

TABLE OF CONTENTS		PAGE
15.	SUBJECTS OF NOTE.....	15.11.1
15.11	Effects on Harvesting and Land Use.....	15.11.1
15.11.1	Introduction.....	15.11.1
15.11.2	Spatial Boundaries.....	15.11.2
15.11.3	Valued Components.....	15.11.2
15.11.3.1	LAND AND RESOURCE USE SUMMARY.....	15.11.3
15.11.4	Pathway Analysis.....	15.11.5
15.11.4.1	POTENTIAL PATHWAYS.....	15.11.5
15.11.5	Pathway Identification.....	15.11.8
15.11.5.1	ENVIRONMENTAL DESIGN FEATURES AND MITIGATION STRATEGIES.....	15.11.11
15.11.6	Pathway Validation.....	15.11.12
15.11.6.1	INVALID AND MINOR PATHWAYS.....	15.11.16
15.11.6.2	VALID PATHWAYS.....	15.11.16
15.11.7	Effects Analysis.....	15.11.17
15.11.7.1	EFFECTS RELATED TO PEOPLE.....	15.11.18
15.11.8	Cumulative Effects.....	15.11.22
15.11.8.1	CUMULATIVE EFFECTS SIGNIFICANCE DETERMINATION.....	15.11.25
15.11.9	Uncertainty.....	15.11.27

TABLE OF FIGURES	
Figure 15.11.1	— Sustainable Livelihoods Asset Mix..... 15.11.24
Figure 15.11.2	— Sustainable Livelihoods Framework..... 15.11.24
Figure 15.11.3	— Cumulative Effects on Traditional Land and Resource Use..... 15.11.26

TABLE OF TABLES	
Table 15.11.1	— Valued Components, Non-Traditional Land and Resource Use..... 15.11.4
Table 15.11.2	— Valued Components, Traditional Land and Resource Use..... 15.11.4
Table 15.11.3	— Potential Pathways Leading from the Project Components to Non-Traditional Land and Resource Use VCs..... 15.11.9
Table 15.11.4	— Potential Pathways Leading from the Project Components to Traditional Land and Resource Use VCs..... 15.11.10
Table 15.11.5	— Non-Traditional Land and Resource Use Pathway Validation..... 15.11.13
Table 15.11.6	— Traditional Land and Resource Use Pathway Validation..... 15.11.14
Table 15.11.7	— Valid Pathways Affecting Non-Traditional Land and Resource Use VCs..... 15.11.17

Table 15.11.8 — Valid Pathways Affecting Traditional Land and Resource Use VCs.....	15.11.17
Table 15.11.9 — Effects Classification – Non-Traditional Land and Resource Use	15.11.20
Table 15.11.10 — Effects Classification – Traditional Land and Resource Use	15.11.20
Table 15.11.11 — Summary of Significance Determination for the Effects on Non-Traditional Land and Resource Use.....	15.11.21
Table 15.11.12 — Summary of Significance Determination.....	15.11.22

15. SUBJECTS OF NOTE

15.11 EFFECTS ON HARVESTING AND LAND USE

15.11.1 Introduction

The assessment of harvesting and land use is composed of traditional and non-traditional land and resources uses. Pathways of effects from the Project to the Valued Component (VC) are either indirect or indirect. Indirect effects result when the Project potentially affects a biophysical component, which then affects the human use of that component. Direct effects result when the Project directly affects a traditional or non-traditional VC. The assessment of indirect and direct VCs is discussed further in the effects assessment.

This chapter contains information and assessments that are also found in other chapters. Chapters that have overlap with effects on Harvesting and Land Use include:

- Chapter 12 — Barren-ground Caribou;
- Section 15.2 — Canal Construction;
- Section 15.5 — effects from Access;
- Section 15.7 — Key Furbearing Species and Ungulates;
- Section 15.9 — Regional Economic Development;
- Section 15.10 — effects on Tourism and Wilderness Character; and
- Section 15.12 — Heritage Resources.

The land and resource use section of the DAR considers the potential effects of the proposed Project on the non-traditional and traditional land and resource use activities.

Non-traditional land and resource use information on the following types of activities, other than traditional uses, is provided in Section 9.6, as relevant to understanding of the effects on any of the identified VCs:

- protected areas and environmentally significant areas (includes existing, proposed and potential protected areas and other areas of interest);
- access and transportation (e.g., traffic from air, water and winter roads);
- mining activities (existing and proposed); and
- renewable resource use (timber resources, commercial and recreational/sport fishing, commercial and sport hunting (including lodges and outfitters), domestic hunting and trapping, tourism and other recreation).

Baseline information relating to non-traditional resource use was obtained from published government sources, information available within the public domain from other projects in the region, and personal communication with regional experts. This information is presented in Section 9.6.

Information on traditional harvesting activities includes hunting, fishing, trapping, plant gathering/use and timber gathering/use, with respect to geographic areas used, species of interest, time of year, and numbers or amounts harvested. Traditional Knowledge related to wildlife and fish populations; travel routes and portages; cabins

and camp sites; and sites that are of special interest to local Aboriginal people for their cultural or spiritual significance is also included. The information collected to support this effects assessment is also presented in Section 9.6.

Assessment of effects on land use involves consideration of specific environmental resources such as wildlife, fish and vegetation, as well as the human use of these resources. Potential effects of the Project on traditional activities such as hunting, trapping, fishing and gathering are linked to the potential effects on these natural resources

15.11.2 Spatial Boundaries

The key to determining and measuring effects, and in making extrapolations from other studies to this Project, is in identifying the correct spatial scale of assessment. Individuals, populations, species and communities all perceive and react to the environment (and effects from the Project) at different spatial and temporal scales (Johnson et al. 2005, Weins 1991). The effect assessment would therefore take place at a range of spatial scales. The Local Study Area (LSA) is intended to predict and capture the direct and small-scale indirect effects from the Project. The Regional Study Area (RSA) is intended to predict and capture the larger scale direct and indirect effects from the Project. The LSA and RSA are generally defined as a distance buffer from the Project. Effects may extend beyond the RSA and into a larger area defined not by distances from the Project, but by geographic or biological systems. For example, changes to community income would be felt throughout the region where expenditures are likely to occur. The spatial scales selected for the effect assessment of this Project are as follows:

- The LSA was defined as the entire Project footprint (or area to be disturbed) with a 5,000 m buffer. The LSA was developed to predict the small-scale direct and indirect effects from the Project on the VCs.
- The RSA was defined as the area actively used for traditional and non-traditional resource harvesting and, includes the NWT Treaty 8 Tribal Corporation and NWT Métis Nation residing in Łutsel K'e, Fort Resolution and Fort Smith. The RSA coincides with the GNWT Bureau of Statistics South Slave Region. The RSA would be used to predict the larger-scale direct and indirect effects to VCs. The RSA scale would also include any cumulative effects from activities adjacent to the Project.
- Beyond Regional Study Areas (BRSA) includes, for example, areas where economic effects may be felt such as Hay River and the Hay River Dene Reserve, or where members of other Aboriginal groups such as members of the North Slave Métis Alliance may occasionally harvest resources.

15.11.3 Valued Components

A Valued Component (VC) is a component that is considered to be ecologically, culturally, socially, or economically important. The selection of VCs is based on their value for interested parties (including community members, regulators and other interested parties). These values are identified mainly during the scoping process for the Project, but can also include consideration of other sources, such as public consultation and comments received on the MVLWB Project Description.

