be limited to a discrete occurrence during the construction of the Access Road.
Reversibility	Partially Reversible: Replacement habitat will become available when the channel is realigned, although it may not be the same quality or type or habitat. Riparian areas will be replanted were possible, and reclaimed in closure.
Context	High: Fish populations have high resilience to a relatively small and temporary decrease in available habitat.

The likelihood rating for this residual effect on Fish Habitat is moderate; the residual effect has 40-80% chance of effect occurring.

The residual effect on Fish Habitat is determined to be not significant. Residual effects are limited to the local area (less than 200 m), and existing habitat does not provide critical function that could not be provided elsewhere in the local area. Any loss of habitat will be offset, as required, and determined by the federal Department of Fisheries and Oceans (DFO) in subsequent permitting stages.

The confidence rating for this residual effect on Fish Habitat is high. There is sufficient baseline data to understand the form and function of existing Fish Habitat. The proposed mitigation measures are commonly applied best management practices with a high degree of effectiveness. This leads to high confidence in the conclusions of the assessment.

27.4.4.6.2 Potential Residual Effects to Dolly Varden due to Surface Water Quality

Residual effects on Fish from changes in Surface Water Quality are expected, based on the Water and Load Balance Model (Appendix 14-C) which, for the mitigated scenario, predicts that some water quality parameters will exceed CCME or BC WQGs.

The Water and Load Balance Model (Appendix 14-C) predicted the maximum monthly concentrations of water quality parameters in Goldslide Creek, Bitter Creek, Rio Blanco Creek and Bear River, occur for operations (Years 1 to 6) and closure/post-closure (Years 7 to 21). Water and Load Balance Model predictions are summarized in the Surface Water Quality Effects Assessment (Chapter 13). Contaminants of potential concern (COPCs) for Fish were identified as those parameters predicted to exceed water quality guidelines (CCME or BC MOE), in the expected case (P50), at model assessment nodes located in the fish-bearing areas (BC06 and BC02). The following COPCs were identified in Bitter Creek, which are discussed below in relation to residual effects on Dolly Varden:

- Operations: selenium
- Post Closure: cadmium, selenium, silver, and zinc

There are no potential contaminants of concern for Fish in Bear River.

Cadmium

There are cadmium exceedances during operations in Bitter Creek. During post-closure, cadmium marginally exceeds the BC WQG (1.1 times and 1.2 times higher) at BC06 and BC02, respectively, and exceeds the CCME WQG (1.6 times and 1.7 times higher) at BC06 and BC02, respectively.

Toxicity of cadmium (Cd) is highly variable among taxonomic groups and life-stages, and is also highly dependent on length of exposure. Excess cadmium interferes with the uptake of calcium by fish, which can result in cellular damage, decreases in metabolic activity, increased mortality, decreased growth, and decreased reproductive capacity and success (BC MOE, 2015). The BC WQG is the more relevant guideline for Bitter Creek, whereas the CCME guidelines are more stringent as they apply to all Canadian waters. Cadmium has been found to be toxic to salmonid species; however, tolerance is highly dependent on species and life-stage. Rainbow Trout are particularly sensitive to high cadmium concentrations, whereas Bull Trout have been found to be more tolerant (Hansen et al., 2002).

The exceedances of the BC WQG are marginal, and therefore adverse effects on Dolly Varden from water borne exposure to this contaminant are expected to be low. Furthermore, exceedances are seasonal (spring / summer), thereby limiting the potential for chronic effects on Dolly Varden.

Selenium

Selenium exceeds the BC WQG and CCME WQG during both operations and post-closure at both BC06 and BC02. During operations, BC WQGs are exceeded by 1.2 times and 2.1 times and CCME WQGs are exceeded by 2.7 times and 4.1 times at BC06 and BC02, respectively.

During post-closure, BC WQGS are exceeded by 2.2 times and 3.8 times at BC06 and BC02, respectively. These exceedances are largely due to background concentrations, which exceeded guidelines in both the water and sediment.

CCME and BC water quality guidelines for selenium are based on a lowest observed effect level (LOEL) of 0.01 mg/L introduced by the International Joint Commission (IJC) to protect species in the Great Lakes (IJC, 1981). For the CCME guideline, a safety factor of 10 was applied to the LOEL to end up with the guidance of 0.001 mg/L. The BC WQG of 0.002 mg/L incorporates a safety factor of 5 to recognize that selenium is an essential trace element for animal nutrition and that it is the bioaccumulation of selenium through the food chain (chronic effects) that is the major source, not through the water column.

Selenium has the potential to induce both reproductive and non-reproductive effects in fish. Reproductive impacts originate from the maternal transfer of selenium, whereas non-reproductive effects are related to direct effects on individuals, and both primarily result from dietary uptake (Lemly, 2008; DeForest and Adams, 2011). Chronic effects of selenium toxicity include lack of fertilization, hatchability and higher mortalities of eggs as well as increased cataracts, pathological alterations in liver, kidneys, heart and ovaries and skeletal deformities (Lemly, 1997; 2002). The likelihood of adverse effects to fish in Bitter Creek is low, as selenium exceeds BC WQG during the winter months (September to March/April). Additionally, a difference in selenium toxicity and bioaccumulation has been noted between lentic and lotic systems. In a review compiled by Adams *et al.* (2000), a clear distinction was demonstrated between fast and slow moving water systems, with selenium bioaccumulation generally ten times greater in lentic environments in comparison to lotic environments. Bitter Creek is a fast moving, lotic system, therefore bioaccumulation and associated dietary uptake by fish are expected to be low.

Silver

There are silver exceedances during operations in Bitter Creek. During post-closure, silver is below BC WQG at both BC06, and marginally exceeds the CCME WQG (1.6 times and 1.2 times higher) at BC06 and BC02, respectively.

Silver uptake in freshwater fish mainly occurs in cells related to nutrient uptake and ion regulation on the gills (CCME, 2015). The inhibition of sodium and chloride uptake channels on fish gills due to silver ions can negatively impact ion balances (CCME, 2015).

An effect on Dolly Varden from increased silver concentrations is considered highly unlikely as concentrations will not exceed the BC WQG and exceedances of the CCME guideline are small and occur in six months of the year only.

Zinc

There are zinc exceedances during operations in Bitter Creek. During post-closure zinc is predicted to be below the CCME WQG. Zinc will exceed the BC WQG (1.3 times higher) at BC06 but be essentially equal to or below the guideline at BC02.

Zinc is an important micronutrient and is therefore essential in the structure of numerous proteins (Hogstrand and Wood, 1996). Uptake of zinc primarily occurs on fish gills, and high

concentrations of calcium in the water can reduce uptake (Bradley and Sprague, 1985). High concentrations of zinc can cause physical damage to the gills, which then induces hypoxia (Spry and Wood, 1984). Lower concentrations of zinc have been seen to impede calcium uptake, and cause hypocalcemia (Spry and Wood, 1985). Zinc exceedances at BC06 is predicted to occur during April to July when water hardness is lower. However, the overall potential for zinc toxicity to fish is expected to be low given the seasonal frequency and small magnitude of exceedance of the BC WQG.

The characterization of residual effects on Dolly Varden is summarized in Table 27.4-10.

Table 27.4-10: Characterization of Residual Effects on Dolly Varden due to Changes in Water Quality

Criteria	Interaction with Dolly Varden
Magnitude	Low: the effect on Dolly Varden is at the limits of natural variation, as only one parameter (selenium) is predicted to exceed the BC WQG for the protection of aquatic life by more than 30%.
Geographical Extent (Biophysical)	Local: Effect is limited to the immediate freshwater environment in Bitter Creek (TMF and Access Roads).
Duration	Permanent: changes to Surface Water Quality from TMF and Mine Site discharge are predicted to be beyond the Post-Closure Phase.
Frequency	Sporadic: Discharges and predicted guideline exceedances occur on an intermittent basis, such that effect on Dolly Varden may not occur during periods where there are no discharges.
Reversibility	Reversible: After post-closure, the Surface Water Quality parameters, and therefore potential effects on Fish (Dolly Varden), are expected to revert back to within baseline conditions.
Context	High: Fish can recover once water quality reverts to baseline conditions.

The likelihood rating for this residual effect on Dolly Varden is low.

Exceedances of water quality guidelines are predicted, but any effects on Fish (Dolly Varden) will be localized and have no far-reaching effects on regional productivity or diversity. Overall, ecological conditions that support Fish populations relative to existing baseline will be maintained. Therefore, the residual effect is considered not significant.

Confidence in the significance determination for this effect is Moderate, because the magnitude of the effect (changes in Surface Water Quality concentrations) cannot be fully quantified but only inferred from the water quality predictions. Monitoring of the aquatic environment, including fish tissue, as part of the MMER and the Project AEMP (Volume 5, Chapter 29) will provide further confidence in managing the risk of selenium on fish populations in the LSA.

27.4.4.6.3 Potential Residual Effects to Dolly Varden due to Changes in Streamflows

A residual effect to Fish and Fish Habitat from changes in streamflow in Bitter Creek is anticipated based on the water quantity predictions in Appendix 14-C (Table 27.4-11).

During operations, increases in flow will occur in Bitter Creek as result of mine discharge into Goldslide Creek.

The maximum predicted increase in flow in January and December is 15% and 10% of baseline conditions at BC06 and BC02 respectively. During freshet and summer (May to September) the change in flow is negligible in Bitter Creek.

The increased flow during operations for the winter is much less than the peak flows during the summer in Bitter Creek, so the increase in flow during the winter is not expected to have any effect on the geomorphology of the stream channel. Under natural conditions, winter is a low flow period. Dolly Varden egg incubation occurs over the winter period, and increases in flow could therefore affect incubating eggs and fry emergence timing. Increased winter flows are also expected to improve the availability of overwintering habitat (deeper areas that do not freeze to bottom) for juveniles.

Table 27.4-11: Characterization of Residual Effects on Dolly Varden due to Changes in Streamflows

Criteria	Interaction with Dolly Varden
Magnitude	Low , based on the predictions for increases in flow.
Geographical Extent (Biophysical)	Local: Effect is limited to the immediate freshwater environment in Bitter Creek (TMF and Access Roads).
Duration	Short-term: Changes to streamflows from discharge inputs is limited to the Operation phase.
Frequency	Regular: Flow increases will occur seasonally during the winter months.
Reversibility	Reversible: After operations, the flow regime will return to within baseline levels and therefore Fish and Fish Habitat will recover as well.
Context	High: Fish and Fish Habitat can recover once flows revert to baseline levels.

The likelihood of effects to Fish from changes in streamflows in Bitter Creek is high.

Although effects on Dolly Varden life stages may occur as a result of winter flow increases in Bitter Creek, the effect will be localized and have no far-reaching effects on regional productivity or diversity. The effect is also seasonal (winter only), short-term (operations), and reversible. Overall, ecological conditions that support Fish populations relative to existing baseline will be maintained. Therefore, the residual effect is considered not significant.

Confidence in the significance determination for this effect is Moderate, because the magnitude of the effect can be indirectly quantified (magnitude of flow changes) and the mechanism through which changes in streamflow impact Fish and Fish Habitat is reasonably well understood.

27.4.4.7 EIS Guideline Requirements

27.4.4.7.1 Ecological Effects

The ecological effects of the Project on Nass salmon, eulachon, steelhead, and non-salmon fish are described in Section 27.4.4.3.

27.4.4.7.2 Treaty Right to Use

Besides ecological effects, the only other factor that could influence Nisga'a citizens' ability to harvest fish in the Bitter Creek valley is access. In consultation with Nisga'a Nation, IDM will develop an Access Management Plan that ensures appropriate access for Nisga'a citizens to exercise Treaty rights.

27.4.4.7.3 Human Health

IDM has conducted a HHRA to evaluate the effects of chemicals of potential concern (COPCs) resulting from all Project activities during construction and operation. The HHRA has been completed for baseline conditions and considers all phases of the Project to yield estimates of incremental risks. The HHRA has been completed in accordance with applicable federal (e.g., Health Canada), provincial (e.g., BC MoE), and regional (e.g., Northern Health) risk assessment guidance.

Fish are present downstream of the Project site, in the lower reaches of Bitter Creek, and will not experience prolonged exposure to COPCs. This limited exposure is unlikely to result in elevated levels of metals in fish tissues that would be consumed and adversely affect humans.

Based on the available information and the results of the HHRA conducted in support of the Project, no residual adverse effects are anticipated on Nisga'a citizens' health resulting from the consumption of fish in the Bitter Creek valley.

27.4.4.8 Follow-up Measures

IDM has developed a series of management plans targeting anticipated Project-specific mitigation and monitoring requirements. These are listed in Part E, Chapter 29 of the Application/EIS. These plans will be implemented to address potential effects on Nisga'a Nation Treaty rights:

- Environmental Management System;
- Adaptive Management Plan;
- Access Management Plan;
- Air Quality and Dust Management Plan;
- Aquatic Effects Management and Response Plan;

- Erosion and Sediment Control Plan;
- Groundwater Monitoring Plan;
- Material Handling & Geochemistry Management Plan;
- Noise Abatement Plan;
- Site Water Management Plan;
- Spill Contingency Plan;
- Tailings Management Plan;
- Terrain and Soil Management Plan;
- Vegetation and Ecosystems Management Plan;
- Waste Management Plan; and
- Wildlife Management Plan

27.4.5 Wildlife and Migratory Birds

27.4.5.1 Spatial Boundaries

The Project may affect Wildlife (including migratory birds) and Wildlife Habitat within the LSA and RSA determined for those VCs. These boundaries were selected based on the footprint of the mine and watershed-based potential effects. The LSA encompasses the area (14,594.6 hectares) from the mouth of Bitter Creek to the headwaters at the base of the Bromley Glacier and the edge of the Cambria Icefields. The RSA is a much larger area surrounding the LSA and is intended to provide a regional context to the wildlife and wildlife habitat found within the LSA. The RSA encompassed 205,350 ha, from Meziadin Lake in the east to the head of the Portland Canal in the west, and from Hastings Arm in the south to the upper end of the American Creek watershed to the north. The RSA was also intended to provide regional context for the LSA and to provide an assessment of wide ranging species such as Grizzly Bear and Wolverine.

IDM recognizes that NLG is concerned regarding potential effects to Nisga'a Nation Treaty rights throughout the Nass Area; however, no effects (either direct or indirect) are anticipated outside of the LSA and RSA outlined for Wildlife and Wildlife Habitat. The Nass Area is significantly larger than the Wildlife and Wildlife Habitat LSA; the Wildlife and Wildlife Habitat LSA represents approximately 0.55% of the Nass Area (159 km² compared to 28,838 km²).

27.4.5.2 Temporal Boundaries

The temporal boundary for this assessment includes the Construction, Operation, and Closure and Reclamation phases of the Project.

27.4.5.3 Project Interactions

As described in Chapters 15 (Vegetation and Ecosystems Effects Assessment), 16 (Wildlife and Wildlife Habitat Effects Assessment), and 18 (Fish and Fish Habitat), the Project is not anticipated to have any environmental effects within Nisga'a Lands.

27.4.5.3.1 Habitat Availability: Habitat Alteration and Sensory Disturbance

Habitat alteration includes the loss or alteration of wildlife habitat due to the Project footprint, which will result in the displacement of wildlife for a period of time. Habitat alteration will occur during the Construction Phase when the Project footprint is cleared of vegetation, but will persist throughout all phases until Project components are removed and reclaimed. All Project components will be temporary. Disturbed areas no longer required for the Project will be progressively reclaimed, and any Project components remaining once production has ceased will be removed and reclaimed.

Sensory disturbance includes the potential effects of Project-related noise, light, dust, or human presence on wildlife, which may result in behavioral changes, different predator-prey interactions, or avoidance of the Project footprint and adjacent areas. Sensory disturbance will occur during all Project phases. Sensory disturbance will be greatest from the Construction Phase through to the Closure and Reclamation Phase, but is anticipated to lessen during the Post-Closure Phase when minimal monitoring and maintenance activity will occur on site. Once production is completed, all Project components will be removed and reclaimed and the potential effects of sensory disturbance should cease.

Measures to avoid, minimize, mitigate, or otherwise address the potential effects of the Project on wildlife habitat availability are listed in Section 27.4.5.5.

Habitat availability has been identified as a potential residual effect on mountain goat, moose, grizzly bear, furbearers, and migratory birds. These residual effects are discussed in Section 27.4.5.6.

27.4.5.3.2 Disruption to Movement

Disruption to movement includes the potential effects of Project activities and infrastructure on habitat connectivity and wildlife movements. Project activities and infrastructure may create physical or sensory barriers or filters to movement between daily or seasonal habitats, which could have implications for the long-term persistence and viability of wildlife populations. Habitat fragmentation occurs through habitat removal (i.e., through vegetation clearing) in a location and in a manner that reduces habitat connectivity, potentially disrupting wildlife movements. The addition of linear features on the landscape (e.g., roads, power line corridors, and seismic lines) is a common example of how habitat fragmentation can occur. Disruption to movement can also occur when infrastructure blocks wildlife movement through restricted terrain features (e.g., a narrow valley or canyon) or restricts wildlife movement within or between waterbodies. Increased traffic levels along the highway can confound the issue, adding a sensory barrier or filter to an already existing physical barrier or filter. Disruption to movement may occur during all Project phases and is considered a potential effect for all wildlife VCs except bats and birds, as flight allows movements to continue uninterrupted by Project activities or infrastructure. Once operations cease, all Project components will be removed, the site reclaimed, and the potential effects of disruption to movement should cease.

Measures to avoid, minimize, mitigate, or otherwise address the potential effects of the Project on wildlife movement are listed in Section 27.4.5.5.

Habitat disruption has been identified as a potential residual effect on mountain goats, moose, grizzly bear, furbearers, and migratory birds. These residual effects are discussed in Section 27.4.5.6.

27.4.5.3.3 Mortality Risk: Direct, Indirect, Chemical Hazards, and Attractants

Direct mortality risk includes the potential direct effects of Project activities and infrastructure on wildlife mortality risk caused by vegetation clearing and ground disturbance during construction, collisions with Project-related traffic on the Mine Site and Access Road, or collisions and electrocution caused by power lines. Mortality risk may occur during the Construction Phase through to the Closure and Reclamation Phase and is considered a potential effect via different pathways for each wildlife VC. Direct mortality risk due to vegetation clearing and ground disturbance is more closely related to small mammals, roosting bats, nesting birds, and amphibians that may not be able to escape clearing equipment. Direct mortality risk due to wildlife-vehicle collisions is pertinent for all wildlife VCs, while direct mortality risk due to power lines is linked to bats and birds only. Direct mortality risk will be greatest during the Construction Phase when the Project footprint is cleared of vegetation and from the Construction Phase through the Operation Phase when vehicle traffic is anticipated to be highest. The risk is anticipated to lessen during the Closure and Reclamation Phase and will be negligible during the Post-Closure Phase when minimal human activity will occur on site for monitoring and maintenance activities. Once operations cease, all Project components will be removed, the site will be reclaimed, and the potential effects of direct mortality risk should cease.

Indirect mortality risk includes the potential indirect effects of Project activities and infrastructure on wildlife mortality risk caused by increased hunting pressure (both legal and illegal) due to improved access, new travel corridors that facilitate predation, or entrapment in Project facilities such as holding ponds, buildings, or along the Access Road corridor during winter due to high snowbanks. This potential effect may occur during the Construction Phase through to the Closure and Reclamation Phase and is considered a potential effect via different pathways for each wildlife VC. Indirect mortality risk due to increased hunting pressure is related to large mammals and furbearers. Indirect mortality risk due to facilitated predation is addressed for Mountain Goat and Moose only, while indirect mortality risk due to entrapment is addressed for all wildlife VCs. The risk is anticipated to be negligible during the Post-Closure Phase when minimal human activity will occur on site for monitoring and maintenance activities. Once production is completed, all Project components will be removed and reclaimed and the potential effects of indirect mortality risk should cease.

Chemical hazards include the potential effects of any Project-related chemicals that may cause adverse health effects on wildlife VCs. Exposure to chemical hazards may occur via uptake from the surrounding environment (e.g., water, dust, soil, or sediment) or via the ingestion of contaminated tissue (e.g., vegetation or animal prey). Exposure may also occur via direct contact with chemical hazards at on-site storage areas. This potential effect may occur during all Project phases and is considered an effect pathway for all wildlife VCs. Chemical hazards related to Project activities may persist within and adjacent to the Project footprint following the Post-Closure Phase (e.g., metal leaching and acid rock drainage).

Attractants include the potential effects of any Project-related features or materials that may interest or provide resources for wildlife VCs, which could lead to behavioral changes and potential human-wildlife conflicts. This may occur during the Construction Phase through to the Closure and Reclamation Phase and is considered a potential effect for all wildlife VCs. Project features or materials that may attract wildlife include infrastructure where odors or food sources associated with petroleum products, food waste and associated domestic garbage, or grey water and sewage may be present. Project infrastructure may also provide refuge or shelter for small mammals or perching, nesting, or roosting sites for bats and birds. Waterbirds and amphibians may be attracted to holding ponds or roadside pools as stop-over, foraging, or breeding sites. Amphibians may also be attracted to road surfaces during the summer that retain heat after sunset. Vegetation growing along Project roads or within the powerline right of way may attract grazing or browsing wildlife, while roadkill carcasses along Project roads may attract scavenging wildlife. Wildlife may also be attracted to salt on Project roads used for deicing or dust suppression, and Project roads and the powerline right of way may create favorable travel corridors. Once production is completed, all Project components will be removed and reclaimed and the potential effects of attractants should cease.

Measures to avoid, minimize, mitigate, or otherwise address the potential effects of the Project on wildlife mortality risk are listed in Section 27.4.5.5.

Mortality risk has been identified as a potential residual effect on mountain goats, moose, grizzly bear, furbearers, and migratory birds. These residual effects are discussed in Section 27.4.5.6.

27.4.5.4 Measurable Parameters

Based on the anticipated interactions discussed above, this assessment will consider:

- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest grizzly bear in the Nass Wildlife Area;
- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest moose in the Nass Wildlife Area;
- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest mountain goats in the Nass Wildlife Area; and
- Potential changes in the ability of Nisga'a citizens to exercise their Treaty right to harvest migratory birds in the Nass Area.

27.4.5.5 Mitigation Measures

IDM has identified measures to avoid, minimize, mitigate, or otherwise address potential adverse effects to Nisga'a Nation Treaty rights. These are summarized in Table 27.4-12.

The effectiveness of the mitigation measures is defined in Section 27.1.1.1.1.

Table 27.4-12: Proposed Mitigation Measures for Wildlife and Wildlife Habitat

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Mountain Goat					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Sensory Disturbance	All Phases	Project Design Minimize Habitat Disturbance Manage Vehicle Traffic	High Moderate Moderate	Low Low Low	Yes
Disruption to Movement	All Phases	Project Design Reduce Barriers or Filters of Movement Manage Vehicle Traffic Prevent Wildlife Entrapment	High Moderate Moderate High	Low Low Low Low	Yes
Direct Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Manage Vehicle Traffic	High High Moderate	Low Low Low	Yes
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Prevent Wildlife Entrapment Manage Vehicle Traffic Access Restriction on Access Road	High High High Moderate High	Low Low Low Low Low	Yes
Chemical Hazards	All Phases	Wildlife Protection Protocol Manage Chemical Hazards	High High	Low Low	No
Attractants	All Phases	Wildlife Protection Protocol Manage Attractants	High High	Low Low	No
Grizzly Bear					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Sensory Disturbance	All Phases	Minimize Habitat Disturbance Manage Vehicle Traffic	Moderate Moderate	Low Low	Yes
Disruption to Movement	All Phases	Project Design Reduce Barriers or Filters of Movement Manage Vehicle Traffic Prevent Wildlife Entrapment	High High High High	Low Low Low Low	No
Direct Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Manage Vehicle Traffic	High High Moderate	Low Low Low	Yes
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Prevent Wildlife Entrapment	High High High	Low Low Low	No
Chemical Hazards	All Phases	Wildlife Protection Protocol Manage Chemical Hazards	High High	Low Low	No
Attractants	All Phases	Wildlife Protection Protocol Manage Attractants	High High	Low Low	No
Moose					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Sensory Disturbance	All Phases	Manage Vehicle Traffic Minimize Habitat Disturbance	Moderate Moderate	Low Low	Yes
Disruption to Movement	All Phases	Prevent Wildlife Entrapment Minimize Habitat Disturbance Reduce Barriers or Filters of Movement Manage Vehicle Traffic	High Moderate Moderate Moderate	Low Low Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Direct Mortality	All Phases	Wildlife Protection Protocols Manage Attractants Manage Vehicle Traffic	High High Moderate	Low Low Low	Yes
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols	High High	Low Low	No
Chemical Hazards	All Phases	Wildlife Protection Protocols Manage Chemical Hazards	High High	Low Low	No
Attractants	All Phases	Manage Attractants	High	Low	No
Furbearers					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Sensory Disturbance	All Phases	Minimize Habitat Disturbance Manage Vehicle Traffic	Moderate Moderate	Low Low	Yes
Disruption to Movement	All Phases	Project Design Reduce Barriers or Filters of Movement Manage Vehicle Traffic Prevent Wildlife Entrapment	High Moderate Moderate High	Low Low Low Low	Yes (marten only)
Direct Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Manage Vehicle Traffic	High High Moderate	Low Low Low	Yes (marten only)
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocol Prevent Wildlife Entrapment	High High High	Low Low Low	No
Chemical Hazards	All Phases	Wildlife Protection Protocol Manage Chemical Hazards	High High	Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Attractants	All Phases	Wildlife Protection Protocol Manage Attractants	High High	Low Low	No
Hoary Marmot					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Disruption to Movement	All Phases	Project Design Manage Vehicle Traffic Prevent Wildlife Entrapment	High Moderate High	Low Low Low	No
Direct Mortality	All Phases	Minimize Habitat Disturbance Wildlife Protection Protocols Manage Vehicle Traffic	Moderate High Moderate	Low Low Low	Yes
Indirect Mortality	All Phases	Wildlife Protection Protocols Prevent Wildlife Entrapment	High High	Low Low	No
Chemical Hazards	All Phases	Wildlife Protection Protocols Manage Chemical Hazards Manage Attractants	High High High	Low Low Low	No
Attractants	All Phases	Wildlife Protection Protocols Manage Attractants	High High	Low Low	No
Bats					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance Wildlife Protection Protocols	High Moderate High	Low Low Low	Yes
Sensory Disturbance	Construction Operation	Project Design Wildlife Protection Protocols	High High	Low Low	Yes
Direct Mortality	Construction	Project Design Minimize Habitat Disturbance Manage Vehicle Traffic	High Moderate Moderate	Low Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Chemical Hazards	Operation Closure and Reclamation Post-Closure	Wildlife Protection Protocols	High	Low	No
Attractants	Operation Closure and Reclamation Post-Closure	Project Design Wildlife Protection Protocols Manage Attractants	High High High	Low Low Low	No
Migratory Breeding Birds					
Habitat Alteration	Construction	Project Design Wildlife Education Program Minimize Habitat Disturbance	High High Moderate	Low Low Low	Yes
Sensory Disturbance	All Phases	Wildlife Education Program Wildlife Protection Protocols Minimize Habitat Disturbance	High High Moderate	Low Low Low	Yes
Direct Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Vehicle Traffic Prevent Wildlife Entrapment	High High Moderate High	Low Low Low Low	No
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Vehicle Traffic Prevent Wildlife Entrapment	High High Moderate High	Low Low Low Low	No
Chemical Hazards	All Phases	Project Design Wildlife Education Program Wildlife Protection Protocols Manage Chemical Hazards	High High High High	Low Low Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Attractants	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Attractants	High High High	Low Low Low	No
Migratory Birds – Species at Risk					
Habitat Alteration	Construction	Project Design Wildlife Education Program Minimize Habitat Disturbance	High High Moderate	Low Low Low	Yes
Sensory Disturbance	All Phases	Wildlife Education Program Wildlife Protection Protocols Minimize Habitat Disturbance	High High Moderate	Low Low Low	Yes
Direct Mortality	All Phases	Project Design Wildlife Education Program Wildlife Protection Protocols Minimize Habitat Disturbance Manage Vehicle Traffic	High High High Moderate Moderate	Low Low Low Low Low	Yes (common nighthawk and marbled murrelet only)
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Vehicle Traffic Prevent Wildlife Entrapment	High High Moderate High	Low Low Low Low	No
Chemical Hazards	All Phases	Project Design Wildlife Education Program Wildlife Protection Protocols Manage Chemical Hazards	High High High High	Low Low Low Low	No
Attractants	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Attractants	High High High	Low Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Raptors					
Habitat Alteration	Construction	Project Design	High	Low	Yes
Sensory Disturbance	All Phases	Minimize Habitat Disturbance	Moderate	Low	Yes
Direct Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols Minimize Habitat Disturbance Manage Vehicle Traffic	High High Moderate Moderate	Low Low Low Low	No
Indirect Mortality	All Phases	Wildlife Education Program Wildlife Protection Protocols	High High	Low Low	No
Chemical Hazards	All Phases	Project Design Wildlife Education Program Wildlife Protection Protocols Manage Chemical Hazards	High High High High	Low Low Low Low	No
Attractants	All Phases	Wildlife Education Program Wildlife Protection Protocols Manage Attractants	High High	Low Low	No
Non-Migratory Game Birds					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Sensory Disturbance	All Phases	Wildlife Protection Protocols Minimize Habitat Disturbance	High Moderate	Low Low	Yes
Direct Mortality	All Phases	Project Design Manage Attractants Manage Vehicle Traffic	High High Moderate	Low Low Low	Yes
Indirect Mortality	All Phases	Wildlife Protection Protocols Manage Attractants	High High	Low Low	No

Potential Effect	Applicable Phase(s)	Mitigation Measures	Effectiveness ¹	Uncertainty ²	Residual Effect
Chemical Hazards	All Phases	Wildlife Protection Protocols Manage Attractants	High High	Low Low	No
Attractants	All Phases	Manage Attractants	High	Low	No
Amphibians – Western Toad					
Habitat Alteration	Construction	Project Design Minimize Habitat Disturbance	High Moderate	Low Low	No
Disruption to Movement	All Phases	Project Design Reduce Barriers or Filters to Movement	High Moderate	Low Low	No
Direct Mortality	All Phases	Minimize Habitat Disturbance Reduce Barriers or Filters to Movement Manage Vehicle Traffic	Moderate Moderate Moderate	Low Low Low	No
Indirect Mortality	All Phases	Prevent Wildlife Entrapment	High	Low	No
Chemical Hazards	All Phases	Manage Chemical Hazards	High	Low	No
Attractants	All Phases	Manage Attractants	High	Low	No

¹Effectiveness: Low = measure unlikely to result in effect reduction; Moderate = measure has a proven track record of partially reducing effects; High = measure has documented success (e.g., industry standard; use in similar projects) in substantial effect reduction

²Uncertainty: High = proposed measure is experimental, or has not been applied in similar circumstances; Moderate = proposed measure has been successfully implemented, but perhaps not in a directly comparable situation; Low = proposed measure has been successfully applied in similar situations

Following the application of mitigation measures, IDM anticipates that there may be residual effects on wildlife habitat availability, habitat distribution, and mortality risk.

27.4.5.6 Potential Residual Effects

27.4.5.6.1 Methods

The methodology for the residual effects assessment is described in Section 27.1.1.1.1.

The definitions for the characterizations of residual effects for Wildlife and Wildlife Habitat are summarized in Table 27.4-13. Quantitative likelihood ratings are based on information and details provided in Chapter 16 (Wildlife and Wildlife Habitat Effects Assessment).

Table 27.4-13: Residual Effect Characterization Definitions for Wildlife and Wildlife Habitat

Criteria	Residual Effect Characterization Definitions for Wildlife and Wildlife Habitat
Magnitude	<ul style="list-style-type: none"> • Negligible (N): no detectable change from baseline conditions. • Low (L): differs from the average value for baseline conditions but remains within the range of natural variation and below a guideline or threshold value. • Moderate (M): differs substantially from the average value for baseline conditions and approaches the limits of natural variation but equal to or slightly above a guideline or threshold value. • High (H): differs substantially from baseline conditions and is significantly beyond a guideline or threshold value, resulting in a detectable change beyond the range of natural variation.
Geographical Extent (Biophysical)	<ul style="list-style-type: none"> • Discrete (D): effect is limited to the Bitter Creek valley. • Local (L): effect is limited to the LSA. • Regional (R): effect extends beyond the LSA but within the RSA. • Beyond regional (BR): effect extends beyond the RSA.
Duration	<ul style="list-style-type: none"> • Short-term (ST): effect lasts less than 18 months (during the Construction Phase of the Project). • Long-term (LT): effect extends beyond the life of the Project (encompassing Operation, Reclamation and Closure, and Post-Closure Phases). • Permanent (P): effect will continue in perpetuity.
Frequency	<ul style="list-style-type: none"> • One-time (O): effect is confined to one discrete event. • Sporadic (S): effect occurs rarely and at sporadic intervals. • Regular (R): effect occurs on a regular basis. • Continuous (C): effect occurs constantly.
Reversibility	<ul style="list-style-type: none"> • Reversible (R): effect can be reversed. • Partially reversible (PR): effect can be partially reversed. • Irreversible (I): effect cannot be reversed, is of permanent duration.
Context	<ul style="list-style-type: none"> • High (H): the receiving environment or population has a high natural resilience to imposed stresses and can respond and adapt to the effect. • Neutral (N): the receiving environment or population has a neutral resilience to imposed stresses and may be able to respond and adapt to the effect. • Low (L): the receiving environment or population has a low resilience to imposed stresses and will not easily adapt to the effect.

27.4.5.6.2 Potential Residual Effects on Grizzly Bear

The potential residual effects on grizzly bears are summarized in Table 27.4-14.

Table 27.4-14: Potential Residual Effects on Grizzly Bear

Residual Effect	Summary of Residual Effects Characterization	Likelihood (High, Moderate, Low)	Significance (Significant or Not)	Confidence (High, Moderate, Low)
Habitat Availability	Magnitude: Low Extent: Local Duration: Long-term Frequency: Continuous Reversibility: Reversible Context: High	High	Not Significant	Moderate
Mortality Risk	Magnitude: Low Extent: Local Duration: Long-term Frequency: Sporadic Reversibility: Reversible Context: Neutral	Low	Not Significant	High

The RSA and LSA are located within the Stewart Grizzly Bear Population Unit. The Stewart Grizzly Bear Population Unit covers 11,740 km², has a density ranging from 30–40 bears/1,000 km², contains an estimated 358 individuals, and is considered having a viable population status (FLNRO 2012a). Bear density within the Stewart Grizzly Population Unit is estimated at 30 to 40 bears per 1,000 km². Based on this information it can be estimated that the LSA would contain five to six grizzly bears over its area of 159 km². IDM does not anticipate that the Project will result in residual effects to grizzly bear habitat distribution.

27.4.5.6.3 Potential Residual Effects on Moose

The potential residual effects on moose are summarized in Table 27.4-15.

Table 27.4-15: Potential Residual Effects on Moose

Residual Effect	Summary of Residual Effects Characterization	Likelihood (High, Moderate, Low)	Significance (Significant or Not)	Confidence (High, Moderate, Low)
Habitat Availability	Magnitude: Low Extent: Local Duration: Long-term Frequency: Continuous Reversibility: Reversible Context: High	High	Not Significant	High

Residual Effect	Summary of Residual Effects Characterization	Likelihood (High, Moderate, Low)	Significance (Significant or Not)	Confidence (High, Moderate, Low)
Mortality Risk	Magnitude: Moderate Extent: Discrete Duration: Long-term Frequency: Sporadic Reversibility: Reversible Context: Low	Low	Not Significant	Moderate

IDM does not anticipate that the Project will result in residual effects to moose’s habitat distribution.

27.4.5.6.4 Potential Residual Effects to Mountain Goat

IDM does not anticipate that the Project will result in significant residual effects to mountain goat (Table 27.4-16).

Table 27.4-16: Potential Residual Effects on Mountain Goat

Residual Effect	Summary of Residual Effects Characterization	Likelihood (High, Moderate, Low)	Significance (Significant or Not)	Confidence (High, Moderate, Low)
Habitat Availability	Magnitude: Low Extent: Local Duration: Long-term Frequency: Continuous Reversibility: Reversible Context: Low to Neutral	High	Not Significant	Moderate
Habitat Distribution	Magnitude: Low Extent: Local Duration: Long-term Frequency: Continuous Reversibility: Reversible Context: Low to Neutral	High	Not Significant	Low
Mortality Risk	Magnitude: Negligible to Low Extent: Local Duration: Long-term Frequency: Regular and Continuous Reversibility: Partially Reversible Context: Neutral	Low	Not Significant	Moderate to High

27.4.5.6.5 Potential Residual Effects on Migratory Birds

The potential residual effects on migratory birds are summarized in Table 27.4-17.