15.11.3.1 LAND AND RESOURCE USE SUMMARY

In the NWT, hunting, trapping, fishing and gathering of resources is the cultural expression of Canada's Aboriginal people. Over time, that expression has changed in response to the socio-economic effects associated with European exploration, fur trade and permanent settlement life. That change, however, has not lessened the cultural, spiritual and personal value of traditional lifestyle. Rather, it has intensified Aboriginal people's concern about the well-being of their culture and identity and, as the Sustainable Livelihoods Framework (see Section 15.11.7) suggests, the emergence of adaptive livelihood strategies. The proposed Project is an example of such strategy.

Traditional livelihood practices are well represented in Łutsel K'e and Fort Resolution, and less so in Fort Smith. Overall, the South Slave is one of the most traditional regions of the NWT in terms of participation in traditional activities. Łutsel K'e is one of the more traditional communities in the South Slave Region, as evidenced by its residents' consumption rate of harvested meat and fish. The average returns of the trappers who sell their furs have increased for the most harvested species, including muskrat, marten and beaver. However, the need to participate in traditional livelihood practices is declining, as is the number of trappers selling furs and household consumption rate of harvested meat and fish. Consumption of harvested meat and fish focuses on caribou, moose, beaver, muskrat, whitefish, trout, loch, grayling and northern pike. Ducks and ptarmigan are also popular.

Currently, the hunting and trapping may be a livelihood strategy that provides significant social, cultural and dietary benefits, and to a lesser extent, financial returns. In the north, the value of resource harvesting has changed, but not diminished. The resource harvesting was the dominant livelihood strategy in the past. Today, harvesting as a livelihood strategy is supported financially by GNWT grants and contributions, designed to sustain the NWT fur industry.

Baseline studies have indicated that the most common land use activities in the LSA are winter trapping for furbearing animals, winter caribou harvesting, and possibly some winter ice fishing. The LSA is largely inaccessible in summer, so summer land use activities (such as duck hunting or berry picking) are not anticipated to occur within the LSA. Refer to Section 9.6 for a summary of land use and harvesting activities.

Five VCs have been identified for non-traditional land and resource use; these are described in Table 15.11.1, along with the rationale for their selection.

Table 15.11.1 – Valued Components, Non-Traditional Land and Resource Use

Selected Valued Component	Rationale	Valued Component Assessment Endpoint
Proposed East Arm National Park	The Project may have implications regarding the establishment of the proposed National Park	Maintenance of the ecological integrity of the proposed East Arm National Park
Fishing opportunities	Important contributors to the NWT economy	Ongoing fishing opportunities
Sport hunting opportunities (caribou)	Important contributors to the NWT economy	Ongoing sports hunting opportunities
Economic forests	Important to the forest industry	Maintenance of economic forests
Wilderness character and aesthetic quality	Tourism is a viable source of income and economic development Tourism in the NWT depends on the wilderness character of the land	Ongoing enjoyment of the wilderness character of the land

Four VCs have been identified for traditional land and resource use pathways. These VCs are described in Table 15.11.2, along with the rationale for their selection and monitoring indicators.

Table 15.11.2 – Valued Components, Traditional Land and Resource Use

VC Selected	Rationale	Valued Component Assessment Endpoint
Cultural Well-being (subsistence lifestyle)	Subsistence lifestyle is important to traditional users of the land. Many wildlife and fish species have cultural importance to Aboriginal people (e.g., caribou). Specific concerns have been raised during issues scoping sessions about caribou and other ungulates (moose, muskox), waterfowl, aquatic furbearers (beaver) and fish. Plants (including trees) are also traditionally used by Aboriginal peoples for food, shelter, medicine or spiritual purposes	“Traditional land use as measured by the number of people involved in traditional harvesting; traditional values as measured by a level of respect shown during land use; and, opportunities for traditional land use as measured by the number of organized on-the-land events/activities.” (LWLED, 2002)
Economic Well-being	Obtaining food, fur and other resources from the environment contributes to the economic well-being of Aboriginal people. In all RSA communities, resources obtained from the environment are combined with the resources provided by a wage-based economy	Economic well-being as measured by: <ul style="list-style-type: none"> – Number of wage/income earning jobs – Trapping (fur value and quantity) – Quality and quantity of basic necessities (housing) (Parlee and Marlowe, 1999)

VC Selected	Rationale	Valued Component Assessment Endpoint
Maintenance of traditional cabins, camp sites and travel routes	Traditional land users rely on access to their cabins and camp sites to carry out their traditional activities. Concerns were raised during scoping sessions about Project effects on use of such sites.	Traditional land use as measured by the number of people involved in traditional harvesting and changes in harvester travel patterns (LWLED, 2002; MVEIRB, 2007)
Cultural/spiritual sites and Aboriginal culture	Certain sites or landmarks have special historic, cultural or spiritual significance for Aboriginal people. Concerns were raised during scoping sessions about the Lockhart River site known as “The Old Lady of the Falls” (Ts’ankui Theda)	Culture as measured by changes in the following: — Use of place names (MVEIRB, 2007) — Cultural values such as beliefs, norms and rules (MVEIRB, 2007)

15.11.4 Pathway Analysis

15.11.4.1 POTENTIAL PATHWAYS

The Project has potential to interact with non-traditional and traditional land and resource uses through indirect and direct pathways. Indirect pathways are those that potentially affect various biophysical environmental components that could then act as stressors on the human uses of the land and natural resources. Direct pathways are those where the Project directly affects the land and resource use. Pathways and endpoints are used to describe the potential interaction between Project components and Valued Components (VCs).

Pathways selected for non-traditional land and resource use were based on information and issues raised from the MVLWB screening, the MVEIRB scoping sessions and public consultations. These issues were cross-referenced to the various baseline land and resource uses, and five Valued Components were identified to represent non-traditional land and resource use. The VCs used for this assessment are discussed in Section 15.11.3 and include:

Traditional Land and Resource Use VCs:

- Proposed East Arm National Park;
- Fishing opportunities;
- Sport hunting opportunities (particularly for barren-ground caribou);
- Economic forests; and
- Wilderness character/aesthetic quality.

Traditional Land and Resource Use VCs:

- Cultural well-being (subsistence lifestyle);
- Economic well-being (including harvesting opportunities in support of economic well-being);
- Maintenance of traditional cabins, camp sites and travel routes; and
- Cultural/spiritual sites and Aboriginal culture.

The potential for changes to hunting, fishing, trapping and gathering activities in terms of the success and opportunities to carry out such activities, is of the concern for residents of the RSA communities. Changes could occur as a result of direct or indirect effects of the Project on the specific resources. For example, any effects of the Project (direct or indirect) on health, abundance or distribution patterns of harvested fish and wildlife species or their habitat could affect hunters, trappers and fishers. Caribou, other ungulates (moose, muskoxen), carnivores, aquatic furbearers, and waterfowl were identified as wildlife species of concern during scoping sessions in late 2007 and early 2008 (MVEIRB, 2008a). No particular fish species were mentioned during these scoping sessions. Broader concerns were related to potential changes to fish and fish habitat in general. Potential effects to beaver and muskrat were also noted as a concern. Use of traditional plants (including trees) was not specifically identified in community scoping sessions in Fort Resolution, Fort Smith or Yellowknife (MVEIRB, 2008a). Traditional plants are used from within the RSA; however, no evidence exists of regular use within the LSA. Current land use activities (summarized in Section 9.6) indicate that harvesting and land use activity within the LSA occurs predominantly during winter, with very little activity identified in summer. This limits the range of land uses that may be affected by the Project. For example, as there is no duck hunting within the LSA, Project effects to waterfowl do not lead to changes in duck hunting. Likewise, there may be effects to berries, but berry picking and other plant use does not appear to regularly occur within the LSA.