Table 27.4-17: Potential Residual Effects on Migratory Birds

Residual Effect	Summary of Residual Effects Characterization	Likelihood (High, Moderate, Low)	Significance (Significant or Not)	Confidence (High, Moderate, Low)
Habitat Availability	Magnitude: Low Extent: Local Duration: Long-term Frequency: Continuous Reversibility: Reversible Context: High	High	Not Significant	Moderate

IDM does not anticipate that the Project will result in residual effects to migratory birds’ habitat distribution or mortality risk.

27.4.5.7 EIS Guideline Requirements

27.4.5.7.1 Ecological Effects

The ecological effects of the Project on wildlife are described in Section 27.4.5.3.

27.4.5.7.2 Treaty Right to Use

Besides ecological effects, the only other factor that could influence Nisga’a citizens’ ability to harvest wildlife in the Bitter Creek valley is access. In consultation with Nisga’a Nation, IDM will develop an Access Management Plan that ensures appropriate access for Nisga’a citizens to exercise Treaty rights.

NLG has also suggested that “the presence of mine infrastructure and personnel has the potential, for safety reasons, to change the area in which Nisga’a hunters can discharge firearms in pursuit of game,” (Demarchi 2017). IDM acknowledges this potential effect; however, IDM feels that this effect will be negligible given the relative size of the Project’s footprint compared to the larger Nass Wildlife Area.

27.4.5.7.3 Human Health

IDM has conducted a HHRA to evaluate the effects of COPCs resulting from all Project activities during construction and operation. The HHRA has been completed for baseline conditions and considers all phases of the Project to yield estimates of incremental risks. The HHRA has been completed in accordance with applicable federal (e.g., Health Canada), provincial (e.g., BC MoE), and regional (e.g., Northern Health) risk assessment guidance.

Animals and plants in the Bitter Creek valley that may be consumed will not be exposed to COPCs for high spatial or temporal extents due to the limited particulate deposition of COPCs predicted.

Based on the available information and the results of the HHRA conducted in support of the Project, no residual adverse effects are anticipated on Nisga'a citizens' health resulting from the consumption of wildlife in the Bitter Creek valley.

27.4.5.8 Follow-up Measures

IDM proposes to implement an Environmental Management System for the Project with several environmental management and/or monitoring plans (EMPs), including a Wildlife Management Plan (WMP). The purpose of a WMP is to minimize Project-related effects on Wildlife and Wildlife Habitat during all Project phases, monitor the effectiveness of mitigation measures, and adaptively manage for any unanticipated effects resulting from Project-related activities. Other EMPs applicable to Wildlife and Wildlife Habitat are identified below. Refer to Volume 5, Chapter 29 of the Application/EIS for a description of all EMPs for the Project.

- Adaptive Management Plan
- Access Management Plan
- Air Quality and Dust Management Plan
- Explosives Management Plan
- Fuel Management Plan
- Hazardous Materials Management Plan
- Noise Abatement Plan
- Site Water Management Plan
- Spill Contingency Plan
- Tailings Management Plan
- Vegetation and Ecosystems Management Plan
- Waste Management Plan

Environmental management will adhere to adaptive management principles. The need for adaptive management or corrective actions to on-site management or for additional control measures will be determined during the Construction Phase, Operation Phase, and Closure and Reclamation Phases. Refer to the Adaptive Management Plan (Volume 5, Chapter 29) for further details. Indications of the need for corrective actions or additional control measures to protect Wildlife and Wildlife Habitat may include, for example:

- Negative wildlife interactions occur that put wildlife or people at risk of death or injury;
- Results of monitoring show adverse effects to wildlife;
- Monitoring data shows an adverse effect on sensitive wildlife pathways; and/or
- Issues are raised by on-site staff, regulators, or local communities.

27.4.6 Guide Outfitting License

Nisga'a Nation, through NPVLP, holds guide outfitting license no. 601084, which overlaps with the Bitter Creek valley. NPVLP purchased the license from Coast Mountain Outfitting in

September 2015. Mountain goats are the primary wildlife species hunted in the Bitter Creek valley under the guide outfitting license (Personal Communication with NGO, 2016).

This section addresses the potential effects to the guide outfitting license resulting from environmental changes due to the Project. The potential socio-economic effects to Nisga'a citizens resulting from Project effects on the guide outfitting license are covered in Section 27.4.8.4 (8(f) assessment). Further assessment of the Project's potential effects on the guide outfitting license can be found in Chapter 19 (Economic Effects Assessment).

27.4.6.1 Spatial Boundaries

The spatial boundary for this assessment is the Bitter Creek valley, as the Project is not anticipated to adversely affect wildlife outside of the valley.

27.4.6.2 Temporal Boundaries

The temporal boundary for this assessment includes the Construction, Operation, and Closure and Reclamation phases of the Project.

27.4.6.3 Project Interactions

The Project may result in reduced availability of hunting resources (specifically mountain goats) in the Bitter Creek valley. Mountain goats are thought by some to be sensitive to noise and will change their seasonal movements in response to the Project activities and components (Personal Communication with NGO, 2016). Such movement could make mountain goats in the Bitter Creek valley less accessible to Nisga'a Guide Outfitting hunting expeditions, but it could just as easily make them more accessible.

27.4.6.4 Measurable Parameters

This assessment considers the potential changes to availability of mountain goats in the Bitter Creek valley.

27.4.6.5 Mitigation Measures

The mitigation measures for wildlife, including mountain goats, are included in Table 27.4-12.

27.4.6.6 Potential Residual Effects

The potential residual effects on mountain goats are summarized in Section 27.4.5.6.4.

27.4.6.7 EIS Guideline Requirements

27.4.6.7.1 Ecological Effects

The ecological effects of the Project on mountain goats are described in Section 27.4.5.3.

27.4.6.7.2 Treaty Right to Use

Nisga'a Guide Outfitters holds a commercial but not a Treaty right to commercially guide hunts for mountain goats in the Bitter Creek valley.

27.4.6.7.3 Human Health

IDM has conducted a HHRA to evaluate the effects of COPCs resulting from all Project activities during construction and operation. The HHRA has been completed for baseline conditions and considers all phases of the Project to yield estimates of incremental risks. The HHRA has been completed in accordance with applicable federal (e.g., Health Canada), provincial (e.g., BC MoE), and regional (e.g., Northern Health) risk assessment guidance.

Animals and plants in the Bitter Creek valley that may be consumed will not be exposed to COPCs for high spatial or temporal extents due to the limited particulate deposition of COPCs predicted.

Based on the available information and the results of the HHRA conducted in support of the Project, no residual adverse effects are anticipated on Nisga'a citizens' health resulting from the consumption of wildlife in the Bitter Creek valley.

27.4.6.8 Follow-up Measures

IDM will continue to engage in dialogue with Nisga'a Guide Outfitters, as a stakeholder and overlapping tenure holder to avoid or minimize the effects of the Project on their interests.

27.4.7 Access to Other Lands

Chapter 6, paragraphs 20 and 23 of the NFA outline Nisga'a Nation's Treaty right to access lands other than Nisga'a Lands:

- Agents, employees, and contractors of Nisga'a Nation, Nisga'a Villages, Nisga'a Corporations and members of the Nisga'a Police Service, in accordance with laws of general application, may enter, cross, and stay temporarily on lands off of Nisga'a Lands to deliver and manage government programs and services, to carry out inspections under law, to enforce laws, to carry out the terms of the NFA, and to respond to emergencies; and
- Nisga'a citizens will have reasonable access to and onto Crown lands that are outside of Nisga'a Lands, including streams and highways, to allow for the exercise of Nisga'a Nation's Treaty rights and for the normal use and enjoyment of Nisga'a Nation interests set out in the NFA, including the use of resources for purposes incidental to the normal use and enjoyment of those rights or interests, provided that this access does not interfere with other authorized uses or the ability of the Crown to authorize uses or dispose of Crown land (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

27.4.7.1 Spatial Boundaries

The spatial boundary considered for this assessment is the Nass Wildlife Area.

27.4.7.2 Temporal Boundaries

The temporal boundary for this assessment includes the Construction, Operation, and Closure and Reclamation phases of the Project.

27.4.7.3 Project Interactions

Project employees will be based in Stewart and commute to the Project along the short stretch of Highway 37A between the town and the turnoff to the Access Road at Bitter Creek. Although some supplies and workers may come from Terrace and other communities along Highway 37 and 37A, the Project is not anticipated to have a significant effect on the abundance or frequency of traffic along those provincial highways.

In order to ensure the safety of individuals around the active mine site, IDM will limit access to the Bitter Creek valley at or near the turnoff from Highway 37A.

IDM is not aware of any portions of the Nass Wildlife Area that are only accessible through the Bitter Creek valley (i.e., that are not accessible by other means). Therefore, limiting access to the Bitter Creek valley will not limit Nisga’a representatives’ or citizens’ ability to access other parts of the Nass Wildlife Area. The Bitter Creek valley, as measured by the Landforms and Natural Landscapes LSA, accounts for less than 1% of the Nass Wildlife Area.

Due to the lack of population and infrastructure in the Bitter Creek valley, it is unlikely that Nisga’a Nation representatives would access the Bitter Creek valley unless they are working at or visiting the Project.

Due to its location, the Project is not anticipated to have any interaction or effect on Highway 113, Nass Road, or the Gingolx Road in the Nass Valley, nor on the Nass Forest Service Road (colloquially known as the Cranberry Connector).

27.4.7.4 Measurable Parameters

The potential effects between the Project’s environmental effects and Nisga’a Nation’s Treaty rights to access are summarized in Table 27.4-18.

Table 27.4-18: Potential Effects and Measurable Parameters for Access

Interest	Potential Effect	Measurable Parameter(s)
Agents, employees, and contractors of Nisga’a Nation, Nisga’a Villages, Nisga’a Corporations, and members of the Nisga’a Police Service and Nisga’a Institutions have the right to access the Nass Wildlife Area to carry out their responsibilities.	The Project’s construction and operation may limit the ability of Nisga’a Nation representatives to access the Bitter Creek valley.	Qualitative assessment of the accessibility of the Nass Wildlife Area to Nisga’a Nation representatives.

Interest	Potential Effect	Measurable Parameter(s)
Nisga’a citizens have the right to reasonable access to Crown lands to allow for the exercise of Nisga’a Nation Treaty rights and for the normal use and enjoyment of Nisga’a Nation interests set out in the NFA.	The Project’s construction and operation may limit the ability of Nisga’a citizens to access the Bitter Creek valley for the exercise of Treaty rights and for the normal use and enjoyment of the land.	Qualitative assessment of the accessibility of Crown lands to Nisga’a citizens.

27.4.7.5 Mitigation Measures

In order to minimize the potential effect of IDM’s limiting access to the Bitter Creek valley, IDM is proposing two mitigation measures:

- IDM will develop an Access Management Plan, in consultation with Nisga’a Nation, which ensures appropriate access for Nisga’a citizens to exercise Treaty rights and for Nisga’a Nation representatives to carry out their responsibilities; and
- IDM will work to maximize the supply of workers and equipment from Stewart to minimize any increase in traffic abundance and frequency on Highway 37 and 37A.

IDM is confident in the effectiveness of these mitigation measures.

27.4.7.6 Potential Residual Effects

With the implementation of the mitigation measures described above, there will be no residual effects of the Project on the ability of Nisga’a Nation representatives to access the Nass Wildlife Area to carry out their duties or on the ability of Nisga’a citizens to access Crown lands.

Confidence in the predictions regarding residual effects on the ability of Nisga’a representatives to access the Nass Wildlife Area or on the ability of Nisga’a citizens to access Crown lands is high, given that the potential disturbance is small and limited.

Since the confidence in this prediction is high, no additional risk analysis has been conducted.

27.4.7.7 EIS Guideline Requirements

27.4.7.7.1 Ecological Effects

There are no ecological effects that may affect the ability of Nisga’a Nation representatives to access the Nass Wildlife Area to carry out their duties or the ability of Nisga’a citizens to access Crown lands.

27.4.7.7.2 Treaty Right to Use

The extent that the Project may affect the ability of Nisga'a Nation representatives to access the Nass Wildlife Area to carry out their duties or the ability of Nisga'a citizens to access Crown lands is described above.

27.4.7.7.3 Human Health

IDM has conducted a HHRA to evaluate the effects of COPCs resulting from all Project activities during construction and operation. The HHRA has been completed for baseline conditions and considers all phases of the Project to yield estimates of incremental risks. The HHRA has been completed in accordance with applicable federal (e.g., Health Canada), provincial (e.g., BC MoE), and regional (e.g., Northern Health) risk assessment guidance.

Based on the available information and the results of the HHRA conducted in support of the Project, there are no anticipated interactions between COPCs and the ability of Nisga'a Nation representatives to access the Nass Wildlife Area to carry out their duties or the ability of Nisga'a citizens to access Crown lands.

27.4.7.8 Follow-up Measures

IDM will implement the following measure to ensure the successful mitigation of potential residual effects on access-related interests of Nisga'a Nation representatives and Nisga'a citizens:

Compliance monitoring to ensure that the Access Management Plan and targeted procurement policy are properly implemented, followed, and adequate in mitigating the potential effects of the Project on the access of Nisga'a Nation representatives and Nisga'a citizens to the Nass Wildlife Area.

27.4.8 Residual Effect Characterization on Nisga'a Nation 8(e) Interests

The following sections summarize and characterize the anticipated residual effects on Nisga'a Nation Treaty interests relevant to this 8(e) assessment. Likelihood ratings for potential effects on Nisga'a Nation 8(e) interests are qualitative.

27.4.8.1 Right to Manage and Harvest Nass Salmon

As stated in Section 27.4.4.3, no effects of the Project are anticipated on salmonid species, as they are not found in the mainstem of Bitter Creek. Sockeye, pink, and chum salmon are absent from the LSA, and the Project is not anticipated to affect these species. Therefore the Project will not affect Nisga'a Nation Treaty right to manage and harvest Nass salmon nor the NFA-defined Nisga'a allocation of Nass salmon.

Project activities will have no interaction with or effect on access to the Bear River, where salmon are present. Therefore, the Project will not result in any changes to access that could affect Nisga'a citizens' ability to harvest Nass salmon.

As stated in Section 27.4.4.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of fish in the Bitter Creek valley.

IDM concludes that the Project will not result in an adverse effect to Nisga'a Nation Treaty right to harvest and manage Nass salmon or on the NFA-defined Nisga'a allocation of Nass salmon. IDM's confidence rating for this prediction is high.

27.4.8.2 Right to Manage and Harvest Nass Steelhead

As stated in Section 27.4.4.3, no effects of the Project are anticipated on steelhead, as they are not found in the mainstem of Bitter Creek, and the Project is not anticipated to result in residual effects outside of Bitter Creek. Therefore the Project will not affect Nisga'a Nation Treaty right to manage and harvest Nass steelhead nor the NFA-defined Nisga'a allocation of Nass steelhead.

Project activities will have no interaction with or effect on access to the Bear River, where Nass steelhead are present. Therefore, the Project will not result in any changes to access that could affect Nisga'a citizens' ability to harvest Nass steelhead.

As stated in Section 27.4.4.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of fish in the Bitter Creek valley.

IDM concludes that the Project will not result in an adverse effect to Nisga'a Nation Treaty right to harvest and manage Nass steelhead or on the NFA-defined Nisga'a allocation of Nass steelhead. IDM's confidence rating for this prediction is high.

27.4.8.3 Right to Manage and Harvest Eulachon

As stated in Section 27.4.4.3, no effects of the Project are anticipated on eulachon, as they are not found in the mainstem of Bitter Creek. Therefore the Project will not affect Nisga'a Nation Treaty right to manage and harvest eulachon nor the NFA-defined Nisga'a allocation for eulachon through the Nisga'a fish allocation for non-salmon species.

Project activities will have no interaction with or effect on access to the Bear River, where eulachon are present. Therefore, the Project will not result in any changes to access that could affect Nisga'a citizens' ability to harvest eulachon.

As stated in Section 27.4.4.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of fish in the Bitter Creek valley.

IDM concludes that the Project will not result in an adverse effect to Nisga'a Nation Treaty right to harvest and manage eulachon or on the NFA-defined Nisga'a allocation for eulachon through the Nisga'a fish allocation for non-salmon species.

IDM's confidence rating for this prediction is high.

27.4.8.4 Right to Harvest Non-Salmon Fish, Aquatic Plants, and Marine Mammals

27.4.8.4.1 Aquatic Plants and Marine Mammals

As stated in Section 27.4.4.3, the Project is anticipated to have no interaction with and no effect on marine mammals or aquatic plants. Therefore, IDM concludes that the Project will not result in an adverse effect to Nisga'a Nation Treaty right to harvest aquatic plants and marine mammals or on the NFA-defined Nisga'a allocation for aquatic plants through the Nisga'a fish allocations of non-salmon fish species or aquatic plants.

27.4.8.4.2 Non-Salmon Fish

As outlined in Section 27.4.4.6, the Project is anticipated to have non-significant, low magnitude, discrete, short-term, one time, partially reversible, and high context effects on Fish Habitat in the Bitter Creek valley with a moderate likelihood of occurring and a high confidence in the prediction of the effect.

The Project is also anticipated to have non-significant, low magnitude, local, permanent, sporadic, reversible, and high context effects on Dolly Varden in Bitter Creek due to changes in water quality with a low likelihood of occurring and a moderate confidence in the prediction of the effect and non-significant, low magnitude, local, short-term, regular, reversible, and high context effects on Dolly Varden in the Bitter Creek due to changes in streamflow with a high likelihood of occurring and a moderate confidence in the prediction of the effect.

As stated in Section 27.4.4.7.2, access restrictions may affect Nisga'a citizens' ability to harvest fish in the Bitter Creek valley. However, IDM anticipates that this effect can be effectively mitigated by appropriate clauses in the Access Management Plan.

As stated in Section 27.4.4.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of fish in the Bitter Creek valley.

The assessment endpoint for Fish VCs is the maintenance of ecological conditions that support populations relative to existing baseline conditions. As outlined in the Fish and Fish Habitat Effects Assessment (Chapter 18), IDM predicts that the Project will meet this objective.