The potential effect of the Project on the hydrology of the Taltson Basin watershed, and the resulting effects on winter icing conditions were also mentioned as a concern. Traditional travel routes, including snowmobile trails, particularly over water bodies or at water body crossings, could be altered. This would compromise the safety of traditional land users and their ability to navigate and access harvesting or other areas. Other concerns were related to the potential for the Project to interfere with use of traditional camp sites or cabins and with culturally important sites such as “The Old Lady of the Falls.”

15.11.4.1.1 Project Components

The Project components and their potential effects on the VCs are described below. Details of the Project Components are contained in Chapter 6 – Development Description.

15.11.4.1.1.1 *Twin Gorges and Nonacho Lake Facilities*

The construction and operation of the new hydroelectric station at Twin Gorges, including the canal, penstocks, powerhouse, and tailrace canal, modification of the current South Valley Spillway, and a new gated control structure at the outlet of Nonacho Lake have the potential to result in a number of effects to the selected VCs. Culturally important sites, travel routes, portages, or plants used for traditional purposes could be directly affected if the physical footprint of the new construction overlaps with any of these areas of traditional use. These areas could be lost or altered and no longer available for use. During scoping sessions in Fort Smith, it was noted that some traplines were destroyed as a result of construction of the original dam (MVEIRB, 2008a). Indirect effects could also occur to harvesters, if fish or wildlife habitat was lost or altered resulting in changes to animal populations or distribution. For example, fish habitat could be lost through infilling and flow diversion during construction of the proposed outflow control structure at Nonacho Lake.

Changes to the hydrology of the Taltson Basin from operation of the hydroelectric facilities could affect the ability of traditional harvesters to fish or trap aquatic furbearers if these populations or habitats are effected. Fish habitat may be affected by events such as decreased water flows in Trudel Creek. Increased regulation of Nonacho Lake water levels could affect fish and fish habitat through the Taltson River drainage basin from Nonacho Lake to Great Slave Lake. Any barrier to fish passage could affect the productivity of the local fishery. It was noted during the scoping session that flooding in the past affected beaver populations and hydrological changes resulted in weaker downstream ice.

Change in water management from Nonacho Lake in the winter could lead to changes in downstream ice conditions, particularly on the rivers connecting the lakes in the Taltson Basin. This has implications for safety of traditional land users and their ability to access traplines or other areas of traditional use.

Changes to water quality as a result of the construction and operation of the hydroelectric facilities could affect fish and aquatic furbearers and their habitat. Effects to water quality from concrete wash water, blasting residue and deposit of sediment in water during construction, drilling and blasting were noted as concerns. Changes to water quality could occur if mercury levels would rise above baseline conditions and potentially affect fish or aquatic furbearer populations and traditional resource users.

15.11.4.1.1.2 Winter Access Roads

Construction and operation of the proposed winter access roads may result in effects to traditional land and resource users through various direct and indirect pathways involving the physical footprint of the proposed roads, dust deposition, airborne dust and air emissions, effects from vehicles, water quality effects, and increased human access to remote areas.

Direct effects to traditional cabins or camp sites, travel routes, culturally important sites or traditional plants could occur if these areas overlap with the physical footprint of the access roads, and are lost or altered as a result. Indirect effects to harvested wildlife could occur if wildlife habitat is lost or fragmented, resulting in changes to wildlife populations or distribution. For example, beaver dams or lodges could be destroyed. Vehicle use could affect water quality through chemical spills, which could affect terrestrial or aquatic habitats or the health of fish or wildlife. Dust deposition could affect wildlife through loss of forage, or through ingestion of dust laden soil, vegetation, prey or water. This could cause changes to health and reproduction of individuals or decrease habitat quality and affect movement and behaviour. Similarly, air-borne dust or air emissions could affect wildlife health or habitat quality. Vehicles could affect harvested wildlife species through sensory effects (e.g., noise, lights, smells, movements) which could agitate animals and affect movements and behaviour, or through collisions causing injury or mortality. The creation of new access into previously remote areas may expand traditional harvesting opportunities for existing harvesters and make it easier for infrequent harvesters or recreational users to frequent the area.

15.11.4.1.1.3 *Camps and Staging Areas*

Camps (other than mobile barge camps) and staging or distribution areas may affect traditional cabins or camps, travel routes, cultural sites and traditional use plants directly, if the physical footprint of these Project components overlaps with any of these traditional use VCs. Indirect effects to traditional harvesters may result if camps and storage areas attract wildlife to these sites by the presence of food, waste, or oil products. This could affect wildlife health and cause injury or wildlife mortality. Camps and distribution areas may also repel some animals through sensory effects (e.g., noise, lights, smells, movements) which could agitate animals and affect movements and behaviour.

15.11.4.1.1.4 *Transmission Line*

Construction and operation of the transmission line could affect traditional cabins or camp sites, travel routes, culturally important sites, or traditional use plants depending on the routing of the line. Fish or wildlife habitat may be lost or altered as a result of terrestrial or riparian clearing, with resulting changes to these populations and possibly harvest success rates. Mortality of birds could occur as a result of collisions with power lines. As a linear feature on the landscape, the transmission line could change wildlife behaviour or migration patterns.

15.11.4.1.2 Construction and Operations Activity

Effects from sensory disturbance are anticipated to be greatest during the construction phase. Activities such as blasting, equipment use, helicopter or other aircraft use, vehicle and Project workers would create noise and smells, and would require the clearing of vegetation and in-stream works. This could directly affect traditional land and resource users' enjoyment of their cabins or camp sites, culturally important sites, and land/water traveling or harvesting. These activities could also indirectly affect traditional users by causing changes to the distribution of fish and wildlife.

During the operations phase, there would be significantly less Project-related activity. There would remain a permanently staffed facility at Twin Gorges, which would require regular flights. Inspections of the transmission line would occur, likely annually, by helicopter. Vegetation clearing within the transmission line right-of-way may be required, but this is anticipated to be very infrequent (i.e., less than once per decade). All other areas of vegetation disturbance (such as staging areas and winter road portages) would be allowed to recover. The single greatest source of operations phase disturbance is anticipated to be from changes in the hydrology regime, although even these are anticipated to have a limited effect.

15.11.5 **Pathway Identification**

As the indirect effects are based on the Project effects on biophysical components discussed in detail in the KLOI or other SON in this DAR, this SON does not repeat the effects assessments of those various biophysical components. It does, however, identify the pathways and considers those assessments in order to evaluate the effects of the Project on non-traditional and traditional land and resource use.

The pathways identified below address the highest level stressors on the various biophysical components. For example, although a change in aquatic habitat may affect fisheries resources and thus fishing opportunities, the highest level stressor is the

change in hydrology. Therefore, change in hydrology is noted as the pathway. The non-traditional and traditional resource use pathways are shown in Table 15.11.3 and Table 15.11.4.

Table 15.11.3 — Potential Pathways Leading from the Project Components to Non-Traditional Land and Resource Use VCs

Project Component	Valued Component (VC)	Assessment Endpoint	Pathway of Effects	Pathway Duration
Construction activities, noise and disturbance	Proposed East Arm National Park	The quality of the wilderness experience	Sensory disturbance Spills and contamination	Construction
	Sport hunting opportunities (birds, caribou, other ungulates)	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience		
	Wilderness character / aesthetic quality	The quality of the wilderness experience		
Winter access roads	Commercial and sport fishing opportunities	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience	Increased access Direct mortality	Construction
	Sport hunting opportunities (birds, caribou, other ungulates)	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience	Change in land cover Sensory disturbance	
	Wilderness character / aesthetic quality	The quality of the wilderness experience		
	Economic forests	The availability of forests to harvest		
Transmission line	Proposed East Arm National Park	The quality of the wilderness experience	Change in land cover Sensory disturbance Direct mortality	Operations
	Sport hunting opportunities (birds, caribou, other ungulates)	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience		
	Wilderness character / aesthetic quality	The quality of the wilderness experience		
	Economic forests	The availability of forests to harvest		
Power facility and infrastructure operation	Fishing opportunities	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge	Change in hydrology	Operations
	Sport hunting opportunities	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience		
	Economic forests	The availability of forests to harvest		

Project Component	Valued Component (VC)	Assessment Endpoint	Pathway of Effects	Pathway Duration
Other site disturbances	Commercial and sport fishing opportunities	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience	Change in land cover Sensory disturbance	Construction
	Sport hunting opportunities	The availability of wildlife to satisfy the fishing, camping, outfitting, and lodge experience		
	Wilderness character / aesthetic quality	The quality of the wilderness experience		
	Economic forests	The availability of forests to harvest		

Table 15.11.4 – Potential Pathways Leading from the Project Components to Traditional Land and Resource Use VCs

Project Component	Valued Component (VC)	Assessment Endpoint	Pathway of Effects	Pathway Duration
Construction activities, noise and disturbance	Cultural well-being (subsistence harvesting)	“Traditional land use as measured by the number of people involved in traditional harvesting; traditional values as measured by a level of respect shown during land use; and, opportunities for traditional land use as measured by the number of organized on-the-land events/activities.” (LWLED 2002, p.42).	Sensory Disturbance Spills and contamination	Construction
	Economic well-being (including harvesting opportunities)	Economic well-being as measured by: Number of wage/income earning jobs Trapping (fur value and quantity) Quality and quantity of basic necessities (housing) (Parlee and Marlowe, 1999).		
	Maintenance of traditional cabins, camp sites and travel routes	Traditional land use as measured by the number of people involved in traditional harvesting and changes in harvester travel patterns (LWLED 2002, p.42, MVEIRB, 2007).		

Project Component	Valued Component (VC)	Assessment Endpoint	Pathway of Effects	Pathway Duration
	Cultural/spiritual sites and Aboriginal culture	Culture as measured by changes in the following: Use of place names (MVEIRB, 2007) Cultural values such as beliefs, norms and rules (MVEIRB, 2007).		
Winter access roads	All as noted above	All as noted above	Increased access Direct mortality Change in land cover Sensory disturbance	Construction
Transmission line	All as noted above	All as noted above	Change in land cover Sensory disturbance Direct mortality	Operations
Power facility and infrastructure operation	All as noted above	All as noted above	Change in hydrology	Operations
Other site disturbances	All as noted above	All as noted above	Change in land cover Sensory disturbance	Construction

15.11.5.1 ENVIRONMENTAL DESIGN FEATURES AND MITIGATION STRATEGIES

Environmental design features and mitigation strategies have been developed for many of the potential pathways. Biophysical effects and design features or mitigation measures are summarized in Section 6.10 – Design, Construction and Operational Mitigation and are included in the various biophysical KLOI and SON. Design features are incorporated directly into the Project at the planning and design stages and are intended to reduce or eliminate potential negative effects.

A mitigation strategy that would limit the effects to harvesting and land use is the proposed gating of the winter roads. An existing winter road from Fort Smith to Twin Gorges would be reactivated, and new winter roads would be pioneered from Twin Gorges to Nonacho Lake. Gates would be placed at the entrance to both these winter roads, and use of these winter roads would be limited to Project-related traffic. Public use of these winter roads would not be permitted.

15.11.6 Pathway Validation

Project environmental effects occur via a pathway between a Project component and the receiving environment. Some pathways may be reduced or eliminated through mitigation. Pathway validation is the process of screening each pathway to assess its expected contribution to the overall effects on VCs after mitigation. To create a Valid pathway leading to changes in harvesting or land use, two criteria must be met:

- The resource must be affected by the Project; and,
- The resource must be used within the RSA.

For example, if there is trapping activity within the RSA, and an effect to the harvested species, a Valid pathway exists. As the baseline studies suggest that the RSA is not regularly used for berry picking, pathway of changes in this type of land use is not Valid (even if berries are affected in the RSA).

In the pathway validation step, all pathways and mitigation were reviewed, and the magnitude of the pathway following mitigation was classified as follows:

- Invalid pathways are those which would not lead to effects on VCs (e.g., the evidence suggests that either harvested resource or the harvesting activity does not occur within the LSA).
- Minor pathways may cause negligible effects (e.g., the evidence suggests that there may be an effect to a harvested resource or a harvesting activity, but the effect is of a short duration or unnoticeable to the land users).
- Valid pathways are those which cause a measurable change and contribute to Project-related effects on VCs (e.g., there is a noticeable effect to harvesting activity or land use).

The results of the pathway validation process are shown for Non-Traditional Land and Resource Use (Table 15.11.5) and Traditional Resource Use (Table 15.11.6).

Table 15.11.5 – Non-Traditional Land and Resource Use Pathway Validation

Project Component	Pathway	Pathway Validation
Construction activities, noise and disturbance (Project construction)	Sensory disturbance	Valid (indirect) – Construction activities may result in a residual effect to beaver and muskrat during construction at Nonacho Lake (see Section 15.2), and a sensory disturbance to wildlife (see Section 15.10 –Key Furbearing Species and Ungulates) Minor (direct) – Noise of construction would not have significant effects to wilderness character/aesthetic quality (see Section 15.10 – Tourism Potential and Wilderness Character)
Construction activities, noise and disturbance (Project construction)	Spills and contamination	Invalid (indirect) - The use of EMPs and mitigation strategies would result in avoidance of contamination events and elimination of contamination effects (see Sections 7; 12; 15.2; 15.4; 15.5; 15.7; 15.10), and monitoring at existing mines indicates that spills and contamination do not lead to a change in abundance or distribution of wildlife (see Section 9.5 Biological Environment).
Winter access roads (use during Project construction only)	Increased access Direct mortality Change in land cover Sensory disturbance	Minor (indirect) - The proposed speed limits, preventing public access to the winter roads, and the results of monitoring programs at existing mines and winter roads indicate that winter roads cause negligible levels of direct mortality (see Section 12 – Barren-ground caribou and Section 15.7 Key Furbearing Species and Ungulates). Further the low levels of Project traffic and the closure of the winter roads following construction indicate that the duration of sensory disturbance effects would be short to medium-term (see Section 15.5 – Access). Further, the percent of land disturbance associated with the winter road is minor (see Section 15.7 – Furbearing Species and Ungulates)
Transmission line (Project operations)	Change in land cover Sensory disturbance Direct mortality	Valid (indirect) – Change in land cover from the transmission line may affect wildlife Valid (direct) – The transmission line may affect wilderness character/aesthetic quality and/or the experience of the Proposed East Arm National Park Invalid (direct) – As there are no economic forests within the LSA, these would not be affected. Invalid (indirect) – Effects to human use of birds are considered Invalid as there is no bird hunting within the Project area (see Section 15.4 – Species at Risk and Key Bird Species)
Power facility and infrastructure operation (Project operations)	Change in hydrology	Valid (indirect) – Changes in water level and flow would result in residual effects to fish.
Other site disturbances (use during Project construction or operations)	Change in land cover Sensory disturbance	Minor – The use of EMPs and mitigation strategies would limit effects (see Sections 12; 15.4; 15.7; 15.10) Further, the percent of land disturbance associated with the infrastructure is minor (see Section 15.7 – Furbearing Species and Ungulates)