IDM concludes that the Project will result in a low magnitude and local effect to Nisga'a Nation Treaty right to harvest non-salmon fish, such as Dolly Varden, and on the NFA-defined Nisga'a fish allocation for non-salmon species. This effect will be short-term, at least partially reversible, and have a high context. The likelihood of the effect is moderate and the confidence of this prediction is high.

The Project is not anticipated to contribute to changes in the ability of Nisga'a citizens to harvest non-salmon species nor to changes in the relevant NFA-defined Nisga'a fish allocation for non-salmon species in the present or foreseeable future.

27.4.8.5 Right to Manage and Harvest Wildlife and Migratory Birds

As stated in Section 27.4.5.6, the Project is anticipated to have residual effects on key wildlife species. These effects are being taken as representative of potential Project effects on all furbearers, medium- to large-sized mammals, and birds.

27.4.8.5.1 Grizzly Bear

The Project is anticipated to result in the following potential effects on grizzly bears:

- Habitat distribution: no residual effects.
- Habitat availability: not significant, high likelihood, low magnitude, local, long-term, continuous, reversible, high context, moderate confidence; and
- Mortality Risk: not significant, low likelihood, low magnitude, local, long-term, sporadic, reversible, neutral context, high confidence.

As stated in Section 27.4.5.7.2, access restrictions may affect Nisga'a citizens' ability to harvest grizzly bears in the Bitter Creek valley. However, IDM anticipates that this effect can be effectively mitigated by appropriate clauses in the Access Management Plan. The presence of mine infrastructure and personnel may also have a negligible effect on the area in which Nisga'a hunters can discharge firearms in pursuit of game.

As stated in Section 27.4.5.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of wildlife, such as grizzly bears, in the Bitter Creek valley.

The assessment endpoint for Wildlife VCs, including grizzly bears, is the maintenance of ecological conditions that support populations relative to existing baseline conditions. As outlined in the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16), IDM predicts that the Project will meet this objective.

IDM concludes that the Project will have a low magnitude effect on Nisga'a citizens' ability to manage and harvest grizzly bears in the Nass Area and the Nass Wildlife Area, as applicable, and on the NFA-defined Nisga'a allocation of grizzly bears. The effect will have a high likelihood of occurring and will be local, long-term, and continuous, as access will only be restricted to the Bitter Creek valley and only for the Construction, Operation, and Closure and Reclamation Phases of the Project. The effect will be reversible, as access will be re-established following the Closure and Reclamation Phase of the Project and will be limited to the Wildlife LSA, as no effects on Wildlife are anticipated outside of the LSA. The context is high, as Nisga'a citizens have a significantly large area in which to hunt and trap grizzly bears. The confidence of this prediction is high.

27.4.8.5.2 Moose

The Project is anticipated to result in the following potential effects on moose:

- Habitat distribution: no residual effect;

- Habitat availability: not significant, high likelihood, low magnitude, local, long-term, continuous, reversible, high context, high confidence; and
- Mortality risk: not significant, low likelihood, moderate magnitude, discrete, long-term, sporadic, reversible, low context, moderate confidence.

As stated in Section 27.4.5.7.2, access restrictions may affect Nisga'a citizens' ability to harvest moose in the Bitter Creek valley. However, IDM anticipates that this effect can be effectively mitigated by appropriate clauses in the Access Management Plan. The presence of mine infrastructure and personnel may also have a negligible effect on the area in which Nisga'a hunters can discharge firearms in pursuit of game.

As stated in Section 27.4.5.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of wildlife, such as moose, in the Bitter Creek valley.

The assessment endpoint for Wildlife VCs, including moose, is the maintenance of ecological conditions that support populations relative to existing baseline conditions. As outlined in the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16), IDM predicts that the Project will meet this objective.

IDM concludes that the Project will have a low magnitude effect on Nisga'a citizens' ability to manage and harvest moose in the Nass Area and the Nass Wildlife Area, as applicable, and on the NFA-defined Nisga'a allocation of moose. The effect will have a high likelihood of occurring and will be local, long-term, and continuous, as access will only be restricted to the Bitter Creek valley and only for the Construction, Operation, and Closure and Reclamation Phases of the Project. The effect will be reversible, as access will be re-established following the Closure and Reclamation Phase of the Project and will be limited to the Wildlife LSA, as no effects on Wildlife are anticipated outside of the LSA. The context is high, as Nisga'a citizens have a significantly large area in which to hunt and trap moose. The confidence of this prediction is high.

27.4.8.5.3 Mountain Goat

The Project is anticipated to result in the following potential effects on mountain goats:

- Habitat distribution: not significant, high likelihood, low magnitude, local extent, long-term, continuous, reversible, low to neutral context, low confidence;
- Habitat availability: not significant, high likelihood, low magnitude, local, long-term, continuous, reversible, low to neutral context, moderate confidence; and
- Mortality risk: not significant, low likelihood, negligible to low magnitude, local, long-term, regular and continuous, partially reversible, neutral context, moderate to high confidence.

As stated in Section 27.4.5.7.2, access restrictions may affect Nisga'a citizens' ability to harvest mountain goats in the Bitter Creek valley. However, IDM anticipates that this effect can be effectively mitigated by appropriate clauses in the Access Management Plan. The

presence of mine infrastructure and personnel may also have a negligible effect on the area in which Nisga'a hunters can discharge firearms in pursuit of game.

As stated in Section 27.4.5.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of wildlife, such as mountain goats, in the Bitter Creek valley.

The assessment endpoint for Wildlife VCs, including mountain goats, is the maintenance of ecological conditions that support populations relative to existing baseline conditions. As outlined in the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16), IDM predicts that the Project will meet this objective.

IDM concludes that the Project will have a low magnitude effect on Nisga'a citizens' ability to manage and harvest mountain goats in the Nass Area and the Nass Wildlife Area, as applicable, and on the NFA-defined Nisga'a allocation of mountain goats. The effect will have a high likelihood of occurring and will be local, long-term, and continuous, as access will only be restricted to the Bitter Creek valley and only for the Construction, Operation, and Closure and Reclamation Phases of the Project. The effect will be reversible, as access will be re-established following the Closure and Reclamation Phase of the Project and will be limited to the Wildlife LSA, as no effects on Wildlife are anticipated outside of the LSA. The context is high, as Nisga'a citizens have a significantly large area in which to hunt and trap mountain goats. The confidence of this prediction is high.

27.4.8.5.4 Migratory Birds

The Project is anticipated to result in the following potential effects on migratory birds:

- Habitat distribution: no residual effect;
- Habitat availability: not significant, high likelihood, low magnitude, local, long-term, continuous, reversible, high context, moderate confidence; and
- Mortality risk: no residual effect.

As stated in Section 27.4.5.7.2, access restrictions may affect Nisga'a citizens' ability to harvest migratory birds in the Bitter Creek valley. However, IDM anticipates that this effect can be effectively mitigated by appropriate clauses in the Access Management Plan. The presence of mine infrastructure and personnel may also have a negligible effect on the area in which Nisga'a hunters can discharge firearms in pursuit of game.

As stated in Section 27.4.5.7.3, the Project is not anticipated to result in adverse effects on Nisga'a citizens' health resulting from the consumption of wildlife, including birds, in the Bitter Creek valley.

The assessment endpoint for Wildlife VCs, including birds, is the maintenance of ecological conditions that support populations relative to existing baseline conditions. As outlined in the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16), IDM predicts that the Project will meet this objective.

IDM concludes that the Project will have a low magnitude effect on Nisga'a citizens' ability to manage and harvest migratory birds in the Nass Area and the Nass Wildlife Area, as applicable, and on NFA-defined entitlement to migratory birds in the Nass Area. The effect will have a high likelihood of occurring and will be local, long-term, and continuous, as access will only be restricted to the Bitter Creek valley and only for the Construction, Operation, and Closure and Reclamation Phases of the Project. The effect will be reversible, as access will be re-established following the Closure and Reclamation Phase of the Project and will be limited to the Wildlife LSA, as no effects on Wildlife are anticipated outside of the LSA. The context is high, as Nisga'a citizens have a significantly large area in which to hunt and trap wildlife and migratory birds. The confidence of this prediction is high.

27.4.8.6 Guide Outfitting License

Similar to the low magnitude effect on Nisga'a citizens' ability to hunt mountain goats described in Section 27.4.8.5, the Project has a high likelihood of having a low magnitude residual effect on NGO's ability to guide mountain goat hunts in the Bitter Creek valley. The effect will be local, long-term, and continuous, as access will only be restricted to the Bitter Creek valley and only for the Construction, Operation, and Closure and Reclamation Phases of the Project. The effect will be reversible, as access will be re-established following the Closure and Reclamation Phase of the Project. The context is high, as NGO has a significantly large area in which to guide hunting expeditions. The confidence of this prediction is high.

27.4.8.7 Right to Access Other Lands

As discussed in Section 27.4.7.6, the Project is not expected to result in residual effects on the ability of Nisga'a Nation representatives to access the Nass Wildlife Area to carry out their duties or on the ability of Nisga'a citizens to access Crown lands.

IDM is not aware of any portions of the Nass Wildlife Area that are only accessible through the Bitter Creek valley (i.e., that are not accessible by other means). Therefore, limiting access to the Bitter Creek valley will not limit Nisga'a representatives' or citizens' ability to access other parts of the Nass Wildlife Area.

Due to its location, the Project is not anticipated to have any interaction or effect on Highway 113, Nass Road, Gingolx Road, or the Nass Forest Service Road.

IDM is confident that effective implementation of an appropriate Access Management Plan will mitigate any adverse effects on Nisga'a Nation representatives to access the Nass Wildlife Area to carry out their duties or on the ability of Nisga'a citizens to access Crown lands.

27.5 Economic, Social, and Cultural Effects Assessment (Pursuant to Chapter 10 Paragraph 8(f) of the NFA)

27.5.1 Introduction

This Nisga’a Economic, Social, and Cultural Impact Assessment (the 8(f) assessment) provides an assessment of the potential effects of the Project on the existing and future economic, social, and cultural well-being of Nisga’a citizens, as required under Chapter 10, paragraph 8(f) of the NFA and as outlined in the Nisga’a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010).

Other chapters and sections of the Application/EIS that have been considered in the 8(f) assessment include:

- Wildlife and Wildlife Habitat Effects Assessment (Chapter 16);
- Fish and Fish Habitat Effects Assessment (Chapter 18);
- Economic Effects Assessment (Chapter 19), including:
 - Contemporary Land and Resource Use; and
 - CRA Fisheries;
- Social Effects Assessment (Chapter 20), including:
 - Visual Quality Assessment;
- Health Effects Assessment (Chapter 22), including:
 - Country Foods Assessment; and
- Traffic Impact Assessment (Appendix 1-C).

27.5.2 Scope of Assessment

27.5.2.1 Regulatory and Policy Setting

Chapter 10, paragraph 8(f), of the NFA sets out the requirement to “assess the effects of the project on the existing and future economic, social and cultural well-being of Nisga’a citizens who may be affected by the project,” (SC 2000, c. 7: Nisga'a Final Agreement Act, 2000).

Table 27.5-1 provides the Nisga’a Nation economic, social, and cultural well-being interests (8(f) interests) to be assessed in accordance with the Nisga’a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010) and Section 12.4 of the Project AIR.

Table 27.5-1: Nisga'a Nation 8(f) Interests

Nisga'a Nation Interest	Related Sections of the AIR
Economic well-being <ul style="list-style-type: none"> • Nisga'a citizens' employment and income • Nisga'a citizens' business activities • Natural resource activities and related earnings or values • Future Nisga'a citizens' economic opportunities and economic development 	2.3, 4.7, 4.9, 4.10, 4.11, 5.0, 9.0, 12.0, 12.3
Social well-being <ul style="list-style-type: none"> • Migration and population effects in Nisga'a Nation communities • Infrastructure and services in the Nisga'a Nation communities • Occupational and non-occupational health and accident risks • Crime • Family and community well-being 	2.3, 4.1, 4.2, 5.2, 6.0,8.0, 9.0, 12.3
Cultural well-being <ul style="list-style-type: none"> • Effects of environmental impacts (including those resulting from accidents and malfunctions) on the cultural activities and practices of Nisga'a citizens. • Effects of changing work patterns on Nisga'a cultural activities and practices • Effects on Nisga'a language 	2.3,4.1, 4.2, 4.9, 4.10, 4.11, 5.3, 5.4, 7.0, 9.0, 12.3

27.5.2.2 Input from Consultation

IDM recognizes that this 8(f) assessment is important to NLG and Nisga'a citizens due to the importance of economic, social, and cultural aspects of Nisga'a culture and the sensitivity of those aspects to larger social and economic changes. IDM and NLG have engaged on the approach and methodology for this 8(f) assessment since 2015. The methodology for this 8(f) assessment was formally discussed during IDM's consultation with NLG on VC selection and the dAIR throughout 2015, 2016, and 2017.

On March 23, 2017, IDM provided NLG with a matrix summarizing IDM's proposed approach to this 8(f) assessment, including brief summaries of the interactions and effects IDM anticipated. IDM followed-up with NLG on multiple occasions regarding any feedback they may have but did not receive a response.

On May 17, 2017, a draft version of this 8(f) assessment was provided to NLG for their review and comment prior to being finalized and submitted to EAO and the Agency. NLG provided comments on July 4, 2017, which were discussed with more context during a conference call that day. NLG provided some further feedback on the 8(f) assessment during the meeting of July 18 and in written comments provided on August 3, 2017. It is IDM's

understanding that NLG will discuss the results of the 8(f) assessment in more detail during the Application Review phase of the EA.

IDM will consider all feedback received from NLG during this consultation and will provide a table summarizing what feedback was received, and whether or not and how that feedback was incorporated into the final assessment.

27.5.2.3 Methodology

In accordance with Section 5.1.1 of the EIS Guidelines issued by the Agency for the Project, IDM developed a work plan for the 8(e) and 8(f) assessments for consultation with NLG. During consultation on the draft work plan, NLG suggested that the dAIR being prepared by IDM for EAO should contain sufficient detail on the assessments, and that an additional work plan would be unnecessary. In response to that feedback, IDM proceeded with including detail on the approach and methodology to be used for the assessments in Sections 12.3 and 12.4 of the AIR.

NLG requested that no primary data be collected from NLG, the Nisga'a Village governments, or Nisga'a citizens given the existence of multiple, similar reports completed in recent years for comparable proposed projects in northwest BC.

Further to this request, 8(f) reports from the following five proposed projects were reviewed:

- Kitsault Molybdenum Mine Project (Alloycorp Inc.);
- Kerr-Sulphurets-Mitchell (KSM) Project (Seabridge Gold Ltd.);
- Brucejack Underground Gold Mine Project (Pretium Resources Inc.);
- Prince Rupert Gas Transmission (PRGT) Project (TransCanada); and
- Westcoast Connector Gas Transmission Project (Spectra Energy).

The data and analysis presented in the above-listed 8(f) reports informed the current assessment of the Project and its potential effects on 8(f) interests. The review of these 8(f) reports was complemented by review and consideration of relevant published and unpublished research and reports (including peer-reviewed journals, 'grey' literature, and online resources), international impact assessment standards, and professional judgment.

An initial scoping was undertaken to identify how Project components or activities might interact with the 8(f) interests. As discussed above, an interactions matrix was developed and shared with NLG for review and comment on March 23, 2017. IDM followed up with NLG on multiple occasions regarding any feedback they may have but did not receive a response. A summary of the matrix is presented below in Table 27.5-2.

To populate the interactions matrix, the following questions were considered:

- Based on the information available, is the Project expected to interact with the 8(f) interest?
- What are the types of effects that result from the interaction of the Project with the 8(f) interest?

- Is the interaction expected to lead to potential adverse effects on the 8(f) interest to a degree that would require mitigation?
- Is the interaction expected to lead to potential benefits that may be enhanced by implementing specific measures?

The objective has been to focus the assessment on those interactions that are of higher likelihood of occurring and that, potentially, carry greater risk to Nisga’a Nation interests.

Table 27.5-2: Potential Project Interactions with Nisga’a Nation Economic, Social, and Cultural Interests

Nisga’a Interest	Component or Activity	Potential Interactions and Effects
Nisga’a citizens’ employment and income	Nisga’a citizens employed by the Project ²	Economic benefits for employees, their families, and communities.
		Potential adverse effects at closure due to loss of employment.
Nisga’a citizens’ business activities	Nisga’a citizens and businesses employed by the Project	Economic benefits for employees, their families, and communities.
		Potential adverse effects at closure due to loss of employment.
Natural resource activities and related earnings or values	Potential environmental effects on natural resources important to Nisga’a Nation	Most contemporary natural resource activities take place on Nisga’a Lands or in other parts of Nass Area that do not interact or overlap with the Project.
		The Bitter Creek watershed is home to a mountain goat population. Mountain goat, which are a valuable hunting resource to Nisga’a Guide Outfitter LP (NGO), are known to be easily disturbed by helicopters and other noise associated with mineral exploration and development. Goats may leave the valley and may become either less or more accessible to NGO clients.
	Bitter Creek Access Road	There is potential for increased access to the backcountry for resident hunters, which may increase competition and pressure on the Bitter Creek mountain goat population. The Access Road could be a potential benefit to NGO operations by providing easier access to the backcountry.
Future Nisga’a citizens’ economic opportunities and economic development	Nisga’a citizens employed by the Project	Economic benefits for employees, their families, and communities will include increased skills and experience improving future opportunities in the job market.
Nisga’a Lisims Government revenues	Project spending	NLG may realize income from the Project through various mechanisms most likely defined through the benefits agreement.

² Includes Nisga’a businesses that gain contracts and Nisga’a citizens working for other contractors.