Table 15.11.6 – Traditional Land and Resource Use Pathway Validation

Project Component	Pathway	Pathway Validation
Construction activities, noise and disturbance	Sensory disturbance	Valid (indirect) – Construction activities may result in a residual effect to beaver and muskrat during construction at Nonacho Lake (see Section 15.2), and a sensory disturbance to wildlife (see Section 15.10 – Wildlife & Ungulates) Minor (direct) – Noise of construction would not significantly affect cultural and/or traditional economic use of land (see Section 15.10 – Tourism Potential and Wilderness Character) Invalid (direct) – The Project would avoid interactions with cultural and traditional sites (see Section 15.12 – Heritage Resources)
Construction activities, noise and disturbance	Spills and contamination	Invalid (indirect) - The use of EMPs and mitigation strategies would result in avoidance of contamination events and elimination of contamination effects (see Sections 7; 12; 15.2; 15.4; 15.5; 15.7; 15.10), and monitoring at existing mines indicates that spills and contamination do not lead to a change in abundance or distribution of wildlife (see Section 9.5 Biological Environment).
Winter access roads	Increased access Direct mortality Change in land cover Sensory disturbance	Minor (indirect) - The proposed speed limits, preventing public access to the winter roads, and the results of monitoring programs at existing mines and winter roads indicate that winter roads cause negligible levels of direct mortality (see Section 12 – Barren-ground caribou and Section 15.7 Key Furbearing Species and Ungulates). Further the low levels of Project traffic and the closure of the winter roads following construction indicate that the duration of sensory disturbance effects would be short to medium-term (see Section 15.5 – Access). Further, the percent of land disturbance associated with the winter road is minor (see Section 15.7 – Furbearing Species and Ungulates)
Transmission line	Change in land cover Sensory disturbance Direct mortality	Valid (indirect) – Change in land cover from the transmission line may affect wildlife (see Section 15.7 Furbearing Species and Ungulates) Valid (direct) – The transmission line may cause human sensory disturbances affecting cultural and/or traditional economic use of land (see Section 15.7 Furbearing Species and Ungulates) Invalid (indirect) – Bird collisions with the transmission line are considered Invalid as they relate to land and resource use as there is no bird harvesting within the Project area (see Section 15.4 – Species at Risk and Key Bird Species) Invalid (direct) – The Project would avoid interactions with cultural and traditional sites (see Section 15.12 – Heritage Resources)
Power facility and infrastructure operation	Change in hydrology	Valid (indirect) – Changes in water level and flow would result in residual effects to fish and wildlife (see Section 13.9 and 14.8 Taltson and Trudel fish assessments) Minor (indirect) – Change in hydrology are not anticipated to cause considerable change to the ice regime on the Taltson River and thus travel routes (see Section 13.3 and 14.3 Trudel and Taltson Hydrology).

Project Component	Pathway	Pathway Validation
Other site disturbances	Change in land cover Sensory disturbance	<p>Minor (indirect) – The use of EMPs and mitigation strategies would result in no residual effects (see Sections 12; 15.4; 15.7; 15.10)</p> <p>Further, the percent of land disturbance within the LSA associated with the infrastructure is minor (see Section 15.7 – Furbearing Species and Ungulates), and no traditional camps, cabins or cultural sites would be affected, as they would be avoided.</p>

15.11.6.1 INVALID AND MINOR PATHWAYS

A pathway is classified as Invalid or Minor if the pathway does not affect the land and resource VC, or if, for an indirect pathway, no residual effect occurs to an environmental component that could consequently affect land and resource use. The following pathways were classified as Invalid or Minor, as they do not lead to a Valued Component or were found to have a negligible effect after mitigation strategies were applied:

- spills and contamination from construction activities;
- change in land cover leading to an effect to heritage resources;
- vegetation removal leading to a reduction in economic forests;
- increased access, direct mortality, change in land cover or sensory disturbance from winter access roads; and
- change in land cover and sensory disturbance from other site disturbances.

A full discussion of Invalid or Minor pathways associated with indirect pathways is contained in the relevant KLOI and/or SON, as noted in Table 15.11.5 and Table 15.11.6.

Only one direct pathway is identified as Invalid, namely, the potential for a change in land cover to affect economic forests. The nearest forestry operations to the Project are near Fort Smith, within the Taiga Plains Ecozone. The Project is situated within the Taiga Shield and Southern Arctic Ecozones, which do not currently contain any forestry operations. Forestry inventory mapping has been confined to the Taiga Plains (Forest Management, 2009). The forests of the Taiga Shield are defined by a patchy distribution of closed forest with thin soils over bedrock and often confined to bedrock fractures (Ecosystem Classification Group, 2008), and are unlikely able to support commercial forestry operations. Therefore, this pathway was identified as Invalid.

15.11.6.2 VALID PATHWAYS

The pathway is classified as Valid if there is a direct effect to land and resource use or if there is residual effect to an environmental component that could consequently affect land and resource use. Indirect pathways were further reviewed to identify if any resulted in a significant negative effect, as these pathways would be given a greater level of assessment to land and resource use than pathways having a residual effect that is not significant. All of the indirect pathways that resulted in a residual negative effect were determined to be not significant in the relevant KLOI or SON effects assessments.

Valid pathways were carried forward to the effects assessment, as addressed in the following section. The following pathways were classified as Valid:

- Sensory disturbances to wildlife from construction activities;
- Sensory disturbances or changes in land cover associated with transmission line affecting wildlife and human land users; and
- Change in hydrology associated with the power generation facility or control structure

15.11.7 Effects Analysis

To assess the Project effects on land and resource use VCs, all Valid pathways potentially affecting a single VC were grouped and are shown in Table 15.11.7 and Table 15.11.8. The residual effects and reference locations for pathways assessed in other sections of the DAR are provided.

Table 15.11.7 – Valid Pathways Affecting Non-Traditional Land and Resource Use VCs

VC	Pathways	Detailed Assessment Reference
Proposed East Arm National Park	Valid (direct) – The transmission line may cause human sensory disturbances affecting wilderness character/aesthetic quality and/or the experience of the Proposed East Arm National Park	Section 15.10.8 – Tourism Potential and Wilderness Character
Fishing opportunities	Valid (indirect) – Changes hydrology would result in residual effects to fish.	Section 13.9 and 14.8 Trudel and Taltson Fish and 15.10 - Tourism Potential and Wilderness Character
Sport hunting opportunities	Valid (indirect) – Construction activities could result in an effect to moose, beaver and muskrat during construction at Nonacho Lake	Section 15.2 – Canal Construction
	Valid (indirect) – Change in land cover or sensory disturbance from the transmission line may affect wildlife	Section 12.5.2 – Barren-ground Caribou
	Valid (indirect) – Changes in hydrology could result in residual effects to wildlife.	Section 13.10 & 14.9 – Trudel and Taltson Wildlife
Wilderness character / aesthetic quality	Valid (direct) – The transmission line may affect wilderness character/aesthetic quality and/or the experience of the Proposed East Arm National Park	Section 15.10.8 – Tourism Potential and Wilderness Character

Table 15.11.8 – Valid Pathways Affecting Traditional Land and Resource Use VCs

VC	Pathways	Detailed Assessment Reference
Cultural well-being (subsistence lifestyle)	<p>Valid (indirect) – Construction activities may result in a residual effect to beaver and muskrat during construction at Nonacho Lake and a sensory disturbance to wildlife)</p> <p>Valid (indirect) – Change in land cover from the transmission line may affect wildlife</p> <p>Valid (direct) – The transmission line may cause human sensory disturbances affecting cultural and/or traditional economic use of land</p> <p>Valid (indirect) – Changes in water level and flow would result in residual effects to</p>	<p>Section 15.2 – Canal Construction;</p> <p>Section 15.7 – Furbearing Species & Ungulates;</p> <p>Chapter 12 – Barren-ground Caribou;</p> <p>Section 15.10.8 – Tourism Potential and Wilderness Character ;</p> <p>Chapters 13 and 14</p>

VC	Pathways	Detailed Assessment Reference
	fish and wildlife (see Section 13.9 and 14.8 Taltson and Trudel fish assessments)	
Economic well-being (including harvesting opportunities)	Same as above	Same as above
Cultural/spiritual sites and Aboriginal culture	Valid (direct) – The transmission line may affect cultural and/or traditional economic use of land	Section 15.10.8 – Tourism Potential and Wilderness Character

The effects analyses of all the Valid pathways are presented in detail in the corresponding SON or KLOI as shown in Tables 15.11.5; 15.11.6; 15.11.7; 15.11.8 above and are not duplicated here. A summary of the effects to the people as harvesters and land users is provided.

15.11.7.1 EFFECTS RELATED TO PEOPLE

Effects to traditional and non-traditional harvesting opportunities are predominantly a function of caribou abundance, distribution, and access. Given the length of travel distance, planned mitigation practices and designs, and the variability in barren-ground caribou winter distribution an increase in harvesting opportunities from improved access was considered to be a Minor pathway (see Section 12.2). However, changes to caribou abundance and distribution from the Project and existing developments can decrease harvesting opportunities for traditional and non-traditional land users.

Principal pathways influencing caribou abundance and distribution are related to direct habitat loss and fragmentation, and sensory disturbance causing a decrease in the amount of quality habitat. The magnitude of incremental and cumulative changes from direct habitat loss and fragmentation on caribou is expected to be low, and low to moderate for effects from sensory disturbance. Results from the PVA models also predicted that cumulative and incremental decreases in carrying capacity (a function of direct and indirect habitat loss) had a negligible influence on caribou abundance. The effect from the Project and other developments on the distribution of caribou across their seasonal ranges is expected to be low in magnitude (i.e., changes should be within the range of baseline conditions). There are natural environmental factors that operate over large scales of space and time (e.g., fire, snowfall, climate-related changes in food abundance and quality) that likely have greater influences on seasonal distributions of caribou relative to effects from the Project and other developments. For example, some studies of caribou have shown that the historical cumulative effect of overgrazing on calving, summer or winter ranges can result in periodic range shifts and large population fluctuations (Messier et al., 1988; Ferguson and Messier, 2000). Traditional knowledge also contends that fire frequency and intensity affects caribou numbers and distribution (Kendrick et al., 2005).

The local to regional incremental effect from the Project is not expected to result in a detectable change in encounter rates between people and caribou on their seasonal ranges (negligible magnitude). Because the ecological context for human use of caribou is considered high, the predicted magnitude from cumulative development on use of caribou by people was increased from low to moderate, and negligible to low

for incremental effects from the Project. The duration of effects on the continued opportunity for harvesting of caribou are expected to be reversible in the medium to long term. Effects on harvesting opportunities would likely be greater during construction of the Project, due to the level and type of activity (e.g., vegetation clearing, truck and helicopter traffic, human presence, and blasting), but these effects occur only during the winter and are expected to be reversible following construction (medium term duration). During operation, effects should be mostly attributed to the presence of the transmission line and associated ROW, and are predicted to be reversible at the end of operation.

Changes in the population size and distribution of key furbearing and other ungulate species may influence the continued opportunity for traditional and non-traditional use of these species (i.e., harvesting activities, and wilderness value and wildlife viewing potential). The magnitude of direct and indirect effects from the Project is anticipated to be low. The cumulative changes to habitat resulting from the Project on key furbearing species and other ungulates are estimated to be less than 1%. This is below the 40% threshold value for habitat loss associated with expected declines in bird and mammal species (see Section 15.4).

Although the direct effects of habitat loss from the Project are local, habitat fragmentation from other developments in the cumulative effects study area may influence the movement and behaviour of furbearer and ungulate populations. Similarly, the indirect effects of the Project from sensory disturbance have local effects on habitat quality. However, the effect on the movement and behaviour of wildlife may extend to the population level.

The indirect effects from sensory disturbance and winter access roads on the continued opportunity for traditional and non-traditional use of muskoxen, moose, marten, and lynx are anticipated to stop shortly after construction of the Project. Changes in hydrology from the Project, and subsequent effects on continued opportunity for traditional and non-traditional use of fisheries resources, muskrat and beaver are anticipated to be last beyond the 40-year operation period.

15.11.7.1.1 Ice Conditions and Effects on Travel Routes

For the 36 MW development scenario, the proposed changes to the management of flows from Nonacho Lake include release of near to baseline flows from October through December, suggesting that ice freeze-up would be similar to the baseline condition. Discharges from the reservoir are predicted to increase above baseline conditions from January through April. At rapids sections and in the open water leads, increasing the flow may cause staging or backwatering effects and increase the potential for localized flooding along the shoreline. For the 56 MW development scenario, releases from Nonacho Lake into the Taltson River would be higher than baseline from October through December, but flows through the Tronka Chua Gap would be lower than baseline. For regions downstream of the Taltson/Tazin confluence, ice formation flows are expected to be similar to the baseline condition. An increase in flow may slow the ice cover formation in the reach between the Taltson/Tazin confluence and the Nonacho reservoir. It is expected that an ice cover would continue to form relatively quickly on the many lakes and velocity in this zone would be slow despite the increased flow. However, the existing open water areas at the narrower channel sections and rapids would likely increase in extent. The

increased open water area may lead to the development of a rougher and thicker ice cover immediately downstream of this area.

The changes to operations at Nonacho Lake are not expected to have an effect on the large lakes downstream of the reservoir. The increased depth of the lake during the freeze-up period is not expected to change the mechanism of thermal ice generation. The ice thickness should remain consistent with baseline conditions.

The changes in operations and the upgrades to the Twin Gorges facility are expected to substantially decrease flow within the Trudel Creek. The decreased flow may affect ice formation. Ice freeze-up would occur more quickly with the lower river velocities. The ice has may be thicker in this reach, and there is the potential for the creek to freeze to the bottom in some sections. It is also possible that in the event of a prolonged load rejection event, the Trudel Creek ice cover may partially break up and re-jam within the channel or in the Taltson River downstream

15.11.7.1.2 Incremental Effects

Based on the effects assessment summaries, and effects assessment classifications in the relevant KLOI and SON, the incremental effects classification for land and resource uses are summarized in Table 15.11.9 and Table 15.11.10.