Nisga’a Interest	Component or Activity	Potential Interactions and Effects
Nisga’a Lisims Government expenditures	Demand from Project for NLG time and resources to comply with regulatory and consultation requirements.	Project management and consultants need to involve NLG personnel in document review, meetings, monitoring activities. NLG could incur administrative costs and opportunity costs related to not being able to work on other issues/projects.
Migration and population effects in Nisga’a Nation communities	Nisga’a citizens employed by the Project	People drawn to the Nass Valley to live in one of the Nisga’a Villages because they (or a family member) have secured employment with the Project.
Infrastructure and services in Nisga’a Nation communities	Nisga’a citizens employed by the Project	Population increase due to Project related employment or opportunities could increase demands on local infrastructure and services in the Nisga’a Villages.
Occupational and non-occupational accident_risks	Nisga’a citizens employed by the Project	All employees are subject to some level of accident risk on an industrial project.
	Project traffic traveling Highways 37 and 37A	Nisga’a citizens exposed to Project traffic while traveling Highways 37 and 37A. Nisga’a citizens exposed to project activities or components, including transportation.
Occupational and non-occupational health risks	Project environmental impacts on “air and water quality, or other impacts giving rise to health-related concerns that are identified in the environmental assessment” (NLG 2010).	Nisga’a citizens living on Nisga’a Lands or in the Nisga’a Urban Locals are not exposed to this risk therefore there are no non-occupational health risks associated with the Project.
	Environmental effects on water quality (including potential catastrophic failure of TMF)	If there were to be contamination of eulachon and other fish downstream and in the Bear River, there could be an effect on Nisga’a Nation Treaty rights to fish. Nisga’a employees may be exposed.
		Potential effects on country foods.
Crime	Project workforce	Increases in petty crime, theft, drug crimes, violence against women and other violent crimes associated with the construction and operation of resource development projects have been linked in many cases to the influx of large male-dominated transient workforces that are typically housed in or near Project host communities (Amnesty International 2016).
	Nisga’a employed by the Project	Behavior of individual Nisga’a citizen employees in their own homes and communities may be influenced by factors related to their employment on the Project, such as a sudden increase in income and/or the unfamiliar aspects of mine employment (e.g., shiftwork, isolation, extended periods away from home and community).

Nisga'a Interest	Component or Activity	Potential Interactions and Effects
Family and community well-being	Unfamiliar work schedules for Nisga'a employed by the Project	Shiftwork schedules and extended absences from home community has documented adverse effects for Aboriginal workers in other contexts, for example: worker discomfort in unfamiliar work environment; worker re-entry into home community; sudden increase in income leading to poor spending choices and unhealthy behaviours that can be associated with other socio-community issues (for example, disruption of family life, marital breakdown).
Effects of environmental impacts on the cultural activities and practices of Nisga'a citizens	Potential environmental effects on natural resources important to Nisga'a cultural practices	<p>Most contemporary natural resource activities take place on Nisga'a Lands or in other parts of the Nass Area and therefore have limited or no interaction with the Project. However, the current level of use does not preclude Nisga'a Nation's exercise of its Treaty rights in the future.</p> <p>Two areas of potential interaction to be addressed:</p> <ul style="list-style-type: none"> • Cultural effects related to Nisga'a citizens exercising Treaty rights to hunt mountain goats in the Bitter Creek watershed; and • Cultural effects related to Nisga'a citizens exercising Treaty rights to harvest eulachon on lower the Bear River.
Effects of changing work patterns and incomes on Nisga'a cultural activities and practices	Work schedules of Nisga'a citizens employed by the Project	Shiftwork and absence due to work at the Project could prevent Nisga'a workers from participating in important cultural activities, some of which may also generate income.
Effects on Nisga'a language	Nisga'a citizens employed by the Project	<p>The Project will be an English language operation. It is expected that all Nisga'a citizens hired to work on the Project will likely have English as their first and dominant language.</p> <p>The Project will have no meaningful interaction or influence on the Nisga'a language.</p>

After the identification of interactions, each potential effect was taken through an analysis that included:

- Description of the effect, including likelihood and confidence (see Table 27.5-3 and Table 27.5-4);
- Measures by which IDM proposes to avoid, minimize, mitigate, or otherwise address potential adverse effects to the 8(f) interests and measures to enhance benefits;
- Residual adverse effects that may remain following the application of the proposed mitigation measures;
- Cumulative effects that may result from the Project's residual effects acting in concert with residual effects from other projects in the region; and

- Follow-up or monitoring measures proposed by IDM to ensure that mitigation measures are implemented and managed.

Project benefits and associated benefit enhancement measures are presented separately from potential adverse effects and, in keeping with EA methodology, are not carried through to residual effects assessment or cumulative effects assessment.

The assessment of potential Project effects on Nisga'a Nation's 8(f) interests has relied on a qualitative process supported by quantitative information and conclusions presented in relevant chapters of the Application/EIS. The 8(f) assessment is based on professional experience, review of the findings from 8(f) assessments completed for other resource development projects in the area, and consideration of peer-reviewed research on the economic, social, and cultural effects of mining projects on indigenous communities in Canada. Building on the context provided in Section 27.2, a narrative has been developed that examines the interactions and potential effects of the Project on Nisga'a Nation's 8(f) interests.

27.5.2.4 Spatial Boundaries

The spatial boundary considered for the 8(f) assessment is the Nass Area, with specific focus on the Project area (i.e., the Bitter Creek valley) and the Nisga'a Villages of Gitlaxt'aamiks, Gitwinksihlkw, Laxgalts'ap, and Gingolx. The three Nisga'a Urban Locals (Prince Rupert/Port Edward, Terrace, and Vancouver) are also included in the assessment.

Where the assessment relies on findings from other chapters of the Application/EIS, it is noted in the text when the analysis or findings is based on different spatial boundaries to that described above.

27.5.2.5 Temporal Boundaries

The temporal boundary for the 8(f) assessment is the life of the Project, which includes Project Construction, Operations, Closure and Reclamation, and Post-Closure Phases.

27.5.3 Potential Project Benefits

27.5.3.1 Economic Well-Being

Project employment, procurement, and other expenditures are expected to have a net positive effect on Nisga'a citizens' economic well-being, which in turn supports individual and family well-being. A summary of benefits is provided below. Section 27.3 (Consultation and Engagement) provides additional detail on the status of discussions with NLG regarding Project benefits and benefit enhancement measures.

Through consultation on this and past projects, NLG and Nisga'a citizens have expressed that long-term employment, training, and business opportunities are a priority (PRGT Ltd. 2014).

27.5.3.1.1 Nisga'a Citizens' Employment and Income

Maximizing employment of Nisga'a citizens residing in the Nisga'a Villages and outside of Nisga'a Lands (i.e., mainly Terrace and Port Edwards/Prince Rupert) is an important goal of the Project.

A key factor in understanding the scale of the opportunity for Nisga'a employment is the projected labour demand during the Project's Construction and Operation Phases produced by the BC Input-Output model (BCIOM; Appendix 19-A BC Input-Output Model Report: Red Mountain). The model uses a variety of publically available data on supply industry sectors, combined with expected levels of Project spending, to produce estimates of the overall economic effect of the Project on BC industries and employment.

Understanding the size of the opportunity is a good starting point; however, the actual number of jobs that would be available for, and taken up by, Nisga'a citizens will ultimately depend on a number of other factors, including:

- Project requirements for skilled and semi-skilled labour;
- The level of qualifications, skills, and experience among Nisga'a citizens;
- The willingness and availability of Nisga'a citizens to work on the Project;
- The location of the Project in relation to where potential Nisga'a employees currently reside; and
- Steps taken by IDM and NLG to enhance employment uptake and employee retention.

To estimate the potential for employment of Nisga'a citizens at the Project, this assessment first examined estimates made in the 8(f) assessments prepared for other mining projects in the region.³ It should be noted that the modeling was based on the Nisga'a Social, Economic, Resource Use and Cultural Survey (Rescan 2011) and not on the BCIOM. The modeling predicted direct employment associated with mine construction and operation. A review of case studies of mining and Aboriginal communities provided further insight into typical levels of Aboriginal employment at mining projects in Canada (ERM Rescan 2014b).

Predicted and actual levels of Aboriginal employment vary considerably for both construction and operations: from a low of about five percent to a high of approximately 34% (Rescan Environmental Services 2012; ERM Rescan 2014b). For the Brucejack and KSM projects, Nisga'a employment is presented as a subset of total Aboriginal employment. The Brucejack 8(f) report estimated approximately five jobs for Nisga'a citizens, or less than one percent of the 870 person-years of direct employment, although the percentage of Nisga'a citizens picking up indirect or induced jobs was assumed to be higher (ERM Rescan 2014). Most projects that have attained 30% or more in Aboriginal employment have done so mostly through mutually agreed-to targets set out in a Benefits Agreement or similar agreements (ERM Rescan 2014b; Rescan Environmental Services 2012).

³ Specifically the Kitsault Molybdenum Mine Project (Alloycorp Inc.) and Brucejack Underground Gold Mine Project (Pretium Resources Inc.).

The Kitsault Mine Project estimated that 20% of jobs would be regional and that 40% of those regional jobs could go to Nisga'a citizens. Using this assumption for Kitsault construction, 116 jobs would be sourced regionally and 46 jobs would go to Nisga'a citizens. It is anticipated that this figure may be high relative to the Red Mountain Project given that the estimate used for the Kitsault Mine Project includes consideration of the proximity of the mine to the Nisga'a Villages; the Kitsault Mine Project is approximately 80 km from Gitlaxt'aamiks and therefore distance was not likely to be a barrier to employment.

Based on experience from the history of recent resource development projects in northwest BC, the BCIOM for Red Mountain estimates that approximately 40% of the goods and services required by the Project could potentially be purchased in the regional area. Applying this factor to employment projections from the model suggests that the Project's 20-month Construction Phase will generate approximately 346 person-years of direct, indirect, and induced employment. Annualized, the potential regional employment from the Project is expected to be about 207 jobs per year during construction.

The BCIOM projections suggest that the Project Operation Phase will generate 491 person-years of direct, indirect, and induced employment and a total of 82 jobs annually in the region.

A conservative estimate would be that 10% of regional work force jobs will go to Nisga'a citizens during construction and 10% during operation. Based on these assumptions, it is expected that the Project will generate approximately 20 direct, indirect, or induced jobs for Nisga'a citizens during construction and approximately 8 direct, indirect, or induced jobs per year during operations.

With regards to earnings and income, the average total income in the Nisga'a Villages in 2011 ranged from \$17,517 for Laxgalts'ap to a high of \$26,305 in Gitwinksihlkw (Section 27.2.4.3). Employment income from the Project will represent an increase from average annual income levels for Nisga'a citizens who are unemployed, underemployed, or for those who shift from lesser paying employment to working on the Project.

Recent research undertaken for the Brucejack Gold Mine Project indicates that the Nisga'a labour force has vocational and technical skills relevant to the mining sector, including individuals with training in carpentry, millwrighting, and mechanical repair, as well as skills related to operating camps, including catering, first aid, safety, and accounting. Previous studies also note, however, that relevant work experience is limited and may be a barrier to employment (ERM Rescan 2014b; PRGT Ltd. 2014). The distance to the Project from Nisga'a Lands (approximately 200 km, or 3.5 hours, by road from Gitlaxt'aamiks to Stewart) may be a barrier to employment as it may be difficult for people to get to Stewart and people may not want to live far from their community.

IDM's objective is to maximize employment and training opportunities for Nisga'a citizens and enhancing Nisga'a citizens' ability to take up mine-related employment through skills training, employment planning, and local procurement policies to encourage contractors to hire qualified Nisga'a citizens. IDM will work with NEST to identify and attract qualified Nisga'a citizens for available positions and contracts.

The benefits of employment, income, and training related to the Project will be of high consequence to Nisga'a citizens who are able to access these opportunities and will contribute to them being able to maintain employment in the resource development industry.

27.5.3.1.2 Nisga'a Citizens' Business Activities

The Project is anticipated to result in increased business opportunities for Nisga'a citizens' businesses.

As discussed in Section 27.2.4.5, the Nisga'a Nation has capacity through Nisga'a Pacific Ventures LP, Nisga'a Village businesses, and citizen-owned businesses in the Nisga'a Villages and outside Nisga'a Lands. The Project Overview (Chapter 1) indicates that the Project will depend on several contract services during construction and operations. Nisga'a businesses that secure contracts related to the Project will benefit from increased revenue, increased capacity in terms of experience and skills, and potential for the businesses to invest in better equipment, technology, and facilities.

It is difficult to determine the extent to which Nisga'a businesses will secure contracts for the Project, as this will depend on multiple factors, including the type of goods and services required and the availability, qualifications, and competitiveness of Nisga'a businesses to provide the needed goods and services.

IDM's objective is to maximize procurement opportunities for Nisga'a businesses and, through consultation and negotiations with NLG, IDM intends to implement measures to help ensure Nisga'a businesses have preferred access to contracting opportunities and benefits from Project opportunities.

27.5.3.1.3 Future Nisga'a Citizens' Economic Opportunities and Economic Development

Employment, training, career development, and business development resulting from the Project may enhance the future employability and entrepreneurship of Nisga'a citizens and may improve the long-term viability of Nisga'a businesses. This is an overall benefit to longer-term economic and social well-being of Nisga'a citizens and Nisga'a Nation. IDM intends to discuss measures to enhance long-term economic benefits with NLG.

27.5.3.1.4 Nisga'a Government Revenues

IDM is committed to the ongoing discussions and negotiations of a benefits agreement with NLG. The Project is expected to have an overall positive effect on NLG revenues, given the potential for additional earnings through a negotiated benefits agreement and any potential revenue sharing agreement that might be reached with the province.

Given that the Project will not cross Nisga'a Lands, IDM will not be required to pay property or goods and services taxes to NLG.

27.5.3.2 Social Well-Being

There is a strong correlation between economic well-being and social well-being. Employment and job security not only provide people with a source of income, they also help strengthen personal identity, facilitate personal growth, and provide a pathway for enhancing social networks (Shandro et al. 2014). It is expected that employment, skills development, and income related to the Project will have positive outcomes for the majority of individuals and their families, including the potential to invest in housing improvements, enhancing wealth accumulation, and, as noted by Nisga'a citizens during focus groups for other mining projects, the opportunity to provide a better life for their children (ERM Rescan 2014b). IDM intends to work with NLG to identify measures to support social well-being.

27.5.3.3 Cultural Well-Being

Cultural activities and practices may be enhanced by the Project to the extent that increased incomes associated with employment on the Project would enable Nisga'a workers to purchase items important to cultural activities and practices, such as equipment and supplies needed for resource harvesting. This would, of course, be dependent on individual choice and behavior. IDM intends to work with NLG to identify measures that can support cultural well-being.

27.5.4 Potential Adverse Interactions and Effects

27.5.4.1 Economic Well-Being

27.5.4.1.1 Nisga'a Citizens' Employment and Income

Potential adverse interactions and effects on Nisga'a citizens' employment and income are anticipated towards the end of the life of the Project, when employment opportunities will decline as Project operations come to an end. As specific workforce requirements for the Closure and Reclamation Phase have not yet been determined, the number of Nisga'a citizens that will continue to be employed is unknown. Work opportunities will drop even more during the Post-Closure Phase as only a small number of people will be needed to fulfill ongoing environmental monitoring requirements. The shift from gainful employment during Project construction and operations to un- or under-employment may cause stress and/or financial hardship and may be of high consequence for some individuals and families.

For many Nisga'a employees, it is expected that loss of Project employment will be offset by the skills and experience gained through Project-related training and experience, which should be highly transferable to other opportunities that are likely to emerge in the future. With a transition plan in place, it is reasonable to assume that Nisga'a workers will be well-positioned to obtain work at other mines, similar resource developments, or heavy industrial projects in the region and apply their skills and experience to new jobs. Projections of shortages of skilled labour in the future will enhance their opportunities for new employment (MIHR 2013, 2016).

It is also expected that some of the positive social benefits of employment and income will make individuals more resilient to change and better able to manage the uncertainty that is likely to come at the end of the Operation Phase.⁴

IDM will consider and/or implement the following measures to facilitate employment transition:

- Development of a closure and post-closure social management plan in consultation with NLG;
- Clear communication with NLG in advance of closure, reclamation, and post-closure schedules;
- Support for training and career development opportunities prior to closure;
- Assisting employees to identify opportunities for employment by providing job search assistance where needed; and
- Identification of skills acquired during employment with the Project and matching those skills to similar positions available at closure as well positions in alternative industries.

27.5.4.1.2 Nisga'a Citizens' Business Activities

Labour Market Competition

It is possible that the Project may attract some workers away from current employment with Nisga'a businesses, which might place pressure on Nisga'a businesses to find similarly qualified replacements and/or to increase wages in an effort to retain good employees. This may be the case for some Nisga'a businesses; however, there are a number of mitigating factors that suggest that it will not be a widespread problem and that it will not lead to a lasting disruption of Nisga'a citizens' business activities.

First, the 8(f) reports for the Kitsault Mine Project and the Brucejack Underground Gold Project provide a detailed analysis of the Nisga'a labour force including availability, skill levels, and interest in mining related work (ERM Rescan 2014b; Rescan Environmental Services 2012). Both reports find that, in general, the supply of Nisga'a labour is likely to exceed the demand for jobs in job categories for which Nisga'a citizens currently have qualifications.

Second, Project construction is likely to require more positions that match the qualifications of Nisga'a citizens. However, the short duration of construction may not attract people who are already gainfully and more permanently employed by a Nisga'a business.

⁴ The primary research undertaken in 2012 for the Kitsault and KSM projects' 8(f) assessments included a series of focus groups with Nisga'a citizens. Participants commented on the value of the less tangible aspects of meaningful employment, such as increased self-esteem, improvements in family well-being and stability, better standards of living, and reduced dependencies on both social assistance and substance abuse.

Third, during Project operation, many positions require specialized skills and training that are less readily available in the Nisga'a workforce so there may in fact be fewer job openings for which Nisga'a citizens are already qualified.

Finally, the ability of Nisga'a businesses to secure and retain employees in an open and competitive labour market is a precondition of a healthy and viable business. IDM does not intend to pay inflated or above-market wages, and it is expected that Nisga'a businesses will be able to adjust and compete effectively for skilled Nisga'a workers.

The adverse effects on Nisga'a businesses from labour and wage competition are expected to be minimal and offset by business and contracting opportunities.

Closure and Reclamation

Contracts required during the Closure and Reclamation and Post-Closure Phases have not yet been determined, but there will be fewer opportunities than during construction and operation. Like employment and income, businesses will feel adverse effects at the time of the Project's closure as contracts and business activities reduce substantially and ultimately come to an end. However, it is also likely that the capacity businesses build through the Project will have long-lasting beneficial effects that will enable them to continue to seek procurement opportunities related to other projects in the region.

IDM intends to maximize procurement opportunities for Nisga'a businesses, and IDM intends to discuss measures to support the transition of businesses at closure with NLG.

27.5.4.1.3 Natural Resource Activities and Related Earnings or Values

Nisga'a Nation commercial natural resource activities and jobs associated with the resource sector include fishing, guide outfitting, mineral and energy resource exploration, recreation and tourism, and timber harvesting.