Table 15.11.9 – Effects Classification – Non-Traditional Land and Resource Use

Valued Component	Direction	Magnitude	Geographic Extent	Duration	Frequency	Likelihood
Proposed East Arm National Park	Adverse	Low	Local	Long term	Continuous	High
Fishing opportunities	Neutral	Low	Local	Long term	Continuous	Low
Sport hunting opportunities	Adverse	Low	Regional	Long term	Continuous	Low
Wilderness character / aesthetic quality	Adverse	Low	Local	Long term	Continuous	High

Table 15.11.10 – Effects Classification – Traditional Land and Resource Use

Valued Component	Direction	Magnitude	Geographic Extent	Duration	Frequency	Likelihood
Cultural well-being (including harvesting opportunities)	Adverse	Low	Local	Long term	Continuous	Moderate
Economic well-being (including harvesting opportunities)	Adverse	Low	Local	Long term	Continuous	Low
Cultural/spiritual sites and Aboriginal culture	Adverse	Low	Local	Long term	Continuous	Moderate

15.11.7.1.3 Significance Determination

The information presented in the effects analysis was expressed in terms of direction, magnitude, geographic extent, duration, frequency, reversibility and likelihood of effect to occur. For example, direct habitat alteration to furbearers might be presented in terms of years until vegetation re-growth (duration), area of habitat that would be disturbed (geographic extent), the number of times the habitat would be disturbed (frequency) and the effect that the disturbance might have on furbearer densities (magnitude). The peoples’ traditional use of the natural resources affected by the Project is considered and evaluated in Table 15.11.11, and a summary of significance determination for incremental effects is provided in Table 15.11.12

Table 15.11.11 – Summary of Significance Determination for the Effects on Non-Traditional Land and Resource Use

VC Selected	Valued Component Assessment Endpoint	Pathways	Significance of Effects
Proposed East Arm National Park	Maintain the ecological integrity of the Proposed East Arm National Park	Sensory disturbance	Not significant
Commercial and sport fishing opportunities	Maintain ongoing sport fishing opportunities	Change in hydrology	Not significant
Sport hunting opportunities (birds, caribou, other ungulates)	Maintain ongoing sports hunting opportunities	Sensory disturbance Change in land cover Change in hydrology	Not significant
Wilderness character / aesthetic quality	Maintain ongoing enjoyment of the wilderness character of the land	Sensory disturbance Increased access Change in land cover	Not significant

Table 15.11.12 — Summary of Significance Determination

Valued Component	Valued Component Assessment Endpoint	Pathways	Significance of Incremental Effects
Cultural well-being	“Traditional land use as measured by: the number of people involved in traditional harvesting; traditional values as measured by level of respect shown during land use; and, opportunities for traditional land use as measured by the number of organized on-the-land events/activities.” (LWLED 2002)	Sensory disturbances Changes in land cover Change in hydrology	Not significant
Economic well-being	Economic well-being as measured by: Number of wage/income earning jobs Trapping (fur value and quantity) Quality and quantity of basic necessities (housing) (Parlee and Marlowe 1999)	Sensory disturbances Changes in land cover Change in hydrology	Not significant
Maintenance of traditional culture through cultural/spiritual sites	Culture as measured by changes in the following measures: — Change in the use of place names (MVEIRB, 2007) — Changes in cultural values such as beliefs, norms and rules (MVEIRB 2007)	Sensory disturbances Changes in land cover Change in hydrology	Not significant

15.11.8 Cumulative Effects

Cumulative effects represent the sum of all human-induced influences on the physical, biological, cultural, and economic change within a period of time and space. Where an effect to a VC was identified, overlapping effects from other development and activities were also considered. Effects may overlap spatially and temporally.

The final determination of significance would not be limited to the incremental effects of the proposed Project on the VC, but depend on the cumulative effects of known developments and trends, including the Taltson Project.

The goal of the cumulative socio-economic and cultural effects assessment is to:

- Provide an understanding of the proposed Project’s incremental effects to the current socio-economic and cultural environment, and
- Provide an understanding of the cumulative socio-economic and cultural effects of this Project in addition to other past and reasonably foreseeable projects.

To help communicate the results of the incremental and cumulative effects assessment, Project effects on VCs were presented in light of their contribution to one or more of the five livelihood assets: human, social, physical, natural and financial capital. Livelihood assets serve as the basis for people's livelihoods. There are five types of asset that together enable people to pursue sustainable livelihoods (NZAID, 2008):

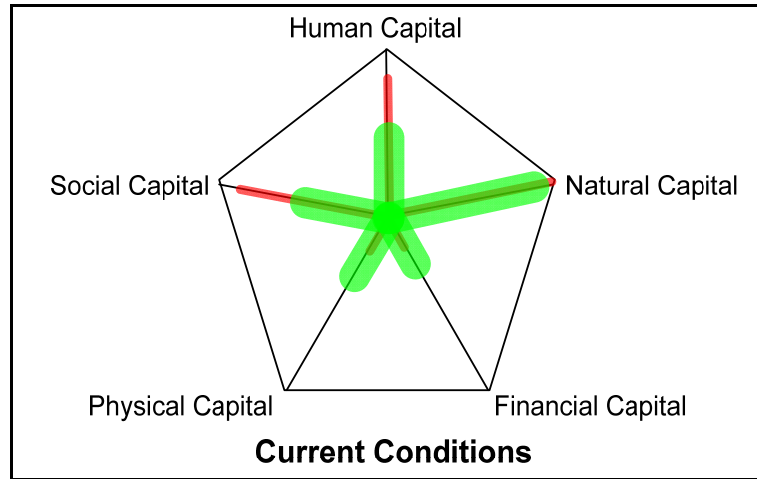
- Human — knowledge, skills, ability to labour and good health,
- Social — the resources people can draw upon in pursuit of their livelihood objectives, including social networks and relationships of trust and reciprocity,
- Natural — the natural resources available,
- Physical — basic infrastructure and producer goods available, and
- Financial — the financial resources people have available.

For assessment purposes, a pristine socio-economic and cultural environment was assumed before extended contact between Aboriginal and non-Aboriginal people, and pristine pre-contact Aboriginal livelihood assets are considered from a contemporary context.

In this DAR, the assessment and classification of the effects was based on both the incremental and cumulative changes. For example, if there was a decline in fur harvesting from baseline conditions and the Project causes an increase in fur harvesting, then the anticipated gain would contribute to an increase in human, social and financial capital. This would increase Aboriginal peoples' capacity to affect policy and institutional processes that influence their livelihood. Socio-economic effects are cumulative and, once experienced, cannot be eliminated from the socio-cultural context. They can only be modified by future events, which would become part of the effect accumulation on the human environment.

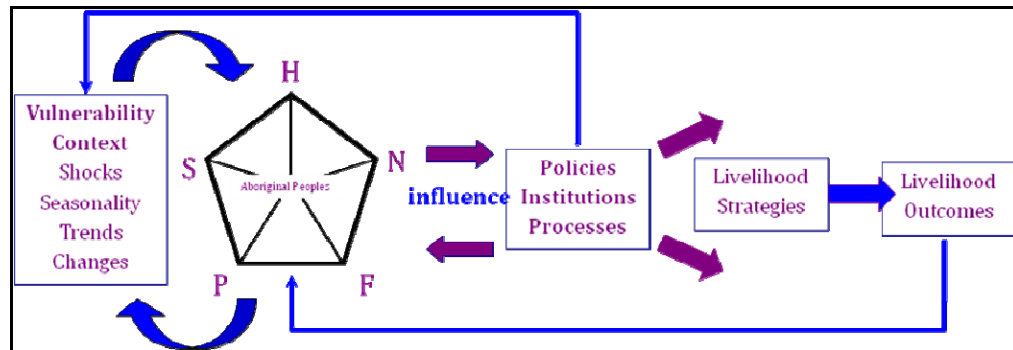
To help communicate this approach, the five-sided Sustainable Livelihoods Framework model in Figure 15.11.1 is used to show the current Aboriginal livelihood assets/capital mix, as compared to baseline conditions. The pentagon enables information about people's assets to be presented visually, thereby bringing to life important inter-relationships between the various assets. The shape of the pentagon can be used to show the variation in people's access to assets. The centre point of the pentagon, where the lines meet, represents zero access to assets while the outer perimeter represents maximum access to assets. The red lines represent the baseline sustainable livelihoods asset mix of Aboriginal people, and the green lines on top of the red lines represent current sustainable livelihoods asset mix. The differences in line lengths show the change in the livelihood asset mix of Aboriginal people possibly affected by the Project between baseline conditions and 2008. This same approach is used to illustrate a plausible future sustainable livelihood asset mix influenced by the socio-economic effects of the proposed Project in combination with the socio-economic effects of other projects.

Figure 15.11.1 — Sustainable Livelihoods Asset Mix



The process of asset use is depicted in the Figure 15.11.2. It shows how Sustainable Livelihood assets work together to either increase or decrease Aboriginal peoples' capacity to influence their future. The intent of proposed socio-economic mitigation and enhancement is to increase the abundance of assets so that Aboriginal people affected by the Project can exert greater influence over their own lives and those of their families and communities.

Figure 15.11.2 — Sustainable Livelihoods Framework



Source: IFAD,2008

15.11.8.1 CUMULATIVE EFFECTS SIGNIFICANCE DETERMINATION

Estimation of the cumulative effects requires some understanding of the socio-economic pristine conditions, historic effects of developments on these conditions, and possible developments that may add to the effects on VCs in the study area. Pristine conditions were presumed to have existed before contact with non-Aboriginal people. The effects of development to date are assumed to be reflected in the current socio-economic status of the study area. The possible future developments that could contribute to cumulative effects to VCs used in the Taltson assessment include:

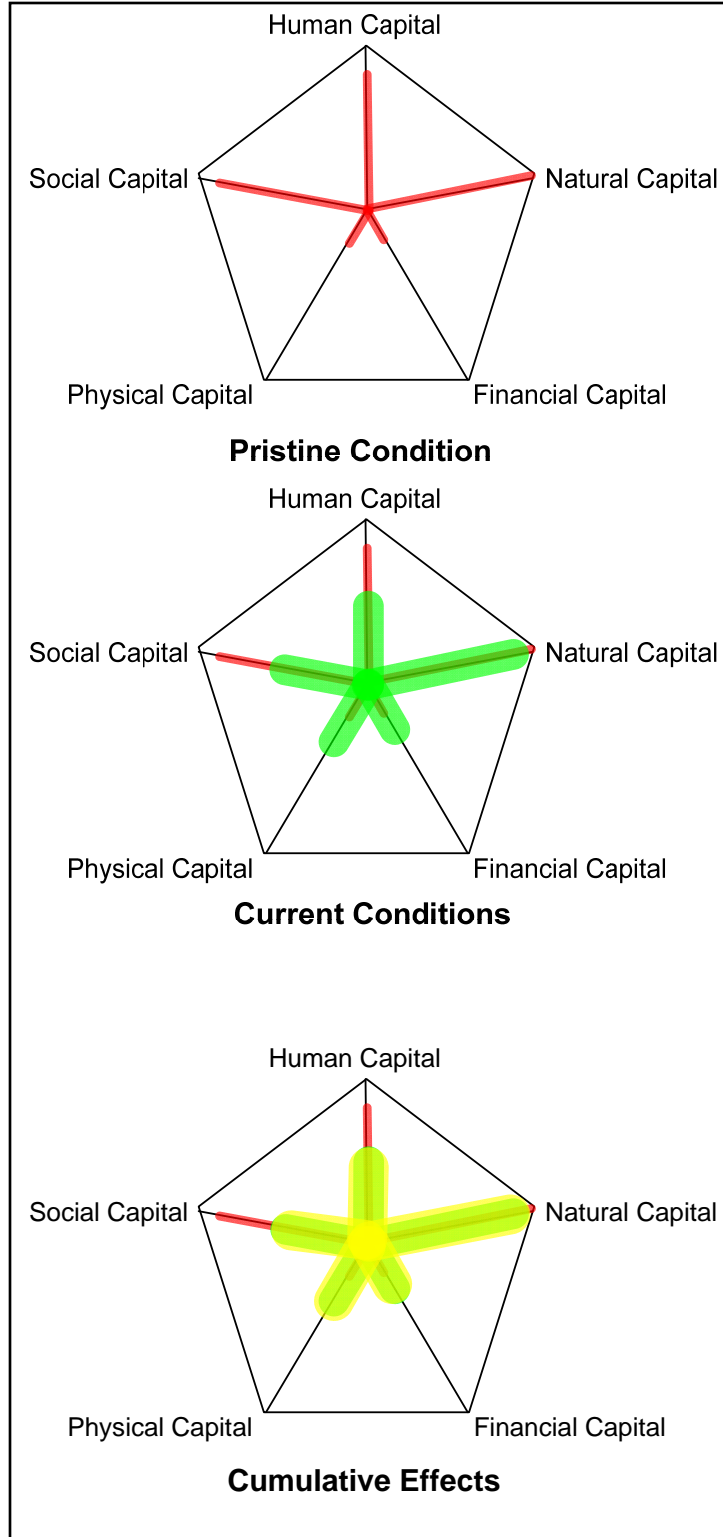
- the Gahcho Kué Project (for the purposes of this DAR it would be considered as an existing project),
- a small mine in the Lac de Gras region, which hauls ore to Ekati for processing,
- the Tyhee Development Corporation’s Yellowknife Gold Project,
- Bathurst Inland Port and Road Project,
- East Arm National Park and,
- Tamerlane’s Pine Point Project.

The livelihood pentagon found in the Sustainable Livelihoods Framework indicates the pristine condition, current condition, and cumulative condition resulting from the Project incremental effects together with potential effects of reasonably foreseeable future projects (cumulative).

Figure 15.11.3 shows the cumulative socio-economic effects assessment outcome using the “livelihood pentagon”. Each spoke of the pentagon represents one of the five livelihood assets (human, social, physical, financial, and natural). The amount of each asset available to communities is depicted by the length of the color bars on each of the spokes. The longer the color bar, the more of that asset that exists.

Pristine assets (red lines also called Baseline condition) in Figure 15.11.3 are characterised by high human, natural and social capital, and minor financial and physical capital. *Current conditions (green lines)* are characterized by a moderate to low human, social, physical and financial capital, and high natural capital. Forecast *cumulative effects (yellow lines)* from this Project on the current conditions would be characterized by high natural capital and moderate social, physical, financial and natural capital.

Figure 15.11.3 — Cumulative Effects on Traditional Land and Resource Use



15.11.9 Uncertainty

Uncertainty refers to the level of confidence in the effects prediction. The purpose of this section is to highlight areas of low certainty. Confidence in socio-economic effects analyses can be related to many elements, including the following:

- Adequacy of data for understanding current conditions and future changes unrelated to the Project (e.g., extent of future developments, climate change, catastrophic events);
- Incomplete or simplified understanding of socio-economic processes;
- Incomplete or simplified understanding of Project-related effects on complex socio-economic and cultural systems that contain interactions across different scales of time and space (e.g., how and why would the Project would influence young working Aboriginal persons); and
- Knowledge of the effectiveness of the mitigation and enhancement measures.

Monitoring would be primarily associated with the environmental components that may affect the human land or resource use. Potential monitoring programs are described in the relevant SON and KLOI sections. If determined valuable by the stakeholders, specific non-traditional land and resource use monitoring would be developed in consultation with regulatory agencies and land user groups.