Fishing

There is no commercial fishery in the Project area; therefore, there is no interaction between the Project and this commercial natural resource activity.

Guide Outfitting License

Nisga'a Guide Outfitting LP (NGO), which guides hunting trips for grizzly bear, black bear, and mountain goat and offers taxidermy services, acquired the guide outfitting license that overlaps with the Project area in September 2015 (R. Milligan, pers. comm. 2016). The Bitter Creek valley is known to have mountain goat, a focal resource for NGO.

Contemporary Land and Resource Use (Chapter 20) assesses the potential Project effects on guide outfitting, including effects on NGO. The assessment is restated here as it also falls under the scope of the 8(f) assessment. Pathways considered in the potential effects of the Project on NGO's guide outfitting license include increased hunting pressure, reduced availability of hunting resources, and changes in visual quality.

Increased Hunting Pressure

An assessment of the potential for an increase in hunting pressure is carried out in the Economic Effects Assessment (Volume 3, Chapter 19) for the valued component (VC) Contemporary Land and Resource Use. For the purposes of this analysis, the spatial boundaries were based on those used in the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16), which correspond to the Bitter Creek watershed for the local study area (LSA) and the Bear River watershed for the regional study area (RSA).

A potential Project-induced increase in population concentrated in the District of Stewart could lead to an increase in the number of resident hunters who might be interested in hunting in the Bitter Creek valley where mountain goat is the primary game species sought by hunters (R. Milligan, pers. comm. 2016). There are several reasons why newcomers to Stewart employed by the Project are unlikely to put pressure on the mountain goat resource.

During construction, the workforce will be composed of mostly transient workers, accommodated in a camp situated in or around Stewart. Most of the construction crew is currently planned to work 12-hour shifts on a schedule of two weeks on and two weeks off. Workers typically have no time while on shift to engage in activities such as mountain goat hunting, which requires considerable time and organization. Furthermore, IDM will have in place a no-hunting policy that prohibits hunting by anyone while on shift.

During operations, employees that are new residents to Stewart would conceivably have time to hunt on their days off. However, access to the Bitter Creek valley will be limited to authorized personnel for safety reasons; the Access Road will be an active industrial road.

Added pressure on hunting resources elsewhere in the Bear River valley due to an influx of 'new' resident hunters is also likely to be quite limited. An important factor is how many Operation Phase workers ultimately end up moving to and residing in Stewart and, of these new residents, how many are hunting enthusiasts. Furthermore, any new residents would have to be experienced hunters to hunt in the backcountry around Stewart, in general, and in the Bitter Creek valley, in particular. For example, a guide outfitter operating in the Coast Mountains notes on its website the rigours of hunting in the region:

Mountain goat hunting can be very physically demanding, so anyone planning to hunt goats ... should be in good physical condition and able to spend long strenuous days backpacking the steep and rugged terrain of the Coast Mountains (Fraser River Outfitters 2017).

It is not known how many Project employees would be interested in hunting in the Bear River watershed. By way of comparison, 97,000 hunting licenses were issued province-wide in 2013 (Vancouver Sun 2013), suggesting that the proportion of resident hunters compared to the general population aged between 15 and 65 years is approximately 2.5%. It is assumed that in a rural setting, such as Stewart, the proportion of hunters is likely to be greater than when averaged across the entire BC population, which includes large urban populations where hunting is less common. If the proportion of hunters is assumed to be two to four times greater than the provincial average, it follows that approximately 5 to 10 percent of new Stewart residents would be hunters. Depending on the quantity of people to

move to Stewart, this may mean the introduction of 6 to 12 new resident hunters, many of whom would likely not be mountain goat hunters.

In summary, it is expected that the Project will not lead to a large increase in hunting pressure on wild game resources in the Bear River watershed.

Any increase in hunting pressure because of a Project related influx of newcomers to Stewart will be limited by:

- The small number of new hunters expected to move to Stewart on a full-time basis;
- The area's inherent physical and geographical barriers;
- The restrictions that will be imposed on access to the Bitter Creek valley itself through the Project's Access Management Plan and no-hunting policy; and
- Existing provincial hunting regulations designed to manage wild game resources for conservation purposes.

Increased competition from the Project workforce is not expected to have any adverse economic effects on the operation or viability of NGO's guide outfitter license.

Reduced Availability of Hunting Resources

The Project will not have adverse environmental effects on hunting resources across the Wildlife RSA.

Within the Wildlife LSA, interactions are expected between Project activities and components and mountain goats. The mountain goat population in the Bitter Creek valley is known to the previous owner of the guide outfitting license. The Bitter Creek valley is a valuable part of the license area (see Chapter 20).

Chapter 16 (Wildlife and Wildlife Habitat Effects Assessment) concluded that the Project is not expected to result in significant residual adverse effects on mountain goat habitat in the Wildlife LSA. Mountain goats are thought by some to be sensitive to noise and may change their seasonal movements in response to Project activities (R. Milligan, pers. comm. 2016). The Project will implement a WMP that will include measures to reduce effects on mountain goat, especially noise restrictions around blasting and helicopter use (Chapter 16,). It is possible that the herd will not change their movements much at all. It is also possible that any change in the movements of mountain goat in the Bitter Creek valley could make them less accessible to NGO hunting expeditions, but it could just as easily make them more accessible. In either case, NGO may need to adjust their expeditions, although this would not necessarily result in a decline in business and associated revenue.

The economic effect on NGO is expected to be neutral and no residual adverse economic effects are predicted due to effects on mountain goat or mountain goat habitat (Chapter 21).

Changes in Visual Quality

It is possible that NGO's clients will see parts of the Access Road, transmission line, and various facilities and components of the mine infrastructure should they choose to hunt in the Bitter Creek watershed (see Appendix 20-B). This will likely detract from their experience insofar as it is assumed that part of the experience of hunting in the backcountry is to be in a natural wilderness setting, remote from human developments. Non-resident hunters could be especially affected because they are likely to have come to this part of BC precisely because of its reputation as a remote and pristine wilderness area. It is also possible that some clients will be completely unaffected by the presence of the Project nor be bothered by being able to see the Project while on a guided hunting trip.

In summary, NGO's license territory covers approximately 27,000 km², of which the Visual Quality RSA covers 126,119 ha or less than 5% of the total license area. The scale of the Bitter Creek valley in relation to the license territory suggests that there are likely numerous productive alternative hunting areas for NGO to choose from, which are as or more accessible than the Bitter Creek valley, which reduces the economic effect of not using the Bitter Creek valley.

There is no measurable economic effect on NGO's outfitter license due to changes in visual quality.

IDM intends to continue consultation with Nisga'a Nation to identify and address issues that arise for NGO, including issues related to potential changes in the visual landscape. In addition, IDM will consider and/or implement the following:

- Compliance monitoring as specified in the WMP to ensure potential effects of the Project on mountain goat are mitigated;
- Compliance monitoring as specified in the Access Management Plan to ensure that mitigation measures restricting access to the Bitter Creek valley are implemented; and
- Ongoing enforcement of the no-hunting policy for Project employees in Bitter Creek valley.

27.5.4.1.4 Timber Harvesting and Mineral Resources

Nisga'a Nation holds Treaty rights to timber and mineral resources within Nisga'a Lands as described in the Land Use Plan for Nisga'a Lands (NLG 2002). The Project is outside Nisga'a Lands; there is therefore no interaction between the Project and Nisga'a Nation Treaty rights to timber harvesting or mineral resources.

27.5.4.1.5 Recreation and Tourism

Other than NGO (see Section 27.5.4.1.2) IDM is not aware of any Nisga'a Nation recreation or tourism businesses currently using the Project area or intending to use the Project area in the future. Should this change, IDM will consult with Nisga'a Nation to address issues as they arise.

27.5.4.1.6 Pine Mushrooms

Pine mushroom harvesting is a source of revenue for the Nisga'a economy. NLG has not informed IDM of any pine mushroom harvesting areas in the Project area (see Section 27.2.4.6). As such, the Project is not expected to affect the ability of Nisga'a citizens to continue harvesting and selling pine mushrooms.

27.5.4.2 Future Nisga'a Citizens' Economic Opportunities and Economic Development

The Project is not expected to impede or otherwise adversely affect the potential for Nisga'a citizens to develop future economic opportunities nor the economic development of Nisga'a Nation.

27.5.4.2.1 Nisga'a Government Expenditures

IDM understands that NLG has allocated, and will continue to allocate, some of its technical, legal, and administrative resources to engagement with IDM and regulators on issues related to the assessment and approval of the Project. It is expected that the Project will require NLG to allocate human and financial resources to support the review of the Application/EIS and to manage and monitor environmental, economic, social, and cultural effects throughout the Project's life-cycle. IDM intends to further discuss with NLG estimates of the costs associated with this engagement and the identification of ways to assist with monitoring efforts. IDM has provided capacity funding to support NLG's meaningful participation in the regulatory and permitting processes associated with the Project's construction and operation and intends to continue broader discussions towards a benefits agreement. IDM anticipates that funds allocated to NLG will offset costs associated with Project review.

The Nisga'a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010) also require consideration of potential cost implications to NLG for incremental infrastructure, facilities, or services required due to the Project. Due to the geographical separation between the Project and Nisga'a Lands, it is not expected that NLG will incur costs with respect to use or maintenance of its assets imposed or required because of the Project. As such, no further assessment of the potential effect of the Project on NLG expenditures is necessary.

27.5.4.3 Social Well-Being

27.5.4.3.1 Migration and Population

Migration and population changes related to resource development projects are linked to the number of workers required for different project phases, the number of jobs likely to go to local people, the location of the projects and worker camps in relation to host communities, and the degree to which people might be enticed to move from their home communities to gain employment on a project. Changes in migration and population in host communities are causally linked to other potential social effects including pressures on infrastructure, housing and services, and increased social problems including crime, substance misuse, and related issues.

Although it is possible that some people will move to (or back to) the Nisga'a Villages for reasons related to mine employment, it is not expected that the Project will lead to discernable migration and population effects in the Nisga'a Villages.

The relatively short timeframe (20 months) of the Construction Phase is not expected to provide sufficient incentive to encourage a move back to Nisga'a Lands. Focus groups conducted to support the PRGT Project 8(f) assessment indicate that Nisga'a citizens living in Terrace, Prince Rupert, and Vancouver would not likely move back to the community for a short-term employment opportunity (PRGT Ltd. 2014).

During operations, the Project will present opportunities for more permanent employment and, as such, the possibility that Nisga'a citizens might move (back) to one of the Nisga'a Villages is potentially greater than during construction, but not by much.

For both phases, the location of the Project is likely to be a barrier to any Project-induced migration and population change in the Nisga'a Villages. Workers will be housed in Stewart during both construction and operation. Given that there is little to no geographic advantage to living in the Nisga'a Villages compared to living elsewhere, for example in Terrace, Prince Rupert, or Smithers, it is unlikely that Nisga'a citizens would move to (or back to) Nisga'a Lands because of work at the Project. It is even less likely that non-Aboriginal workers will move to the Nisga'a Villages as a result of the Project.

Out-migration and population decline can also be an effect of resource development projects, as people leave their communities either to secure work or for other reasons. It is possible that Nisga'a citizens might choose to move away from their community to secure employment with IDM during construction, but it is not very likely.

The Project's construction workforce will be housed in worker accommodations in Stewart while on-shift and will be able to return to their home communities while off-shift. Workers will not be expected to relocate to Stewart to secure employment during the Construction Phase. It is likely that Nisga'a citizens will opt to stay in their communities rather than relocate permanently to Stewart. Even where some people may choose to leave Nisga'a Lands for Construction Phase employment, it is likely they would return home at the end of their contract, so the change would likely be short-term.

During the Operation Phase, IDM hopes to encourage more permanent residency in Stewart by having a large portion of the workforce move to Stewart on a full-time basis. IDM's intention is to maximize Project benefits in Stewart, and this will likely lead to some community revitalization of Stewart, which has endured many years of population decline in the wake of closure of previous mine projects in the area. Given the nature of the anticipated shiftwork and schedule rotation, however, it is assumed that most prospective Nisga'a employees would need compelling reason or incentive to move from their ancestral homeland to Stewart for the planned six-year Operation Phase.

Taking the factors discussed above and the balance between out- and in-migration into consideration, the Project is not expected to have a measurable effect on migration or population change on Nisga'a Lands.

27.5.4.3.2 Infrastructure and Services

Infrastructure and services refer specifically to those elements on Nisga'a Lands that support the functioning of the four Nisga'a Villages.⁵ Infrastructure and services outside Nisga'a Lands where Nisga'a citizens reside (i.e., Terrace, Prince Rupert, or Vancouver) are considered in the Social Effects Assessment (Chapter 20). Project interactions with infrastructure and services are typically associated with the following two factors:

- Project requirements for community infrastructure and services. For example, use of local water supply and sewage facilities or demand on medical and emergency services to handle worker needs; and
- An influx of construction workers (being Nisga'a citizens or not) to the area in search of economic opportunities that could increase demand on infrastructure and services.

All Project activities and components, including worker accommodation and industrial transport, are well removed from the Nisga'a Villages and will not place additional demands on community infrastructure or services. The Project will also implement a Health and Social Services Plan to manage potential health related effects in the District of Stewart and City of Terrace. Project effects on infrastructure or services are not anticipated outside of these two communities.

As discussed above, it is unlikely that Nisga'a Villages will experience discernable population change. Even if some Nisga'a citizens were to relocate in search of economic opportunities associated with the Project, recent baseline studies indicate that, with the possible exception of healthcare services and housing, community infrastructure and services can meet the needs of a larger population (ERM Rescan 2014b; PRGT Ltd. 2014).

The Project is not expected to have any effect on community infrastructure or services in the Nisga'a Villages.

27.5.4.3.3 Occupational and Non-Occupational Accident Risks

Occupational accidents include slips, trips, falls, crashes, and injuries from being struck by moving objects or heavy equipment and traffic accidents while working at or for the Project. Non-occupational accidents relate to traffic accidents that may cause injuries or fatalities or health issues due to exposure to hazardous goods or materials due to leaks or spills.

Construction, operations, and closure activities at the mine site and on the Access Road will, like any industrial activity, involve some degree of risk and create the potential for occupational accidents. In 2015, the rate of serious injury in the primary resource sector, which includes mineral resources, was 0.69 per 100 person-years of employment (Work Safe BC 2015).

⁵ Infrastructure includes roads, water, sewage, electricity, communications, and social infrastructure (for example, schools or clinics), and housing. Services include emergency, public safety, medical, and education services.

IDM believes that all accidents and incidents are preventable. To date, IDM has had a strong safety record during exploration activities. IDM's goal is to minimize all accidents and incidents to "Zero Harm". Occupational accident risks are well-understood and IDM will establish a number of management plans to minimize risks, including: Occupational Health and Safety Policy and Plan, Risk Management and Emergency Response Plan, Access Management Plan, WorkSafe BC codified practices, and standard operating procedures. With these plans in place, it is anticipated that occupational accident risks will be managed to negligible levels and the effect is not assessed further.

Recent research highlights the correlations between increased industrial transportation activity and effects to road safety and health (Shandro et al. 2014; Gibson and Klinck 2005). Highway 113, Nass Road, Gingolx Road, and the Nass Forest Service Road, the major transportation corridors for Nisga'a citizens living in the Nass Valley, will not be used to transport Project-related industrial goods or services. As such there is no interaction between the Project and these roadways.

The Project will use Highway 37A to transport employees and some supplies from Stewart to the Project (between the town and the turnoff to the Access Road at Bitter Creek). Some supplies and workers may also come from Terrace and other communities along Highway 37 and 37A. While there is potential for traffic-related collisions or fatalities to occur along that highway and for users of the highway to be affected, the Traffic Impact Study (Appendix 1-C) concludes that the Project is expected to have a relatively modest effect on traffic volumes. Along Highway 37, volume is projected to increase approximately 0.06% during construction and 0.13% during operations. Along Highway 37A, between the Access Road and Stewart, traffic volume is projected to increase 2.38% during construction and 3.12% during operation.

The Access Management Plan and associated policies to limit speed, cap daily working hours for drivers, and otherwise promote safe driving practices will further reduce the occupational and non-occupational risks related to Project induced traffic. With these measures in place, it is anticipated that there will be little if any change in the level of exposure of Nisga'a citizens to non-occupational accident risks. No further assessment is required.

27.5.4.3.4 Occupational and Non-Occupational Health Risks

The Nisga'a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010) define health risks as those related to Project environmental effects on "air and water quality, or other impacts giving rise to health-related concerns that are identified in the environmental assessment," (NLG 2010).

The potential human health effects of Project construction and operation are assessed in the Health Effects Assessment (Chapter 22). The Health Effects Assessment presents an analysis of the potential health effects related to changes in noise, surface and drinking water quality, air quality, and country foods.

Nisga'a citizens are concerned about health risks linked to air, water, and noise pollution. The Health Effects Assessment indicates that potential adverse health effects of the Project are expected to be localized to the mine site. Nisga'a citizens in the Nisga'a Villages and in

the three Nisga'a Urban Locals would therefore not be exposed to Project-related health risks.

Nisga'a workers employed on the Project may be exposed to health risks associated with noise, air, and water quality changes near the Project. However, Project activities are designed and sequenced to ensure emissions and exposure levels remain within the relevant provincial and federal guideline targets. Several management plans will also be implemented to ensure that risks to workers are minimized, including the following: Occupational Health and Safety Plan, Risk Management and Emergency Response Plan, Air Quality and Dust Management Plan, Noise Abatement Plan, and Spill Contingency Plan. With the application of management practices and mitigation measures, Nisga'a workers' exposure to occupational and non-occupational health risks is expected to be well within acceptable limits.

Nisga'a citizens have also expressed concern regarding the long-term safety and quality of the food they harvest and depend on for ceremonial, sustenance, and economic purposes and the effect this might have on their ability to exercise Treaty rights (PRGT Ltd. 2014; ERM Rescan 2014b). To IDM's knowledge, Nisga'a citizens do not currently use the backcountry area at or near the mine site likely because of its distance from the Nisga'a Villages, the lack of current access infrastructure, and the accessibility and availability of areas closer to the Nisga'a Villages where resource and land use is more familiar and more prevalent.

NLG has raised concerns related to country foods in the Project area in general and, more specifically, to potential downstream effects on the Bear River eulachon. With respect to the Bear River, while Nisga'a citizens are not currently harvesting eulachon there, they may choose to exercise that Treaty right in the future. The Health Effects Assessment (Chapter 22) concludes that there will be no residual effects on the quality or quantity of country foods in or near the Project area and the Fish and Fish Habitat Effects Assessment (Chapter 18) concludes that there will be no downstream water quality effects to the Bear River. As a result, the Project is not expected to have an adverse effect on country foods of importance to Nisga'a Nation.

Recent research highlights the potential for increased industrial traffic to facilitate hitchhiking through the use of trucks or personal vehicles to pick up hitchhikers. This is a potential safety risk for women and vulnerable community members (Gibson and Klinck 2005). As noted above, there is no interaction between the Project and Highway 113, Nass Road, Gingolx Road, nor the Nass Forest Service Road, and the Project is not anticipated to influence the abundance or frequency of traffic along Highways 37A and 37 (Section 27.5.4.3.3). Nonetheless, in recognition of the gravity of this issue, IDM's intention is to implement appropriate measures to minimize any potential risk. For example, IDM may implement worker restrictions on picking up third parties while driving on duty or driving to or from work (whether in a company or personal vehicle).

In summary, the assessment finds that changes in occupational and non-occupational health risks to Nisga'a citizens are expected to be negligible.

27.5.4.3.5 Crime

Recent research on resource extraction projects indicates that the proximity of industrial camps, with their predominantly male transient work forces to host communities, is linked to problems of petty crime, such as theft and drug crimes, domestic violence, sexual assault, and an increased incidence of sexually transmitted infections due to rape, prostitution, and sex trafficking. Indigenous women and girls are the most vulnerable to the latter crimes and associated health risks (Shandro et al. 2014; NAHO 2008; Gibson and Klinck 2005; Gibson et al. 2017).

Given the geographic separation between the Project and Nisga'a Lands, the Project is not expected to result in increased crime or added pressure on police services in the Nisga'a Villages. Similarly, the Social Effects Assessment (Chapter 20) concludes that there will be no residual effects on crime in Terrace, where Nisga'a citizens also reside. No further assessment is required.

IDM will develop and implement a worker code of conduct and other guidance to help ensure that workers do not participate in, or condone, illegal or inappropriate activities. Through worker orientation, training, and management, IDM will seek to foster an atmosphere and culture of respect for the host community of Stewart. IDM contractors will be required to sign-on and adhere to IDM's construction camp policies for workers. IDM will seek input from the District of Stewart, Northern Health, NLG, and other interested parties as it develops appropriate policies to curtail the use of drugs and alcohol by employees and contractors.

IDM intends to continue discussions with NLG to identify and address issues or concerns that might arise due to the behaviour or actions of Project employees and contractors.

27.5.4.3.6 Family and Community Well-Being

While employment and income bring many benefits to individuals and their families, there are several confounding factors that come into play that can adversely affect individual, family, and community well-being. Research suggests that the influx of workers associated with large resource development projects can influence changes in individual behaviours, social conditions, and community dynamics in small remote communities (ERM Rescan 2014b; Gibson et al. 2017; Amnesty International 2016). However, given the negligible immigration predicted due to the Project, it is unlikely that the Project would cause this type of effect in the Nisga'a Villages.

There is nonetheless potential for family and community well-being to be adversely affected by the Project due to increases in disposable income and work schedules. These are discussed below.

Increases in Disposable Income

Wages in the mining industry are high compared to other sectors of the economy. While increased income can lead to improved standards of living and quality of life (NAHO 2008), it can also lead to negative social issues such as substance misuse and poor family function, especially in communities that are already vulnerable to such issues.

Recent research indicates that some workers in the mining sector are ill equipped to manage what is often a sharp increase in disposable income. This, at times, results in mismanaged spending and poor choices that result in negative social behaviours. When returning to their home community after shifts, some workers release work-related stress through destructive and anti-social behaviours referred to as “blowing off steam”; this can include partying, gambling, and alcohol and drug use (Amnesty International 2016). In relation to employment with Thompson Creek Metals, it was reported that “for some (workers), large cheque amounts increased reckless spending, problematic substance use on days off and family conflict,” (Shandro et al. 2014). The potential effect of this behavior is an increased risk of family discord and domestic violence (Gibson et al. 2017; PRGT Ltd. 2014). Research undertaken to support the 8(f) report for the Brucejack Gold Mine Project indicates that youth are especially vulnerable to the temptation of substance abuse enabled by higher incomes and that this has effects on the individual, their families, and the community at large (ERM Rescan 2014b).

Whereas there is evident concern that increased disposable income can lead to more drug and alcohol misuse, these are also ongoing challenges for many indigenous communities. Drug and alcohol use was a common social concern expressed during focus groups in the Nisga’a Villages for the PRGT 8(f) assessment. Nisga’a citizens also raised the concern that existing drug and addiction problems would intensify if not addressed (PRGT Ltd. 2014).

The relationship between employment and substance abuse varies from person to person. Some people may not be able to effectively manage stress and may choose to use new income in ways that do not create benefits for themselves or their families. On the other hand, many people will thrive with expanded economic opportunity and use increased incomes and savings to enhance their standard of living and household economic security. Employment can bolster self-esteem and reverse some of the socio-economic and cultural challenges that are linked to substance abuse (AREVA Resources Inc. 2011). Nisga’a elders came to this same conclusion at focus groups undertaken to support the Brucejack Gold Mine Project 8(f) assessment. They emphasized “the importance of reducing unemployment and the commensurate social benefits of meaningful occupation of people’s time, including increased self-esteem,” (ERM Rescan 2014b).

Individual challenges with new economic opportunities are not expected to manifest in reduced individual or family wellbeing overall. To the extent that people do struggle with transitioning to the wage economy, this is likely to be most often seen during the Construction phase until adjustments and adaptations can be made.

Measures to help reduce the potential for employment (income and work schedules) to adversely affect family well-being are discussed below.

Work Schedule

During construction, IDM will follow a shift rotation typical to mine development in many parts of Canada. IDM’s current estimate is that during construction, employees will work 12-hour shifts on a schedule of up to two weeks on and two weeks off. Workers will be absent from their family for two weeks at a time and will return home every two weeks. During operations, the rotation may be different as it is expected that some workers will be full-

time residents of Stewart. Nevertheless, the mine will be a 24-hour per day operation and will make substantial demand on employees' time during the on-shift rotation.

Much has been written on the potential effects of rotational employment on personal relationships and family dynamics (Gibson and Klinck 2005; Shandro et al. 2014). Social disconnection from families and friends can cause: increased strain and workload on the (usually female) spouse who remains at home; effects on children due to the absence of one of the parents (often the father / male role-model); and substance misuse due to worker isolation and work stress. Reinsertion into the community can cause family tension and conflict, including increased incidents of domestic violence (ERM Rescan 2014b; Shandro et al. 2014).

Some of these effects may occur due to the Project. Nisga'a focus groups that were formed to support the Brucejack Gold Mine Project 8(f) assessment revealed concerns about these types of effects. At the same time, focus group participants explained that strong familial ties exist throughout the Nisga'a Villages and act as a built-in safety net (ERM Rescan 2014b). These ties could support families dealing with the challenges of one or both parents working on the Project.

IDM's intention is to consider and/or implement the following measures to help reduce the potential for employment (income and work schedules) to adversely affect family well-being:

- A Drug and Alcohol policy, which would apply to all IDM employees and workplaces;
- Offering substance misuse prevention, rehabilitation, and aftercare guidance to workers;
- Providing onsite counseling services and money-management training to workers; and
- Providing transportation for Nisga'a workers to return to the Nisga'a Villages while off shift.

In summary, with these mitigations in place, IDM anticipates that the potential for adverse effects of the Project on Nisga'a family well-being will be substantially reduced, if not eliminated. However, there are too many unknowns to be able to state unequivocally that these effects will be avoided altogether. The extent of the effects will be determined not only by the number of Nisga'a citizens that obtain employment with the Project but also how specific individuals and families respond to employment, income, and work rotation schedules.

27.5.4.4 Cultural Well-Being

27.5.4.4.1 Effects of Environmental Changes on the Cultural Activities and Practices of Nisga'a Citizens

Nisga'a citizens are not known to currently use the backcountry at or near the mine site. Two areas of potential interaction are discussed here:

- Project-related effects on mountain goat and other resources in the Bitter Creek watershed and their potential effect on the ability of Nisga'a citizens to exercise their Treaty rights to hunt, fish, and gather; and
- Project-related effects on eulachon on the lower Bear River and their potential effect on the ability of Nisga'a citizens to exercise their Treaty right to fish eulachon.

The potential for these effects to change the ability of Nisga'a citizens to exercise their Treaty rights in the Project area are discussed in more detail in Section 27.4.

With respect to mountain goat and other resources in the Bitter Creek valley, the Wildlife and Wildlife Habitat Effects Assessment (Chapter 16) concludes that pressure on wild game resources will be limited and the Health Effects Assessment (Chapter 22) concludes that there will be no residual effect on the quality or quantity of country foods in or near the Project area.

IDM will develop an Access Management Plan in collaboration with NLG and other regulatory agencies. The plan will identify measures to control access to the backcountry to limit potential hunting pressures. At the same time, IDM will work with NLG to ensure Nisga'a citizens' access to the Bitter Creek valley is managed and coordinated to ensure that Nisga'a Nation Treaty rights are respected and upheld without compromise to health and safety.

With respect to the Bear River, while Nisga'a citizens are not currently harvesting eulachon there, they may choose to exercise that Treaty right in the future. The Fish and Fish Habitat Effects Assessment (Chapter 18) concludes that there will be no downstream water quality effects to Bear River and therefore no effects to eulachon are anticipated.

As a result, the Project is not expected to have environmental effects that would prevent Nisga'a citizens from engaging in cultural activities and practices now or in the future.

27.5.4.4.2 Effects of Changing Work Patterns and Incomes on Nisga'a Cultural Activities and Practices

Mine related employment is known to sometimes conflict with Aboriginal peoples' ability to participate in and maintain important cultural activities and practices including hunting, fishing, gathering (e.g., berries, non-timber forest products, and medicinal plants), and attending cultural events and ceremonies such as marriages, funerals, feasts, seasonal celebrations, or harvests (Gibson and Klinck 2005).

The Nisga'a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010) point to Project employment as a potential barrier to individual Nisga'a citizen's participation in activities and practices essential to the maintenance of Nisga'a culture. There are two

primary sorts of interactions that could lead to Nisga'a citizens missing out on important cultural events, activities, or practices. First, there are sudden, unplanned, or unanticipated events that, if they occur when a Nisga'a employee is on shift, will be difficult for her/him to participate in. Second, there are potential schedule conflicts because, depending on the type of job, employment at the mine will consume at least 50% of a person's time over the course of a year, which will leave less time to participate in other activities.

Missing out on cultural activities and practices may affect the individual's capacity to feel connected to their community, their cultural identity, and limit that person's ability to contribute to the perpetuation of cultural practice and the transmission of cultural knowledge (Gibson et al. 2017; Gibson and Klinck 2005). Employment during either construction or operation may also have an opportunity cost for Nisga'a workers who are unable to contribute to household livelihood, either through stockpiling food (e.g., from hunting or fishing) or in generating income from certain cultural activities.

It is anticipated that the potential cultural effects of changing work patterns will be offset in several ways. First, the planned two-week shift rotation schedule during construction will give Nisga'a employees large blocks of off-time in between their work shifts. While some of their time off will be spent with family and friends in their home community (a cultural activity in itself), the two-week block should also allow for at least some time to be spent out on the land or pursuing other culturally important activities.

Second, many cultural events are planned in advance, such as stone movements⁶ and other feasts, elder-youth centered learning events such as culture camps, and annual or seasonal gatherings. Many harvesting seasons are also well defined, although timing windows may be flexible and short. For example, the eulachon harvest and oil processing season consists of a few weeks in early spring. It will be possible for Nisga'a employees to plan their work schedules around those events and activities so that they can participate as much as possible. Where events are unplanned or on short notice (e.g., deaths and funerals), typical work schedules may prevent Nisga'a workers from fulfilling certain cultural duties.

IDM is sensitive to the cultural obligations of Nisga'a workers and to the importance of continued participation in seasonal harvesting. IDM will work with NLG to identify measures to enable Nisga'a workers to continue to participate in traditional activities and will work with successful contractors to develop human resource policies that recognize and accommodate cultural practices. Such policies may include a cultural leave policy that would operate in much the same way as vacation, bereavement, or sick leave, to enable Nisga'a citizens to book time off for feasts, funerals, and other ceremonies. IDM will also consider developing flexible work schedules or permission to take unpaid leave to accommodate seasonal resource harvesting, where needed.

IDM anticipates that these measures will enable Nisga'a workers to maintain employment while having sufficient time and opportunities to participate in cultural activities and practices. With ongoing communication between Nisga'a workers and Project management it is expected that Nisga'a citizens will be able to find the right balance between their work and their cultural obligations. The effect of the Project is expected to be negligible.

⁶ Follows the death of a Nisga'a citizen and is part of the passing-on of names and titles. Stone movements are typically placed on the official Nisga'a cultural calendar with approximately two months' notice.

27.5.4.4.3 Language

The Nisga'a Economic, Social, and Cultural Impact Assessment Guidelines (NLG 2010) call for an analysis of the potential for the Project to affect the Nisga'a language. The effects of resource development projects on language, or the ability for people to continue to speak and maintain their language, are generally the result of: 1) interactions between non-English or bilingual speakers and an English work environment; and 2) the in-flux of English-speaking workers to host communities. Given that the Project is far removed from the Nisga'a Villages, an influx of people into the communities is not expected and will therefore not interact with language.

The potential for Nisga'a workers to be exposed to English on a full-time basis while on shift at the Project is a reality, but is not expected to have any additional effect on the Nisga'a language compared to baseline for the following reasons:

- According to recent surveys undertaken for other projects, English is the predominant language spoken in Nisga'a households (PRGT Ltd. 2014). It is expected that all Nisga'a citizens who might be hired to work on the Project are likely to have English as their dominant language, if not their mother tongue;
- It is unlikely that exposure to English and other languages at the work site and camp will prevent Nisga'a workers from speaking Nisga'a. In addition, should they wish to begin or continue to learn Nisga'a, Nisga'a workers can do so while back in the Nisga'a Villages and even when at camp using educational resources, such as the smartphone application;
- Where Nisga'a language is spoken (i.e., in the home and in the Nisga'a Villages), the Project will have no meaningful interaction or influence;
- NLG has a number of language revitalization initiatives underway that can continue to reach Nisga'a employed on the Project; and
- As discussed above, IDM will implement human resource policies to enable Nisga'a workers to return home to engage in cultural events and activities (e.g., feasts, celebrations, and ceremonies), the sphere in which Nisga'a language is most often used.

The Project is not expected to pose a challenge to the maintenance or enhancement of the Nisga'a language or on Nisga'a Nation's language revitalization initiatives.

IDM understands the importance of language and culture to Nisga'a Nation and is open to continuing to engage with NLG to support Nisga'a Nation's revitalization efforts.

27.5.5 Summary of Effects

The 8(f) assessment has considered the potential for the Project to interact with and affect Nisga'a Nation's economic, social, and cultural interests. The Project is expected to result in benefits to the Nisga'a Nation through some employment, training, and contracting

opportunities, and more substantially, through a benefits agreement that is currently under discussion.

While the potential exists for the Project to have adverse social, economic, and cultural effects on Nisga'a citizens, several factors are at play that limits the extent of the effects and the likelihood of their occurrence. These factors are summarized below:

- The Project and related worker accommodation are located 200 km away from the closest Nisga'a Village and even further from other urban centers where Nisga'a citizens reside. Therefore, the Project is not expected to affect Nisga'a Lands or the Nisga'a Villages in ways typically associated with large industrial work camps and workforces;
- The Project is not expected to result in measurable in-migration or population change, factors typically associated with burdens on infrastructure, services, increased crime rates;
- Given the size of the construction and operational workforces as a whole and the number of Nisga'a citizens likely to be employed, adverse social issues related to employment are not expected to be widespread;
- The Project is not in a location that is actively used by Nisga'a citizens in the exercise of their Treaty rights and will not have adverse residual effects on eulachon and other harvested resources, such as mountain goats. Therefore, the Project is unlikely to affect Nisga'a Nation Treaty rights to hunt and fish; and
- IDM will put in place mitigation, management, and monitoring measures to address and reduce potential adverse effects.

Table 27.5-5 summarizes the results of the preceding assessment of the Project's potential beneficial and adverse effects on Nisga'a Nation's 8(f) interests. Where potential adverse residual effects are identified, IDM has provided characteristics of these residual effects. Definitions of residual effect characterizations can be found in Effects Assessment Methodology (Chapter 6, Section 6.7.2). No characterizations are provided where the residual effect has been identified as beneficial and when no residual effect or a negligible effect has been identified.

Table 27.5-3 provides definitions of the likelihood of the effect occurring. Likelihood is influenced by existing conditions, activities and physical works, Project-effect mechanisms, and the implementation of legislated or Project-specific mitigation measures. Information on these factors is used to determine qualitatively whether there is a low, moderate, or high likelihood of there being an adverse residual effect.

Table 27.5-4 provides IDM's confidence in the assessment as a measure of how well effects are understood and the quality of the input data. The confidence rating considers the reliability of data inputs and analytical methods used to predict Project effects, an understanding of the effect mechanisms and the effectiveness of mitigation measures, and certainty of the predicted outcome. Confidence is rated as low, medium, and high.

Table 27.5-3: Likelihood Ratings and Definitions

Likelihood Rating	Definition
High	An effect due to anticipated interaction between Project components and/or activities is expected to occur.
Moderate	An effect due to anticipated interaction between Project components and/or activities is possible, but not certain.
Low	An effect due to anticipated interaction between Project components and/or activities is not expected to occur.

Table 27.5-4: Confidence and Ratings Definitions

Confidence Rating	Definition
High	The cause-effect relationship between the Project and the Nisga'a Nation 8(f) interest is well understood and all necessary data are available to support the assessment. The effectiveness of the selected mitigation measures is moderate to high. There is a low degree of uncertainty associated with data inputs and variation from the predicted effect is expected to be low. Given the above, there is high confidence in the conclusions of the assessment.
Moderate	The cause-effect relationship between the Project and the Nisga'a Nation 8(f) interest is not fully understood (e.g., there are several unknown external variables or data for the Project area are incomplete). The effectiveness of mitigation measures may be moderate or high. Based on the above, there is a moderate confidence in the assessment conclusions
Low	Cause-effect relationship between the Project and the Nisga'a Nation 8(f) interest is poorly understood (e.g., there may be several unknown external variables and/or data for the Project area is incomplete). The effectiveness of the mitigation measures may not yet be proven. There is a high degree of uncertainty in the conclusions of the assessment.

Table 27.5-5: Summary of Economic, Social, and Cultural Effects

Nisga'a Nation 8(f) Interest	Component or Activity	Possible Interaction	Applicable Phase(s) ¹	Effect	Direction	Likelihood	Characterization of Effect (descriptive)	Confidence
Nisga'a citizens' employment and income	Employment ⁷	Y	O & C	Socio-economic benefits	Beneficial	High	Modest levels of employment (assume Nisga'a workers make up +/- 10% of workforce during Construction and Operation).	High
		Y	CR	Loss of employment at closure	Adverse	High	CR employment requirements unknown. Negligible adverse effect with IDM employee transition measures & new skills and experience acquired from Project related employment.	High
Nisga'a citizens' business activities	Employment and procurement	Y	O & C	Economic benefits	Both	High	Minimal adverse effect of labour and wage competition offset by opportunities for Nisga'a businesses and contractors.	High
Natural resource activities and related earnings or values	Land and resource disturbance	N	O & C	The Project is not anticipated to result in decreased earnings from fishing, timber harvesting, mineral resources, and recreation and tourism	N/A	N/A	N/A	High
		Y	O & C	Effects to guide outfitting license due to potential increase in hunting pressure, effects on mountain goat, and effects of changes to Visual Quality.	Adverse	Low	No substantial increase in resident hunting pressure anticipated. No residual adverse environmental effects on mountain goat habitat in the Wildlife LSA. No residual adverse effects on visual quality. Residual effect on guide outfitting anticipated to be low magnitude, cover a discrete geographic area limited to the Bitter Creek valley, of long-term duration (i.e., the life of the Project), of continuous frequency during the life of the Project, reversible at the end of the life of the Project, and have a high context due to the large guide outfitting license area.	Moderate
	Bitter Creek Access Road	Y	O & C	Increased access to the backcountry for resident hunters. The Access Road could be a potential benefit to NGO operations.	Both	Low	Negligible effect on NGO due to access controls on Bitter Creek Access Road.	High
Future Nisga'a citizens' economic opportunities and economic development	Employment and contracting opportunities	Y	O & C	Economic benefits	Beneficial	High	Income and socio-economic development	Moderate
Nisga'a Lisims Government expenditures	Project demand on NLG time and resources for compliance & consultation	Y	O & C CR	Economic burden on NLG	Adverse	Moderate	Negligible effect on NLG resources as costs incurred for project review, meetings, and monitoring offset by capacity funding and by Benefits Agreement.	High
Migration and population effects in Nisga'a Nation communities	Employment and contracting opportunities	Y	O & C	Project induced in-migration to the Nass Valley	Both	Low	Negligible effect as employment and contracting are insufficient incentive to move for many Nisga'a citizens and no geographical advantage to locating in the Nass.	High

⁷ Includes Nisga'a businesses that gain contracts and Nisga'a citizens working for other contractors.

Nisga'a Nation 8(f) Interest	Component or Activity	Possible Interaction	Applicable Phase(s) ¹	Effect	Direction	Likelihood	Characterization of Effect (descriptive)	Confidence
Infrastructure and services in Nisga'a Nation communities	Employment	N	N/A	The Project is not anticipated to increase demands on local infrastructure and services in the Nisga'a Villages.	N/A	N/A	N/A	High
Occupational and non-occupational accident risks	Employment	Y	O & C CR	Risk of accident or injury working on an industrial project.	Adverse	Low	Negligible effect due to health and safety management and compliance with WorkSafe BC regulations	High
	Project traffic traveling Hwy. 37/37A	Y	O & C	Nisga'a citizens exposed to Project traffic while traveling the Highways 37 and 37A. Nisga'a citizens exposed to project activities or components, including transportation.	Adverse	Low	Negligible effect as Project traffic will not cross Nisga'a Lands and small overall increase in traffic volume on Hwy 37 (0.06%) and Hwy 37A (0.13%).	High
Occupational and non-occupational health risks	Project effects on air and water quality, noise, industrial traffic	N	O & C CR	Nisga'a citizens living on Nisga'a Lands or Nisga'a Urban Locals are not exposed to this risk therefore there is no non-occupational health risks associated with the Project.	N/A	N/A	N/A	High
	Environmental effects on water quality	Y	O & C CR	Nisga'a employees may be exposed.	Adverse	Low	Negligible effect as Project will comply with all federal and provincial health and safety standards.	High
				Potential effects on country foods (including Bear River Eulachon).	Adverse	Low	No residual adverse effect expected for quality or quantity of country foods.	Moderate
Crime	Project workforce	N	O & C CR	Due to the geographic distance between the Project's workforce accommodation and the Nisga'a Villages, increases in petty crime, theft, drug crimes, violence against women and other violent crimes associated with the construction and operation of resource development projects are not anticipated.	N/A	N/A	N/A	High
	Nisga'a employed by the Project	Y	O & C CR	Behavior of individual Nisga'a citizen employees in their own homes and communities may be influenced by factors related to their employment on the Project, such as a sudden increase in income and/or the unfamiliar aspects of mine employment (e.g., shiftwork, isolation, extended periods away from home and community).	Adverse	Low	Negligible effect with mitigation and management measures applied by IDM to support workers and curtail poor choices and behaviours while on-shift; working with NLG to ensure workers are appropriately supported when off-shift.	Moderate
Family and community well-being	Unfamiliar work schedules for Nisga'a employed by the Project	Y	O & C CR	Worker discomfort in unfamiliar work environment; worker re-entry into home community; sudden increase in income leading to poor spending choices and behaviours; disruption of family life; loss or absence of male role models; added pressure on single parent left at home; marital breakdown.	Adverse	Low	Negligible effect with mitigation and management measures applied by IDM to support workers and curtail poor choices and behaviours while on-shift; working with NLG to ensure workers are appropriately supported when off-shift	Moderate
Effects of environmental impacts on the cultural activities and practices of Nisga'a citizens	Potential environmental effects on natural resources important to Nisga'a cultural practices	Y	O & C CR	Cultural effects related to Nisga'a treaty right to hunt mountain goats in the Bitter Creek watershed. Cultural effects related to Nisga'a exercising treaty rights to harvest eulachon on lower Bear River.	Adverse	Low	Negligible effect on Treaty interest in Mountain Goat as no significant residual adverse environmental effect expected. Negligible effect on Treaty interest in Eulachon as no significant residual adverse environmental effect on water quality in Bitter Creek or on fish or fish habitat in lower Bear River.	Moderate

Nisga'a Nation 8(f) Interest	Component or Activity	Possible Interaction	Applicable Phase(s) ¹	Effect	Direction	Likelihood	Characterization of Effect (descriptive)	Confidence
Effects of changing work patterns and incomes on Nisga'a cultural activities and practices	Work schedules of Nisga'a citizens employed by the Project	Y	O & C CR	Shiftwork and absence due to work at the Project could prevent Nisga'a workers from participating in important cultural activities, some of which may also generate income.	Adverse	Low	Negligible effect because workers able to plan for most activities and/or take advantage of IDM cultural policies in place to enable time off work for participation in cultural activities.	High
Effects on Nisga'a language	Nisga'a citizens employed by the Project	N	O & C CR	The Project will be an English language operation. It is expected that all Nisga'a citizens hired to work on the Project will likely have English as their first language. Where Nisga'a language is spoken, in the home and the Nisga'a Villages, the Project will have no meaningful interaction or influence.	N/A	N/A	N/A	High

Notes:
 1: C = Construction Phase; O = Operations Phase; CR = Closure and Reclamation Phase

27.5.6 Cumulative Effects

On its own, the Project is likely to have very limited adverse effects on Nisga'a Nation economic, social, and cultural interests (Table 27.5-5) and therefore a detailed cumulative effects assessment has not been undertaken.

IDM is nonetheless sensitive to the possibility that other major projects, such as the Brucejack Underground Gold Project, Kitsault Mine, PRGT Project, or the Westcoast Connector Gas Transmission Project, may commence construction or come online at or around the same time as the Project, and is aware of the implications this might have for Nisga'a Nation's 8(f) interests.

While the Project may not by itself cause a measurable migration of people to the Nass Area, and therefore will have limited to no effects on infrastructure and services, crime, and other social issues, it is possible that effects of increased population and work camps associated with other major projects will interact with this Project's modest effects to cause effects of concern to NLG.

Given that the Project's adverse effects on Nisga'a Nation's 8(f) interests are limited, it is reasonable to assume that the Project's contribution to cumulative effects on 8(f) interests will also be limited.

IDM intends to work with NLG on an ongoing basis to monitor and manage the economic, social, and cultural effects of the Project and to maximize potential benefits of the Project for Nisga'a citizens, businesses, and communities.

27.5.7 Follow-up

It is always a challenge to assess project effects on the social environment as both positive and negative social change is a result of multiple, inter-related factors, including human preferences and choices, which are notoriously difficult to predict. IDM therefore intends to continue discussions with NLG to identify and address issues as they arise.

IDM looks forward to continuing to work with NLG to design and implement appropriate follow-up measures to monitor economic, social, and cultural changes that may result from the Project. These include monitoring of employment, training, and procurement opportunities and monitoring to track compliance with all management and human resource development plans.

27.6 Other Matters of Concern

To date, NLG has not raised any other matters of concern.

27.7 Issue Summary Table

Table 27.7-1 summarizes the issues, interests, and concerns raised by NLG, IDM's proposed mitigation measure, and the status of the issue, interest, or concern.

It is IDM's opinion that all potential effects to Nisga'a Nation's Treaty Interests can be fully mitigated or accommodated.

Table 27.1-1: Nisga’a Nation Issue Summary Table

Topic	Issue, Interest, or Concern Raised	Analysis of Potential Effect	Proposed Measures to Avoid, Mitigate or Otherwise Manage Effects	Status of Resolution (e.g. resolved, ongoing resolution, referred to agency, etc.)
Access	Concern regarding increased access to the Bitter Creek valley and associated increased hunting and fishing pressure. Request that the Access Road be gated and controlled.	Increased access may increase hunting and fishing pressure on wildlife and fish resources in the Bitter Creek valley. During Construction, it is unlikely that transient workers will have time for hunting and fishing while on-shift. They will not remain in the Bitter Creek valley while off shift. During Operation, the number of additional hunters or fishers will likely be minimal.	IDM will develop an Access Management Plan, in consultation with Nisga’a Nation, which ensures appropriate access for Nisga’a citizens to exercise Treaty rights and for Nisga’a Nation representatives to carry out their responsibilities. IDM will implement a “no hunting, no fishing” policy for on-shift workers.	Ongoing
Birds	Concern regarding potential adverse effects on migratory birds and habitat.	The Project is not likely to result in significant residual effects on migratory birds. There is a high likelihood that the Project will result in a low magnitude effect on Nisga’a citizens’ ability to manage and harvest wildlife and migratory birds in the Nass Area and the Nass Wildlife Area, as applicable. The effect will be local, long-term, continuous, and reversible. The context is high. The confidence of this prediction is high.	See Table 27.4-12	Ongoing
Economic, Social, and Cultural Values	Concern regarding potential increased drug and alcohol use.	Increased income due to Project employment may result in individuals choosing to increase their drug and/or alcohol consumption.	IDM’s intention is to consider and/or implement the following measures to help reduce the potential for employment (income and work schedules) to adversely affect family well-being: <ul style="list-style-type: none"> • A Drug and Alcohol policy, which would apply to all IDM employees and workplaces; • Offering substance misuse prevention, rehabilitation, and aftercare guidance to workers; • Providing onsite counseling services and money-management training to workers; and • Providing transportation for Nisga’a workers to return to the Nisga’a Villages while off shift. 	Ongoing
Economic, Social, and Cultural Values	Concern regarding the potential decrease in Nisga’a citizens’ ability to participate in cultural activities and practices, such as feasts and funerals.	Increased employment may result in Nisga’a citizens being unable to participate in cultural activities and practices.	IDM will work with NLG to identify measures to enable Nisga’a workers to continue to participate in traditional activities and will work with successful contractors to develop human resource policies that recognize and accommodate cultural practices. Such policies may include a cultural leave policy that would operate in much the same way as vacation, bereavement, or sick leave, to enable Nisga’a citizens to book time off for feasts, funerals, and other ceremonies. IDM will also consider developing flexible work schedules or permission to take unpaid leave to accommodate seasonal resource harvesting, where needed. Shift work will also allow Nisga’a citizens some larger blocks of time off, which may allow them to participate in cultural activities and practices.	Ongoing

Topic	Issue, Interest, or Concern Raised	Analysis of Potential Effect	Proposed Measures to Avoid, Mitigate or Otherwise Manage Effects	Status of Resolution (e.g. resolved, ongoing resolution, referred to agency, etc.)
Fish	<p>Concern regarding potential adverse effects on Fish, Fish Habitat, and fish management, including:</p> <ul style="list-style-type: none"> • CRA Fisheries; • Salmonids; and • Eulachon. 	<p>The Project is not likely to result in significant residual effects on fish. No residual effects on Nisga'a citizens' Treaty rights to manage and harvest Nass salmon, Nass steelhead, or eulachon are anticipated.</p>	<p>See Table 27.4-7</p>	<p>Ongoing</p>
Fish	<p>Request that the determination of significance of effects for Fish, Fish Habitat, and Water Quality be made inclusive of the lower Bear River.</p>	<p>The Fish and Fish Habitat Effects Assessment, which informed the assessment of potential effects to Nisga'a Nation Treaty rights considered the potential effects of the Project on eulachon in the lower Bear River.</p>	<p>n/a</p>	<p>Ongoing</p>
Nisga'a Nation Treaty Rights	<p>Concern regarding full inclusion of Nisga'a Nation Treaty rights in Assessment.</p>	<p>The proposed Project is located within the Nass Wildlife Area, as set out in the NFA, and may have potential effects on Nisga'a Nation Treaty rights. An assessment of these potential effects is provided in the 8(e) and 8(f) assessments.</p>	<p>IDM intends to continue ongoing dialogue, consultation, and engagement with Nisga'a Nation, as represented by NLG, during the remainder of the EA process, the permitting process, and throughout the life of the Project.</p>	<p>Ongoing</p>
Transportation	<p>Concern regarding the potential effects of increased traffic along Highway 37.</p>	<p>The Project will use Highway 37A to transport employees and some supplies from Stewart to the Project (between the town and the turnoff to the Access Road at Bitter Creek). Some supplies and workers may also come from Terrace and other communities along Highway 37 and 37A. While there is potential for traffic-related collisions or fatalities to occur along that highway and for users of the highway to be affected, the Traffic Impact Study (Appendix 1-C) concludes that the Project is expected to have a relatively modest effect on traffic volumes.</p> <p>Along Highway 37, volume is projected to increase approximately 0.06% during construction and 0.13% during operations.</p> <p>Along Highway 37A, between the Access Road and Stewart, traffic volume is projected to increase 2.38% during construction and 3.12% during operation.</p>	<p>The Access Management Plan and associated policies to limit speed, cap daily working hours for drivers, and otherwise promote safe driving practices will further reduce the occupational and non-occupational risks related to Project induced traffic.</p>	<p>Ongoing</p>
Water Quality	<p>Concern regarding potential effects to Water Quality, particularly considering pathway effects to Fish and Fish Habitat, Nisga'a Nation Treaty interests, and Human Health. Selenium has been raised as a particular concern.</p>	<p>The Project has a low likelihood of having a non-significant, low magnitude, local, permanent, sporadic, and reversible effect on Dolly Varden in Bitter Creek due to changes in water quality, particularly selenium.</p> <p>The Human Health Effects Assessment has not identified any potential effects to Human Health as a result of changes to water quality.</p>	<p>To maintain the ecological conditions that support populations relative to existing baseline, monitoring and adaptive management strategies will be implemented, as described in the AEMRP (Volume 5, Chapter 29.5) and the Adaptive Management Plan (Volume 5, Chapter 29.2). These management plans have been designed to mitigate the risk related to a residual effect on Aquatic Resources. The objectives of the AEMRP is to minimize the risk of effects to the aquatic environment through Project design, monitoring and adaptive management. The AEMRP includes an Aquatics Effects Monitoring Program (AEMP) that will provide feedback via the receiving environment on the performance of IDM's management and mitigation during construction, operations, reclamation and closure, and post-closure phases of the Project. The AEMRP also includes management response measures (additional assessment, monitoring and mitigation measures) that would be implemented in response to an unanticipated effect on Aquatic Resources.</p>	<p>Ongoing</p>
Wildlife	<p>Concern regarding the potential effects of Project-related traffic on wildlife.</p>	<p>Traffic, including mortality risk and disturbance, has been considered a pathway for effects on wildlife. It has been considered in the Wildlife Effects Assessment as well as in the 8(e) assessment.</p>	<p>n/a</p>	<p>Ongoing</p>

Topic	Issue, Interest, or Concern Raised	Analysis of Potential Effect	Proposed Measures to Avoid, Mitigate or Otherwise Manage Effects	Status of Resolution (e.g. resolved, ongoing resolution, referred to agency, etc.)
Wildlife	Concern regarding the potential effects of the Project on Mountain Goats.	<p>The Project is not likely to result in significant residual effects on mountain goats.</p> <p>There is a high likelihood that the Project will result in a low magnitude effect on Nisga'a citizens' ability to manage and harvest wildlife and migratory birds in the Nass Area and the Nass Wildlife Area, as applicable. The effect will be local, long-term, continuous, and reversible. The context is high. The confidence of this prediction is high.</p>	See Table 27.4-12	Ongoing
Shipping	Concern regarding the shipping of concentrate from the Port of Stewart and increased marine traffic in the Portland Canal, Portland Inlet, and Observatory Inlet.	<p>The proposed Project does not include the shipping of concentrate; waste rock, ore, and tailings will be processed and stored at site. Certain pieces of equipment or infrastructure may be transported to Stewart by barge; however, this barge use will be incidental and is not anticipated to be a regular occurrence. IDM has provided this information to NLG in a transportation memo, dated March 24, 2016.</p>	n/a	Ongoing

27.8 References

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