Yukon
Energy, Mines and Resources

Minto Burn Commercial Fuelwood Timber Harvest Project

Forest Management Unit: **Y08**
October 2007

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Executive Summary

The Minto Commercial Fuel Wood Timber Harvest Project encompasses 127 ha, accessing 10,976 m^3 and producing 4844 cords of fuelwood. This fulfils the anticipated local fuelwood demand for the next five years. The goal is to ensure sustainable land management while meeting the demand for personal use and commercial operators. Little Salmon Carmacks First Nation and Selkirk First Nation have provided recommendations specific fuelwood development and the respective First Nations needs.

The development of individual blocks and associated roads will occur in phases as the demand arises. Traditionally, commercial fuelwood in the Yukon refers to operations that are harvesting more than 50 m^3 and selling fuel wood to clients. Operators typically are manually harvesting the wood and transporting it by pickup and trailer. Access to the THP will use existing infrastructure (where feasible). In consideration of cumulative effects and environmental and socioeconomic factors, this THP sets guidelines for fuelwood development, manages the fuelwood harvesting activities monitors the impact of the harvesting activities and monitors regeneration.

The Forest Management Branch is responsible for the upgrading and construction of roads. The harvesting activities are monitored by Client Services and Inspections Branch. Forest Management Operations is responsible for monitoring the forest practices and the silviculture activities specific to this project. Regeneration of harvested areas is governed by Yukon Silviculture Manual standards.

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Table of Contents

1.0 Introduction

2.0 Background

The development of the Minto Burn began in 2002 when the Forest Resources of the Department of Indian Affairs and Northern Development (DIAND, 2002) consulted with the Little Salmon Carmacks First Nation, Village of Carmacks, Selkirk First Nation and the Village of Pelly Crossing. This resulted in the Minto Burn Fuelwood Extraction Guidelines for the Y08 (Salmon) Forest Management Unit.

Between 2003 and 2006, fuelwood permits were allocated on the east side of the Klondike Highway between km 408 and 412 with a total permitted volume of 3800 m^3 (~1678 cords). Current fuelwood demand is depleting the supply of fuel wood sooner that anticipated. Little Salmon Carmacks FN, Village of Carmacks, Selkirk FN and the Village of Pelly Crossing see a need to balance the fuelwood needs of the local communities' with the demands of commercial fuel wood operators.

In response to this concern, Minto Commercial Fuelwood Timber Harvest Project proposes development of four areas within two distinct areas.

2.1 Overview of Timber Harvest Project Operating Units

The Operating Units are Minto Area 2 Bench and Minto Area 6 (North, South and West). The total area under development is 127 ha, with an estimated volume 10,976 m^3 or 4844 cords of fuel wood.

Minto Area 2 Bench is accessed at km 406.4 of the Klondike Highway. The access point will be constructed to meet the Department of Highways standards as per specification in Permit #1556.

Minto Area 6 South and West are accessed at km 447.7. This is a new access point and will be gated. Currently, FMB has applied with the Department of Highways and Public Works to establish an approved access point for these areas.

Minto Area 6 North is accessed at km 448 via a cat-guard. Currently, FMB has applied with the Department of Highways and Public Works to upgrade the access to comply with safety standards. A gate will be established at the junction of the cat-guard and the proposed access.

Minto Area 2 and Blk 1, 2, 3 and 6 in the Minto Area 6 North have all season access. Minto Area 6 West, Minto Area 6 South Blk 4 and 5 are winter access only.

Table 1 Minto Burn Commercial Fuel Wood Planning Area Summary

Operating Unit	Approximate Total Area (ha)	Approximate Harvest Volume (m^3)*	Approximate Harvest Equivalent in Cords*
Minto Area 2 Bench	19.0	1400	618
Minto Area 6 North	48.0	4565	2013
Minto Area 6 South	45.0	3385	1493
Minto Area 6 West	15.2	1630	720
Total	127.2	10980	4844

For the purposes of this table areas and volumes were rounded. More accurate estimates are in table summaries applicable to specific to the proposed OU.

3.0 Ecoregion

This project falls within the Yukon Plateau-Central Ecoregion (Ecoregion 175).

3.1 Topography

This ecoregion extends northward from Lake Laberge to the lower Stewart River in the central Yukon. The Yukon Plateau-Central ecoregion is composed of several groups of rolling hills and plateaus separated by deeply cut, broad valleys. Elevations are above 1000 m ASL, except for major river valleys, which lie below 600 m ASL in the northwestern portion. Several mountains reach heights of 1500 m ASL. (Yukon Ecoregions Working Group, 2004)

3.2 Climate

The climate is cold and semiarid. The mean annual temperature for the area is approximately -3.5°C with a summer mean of 12°C and a winter mean of -19°C. Mean annual precipitation varies from 250 mm in the southern areas near Carmacks to 400 mm at higher elevations in the north and east. (Yukon Ecoregions Working Group, 2004)

3.3 Vegetation

White and black spruce form the most common forest types. Black spruce is usually dominant in wetter areas. Lodgepole pine frequently invades burnt-over areas and very dry sites. A significant vegetative feature of this ecoregion is the presence of extensive grasslands on all low-elevation, south-facing slopes. The forests suffer frequently from recurring natural fires such that seral communities are most common (Yukon Ecoregions Working Group, 2004).

In Minto Area 6, a natural stand conversion is taking place. Pre-fire, the forest stands were late succession white spruce. The fire intensity and time reduced the white spruce seed source (burned and poor cone crop). Black spruce regeneration is the dominant species as black spruce is fire adapted and a prolific seeder.

3.4 Soils

Eutric Brunisols have developed on steeply-sloping, ridged to hummocky landforms. Loamy morainal and sandy fluvioglacial material are dominant the dominant parent materials in the ecoregion. Much of the ecoregion is covered by a veneer of recent volcanic ash 10-30 cm thick. Permafrost is discontinuous to sporadic with high ice content associated with fine-textured valley deposits (Yukon Ecoregions Working Group, 2004).

4.0 Landscape Issues

The landscape has been impact by large forest fires. The Government of Yukon's Timber Harvest Planning and Operating Guidebook (THPOG) describes five natural disturbance zones (NDZ). The Minto burn occurs in NDZ3 which is described as:

> *"a simple homogeneous upland characterized by flat rolling terrain and is physically separate from distant lowland by distance and elevation."*
>
> (Forest Resources, 1999)

Moisture regime and aspect delineate stand types. North aspects are moist and cool dominated by young white spruce stands. South aspects are drier and dominated by young white spruce or pine. Young pine forests dominate areas with significant ground disturbance.

Fire intensity and type have determined forest succession within the Minto burn. Across the landscape, the following patterns emerge:

- Low intensity crown fires, typically leave higher volumes of dead standing fuelwood with minimal natural regeneration.
- High intensity crown fires leave lower volumes of dead standing fuelwood and sufficient natural regeneration.
- Low intensity ground fires leave moderate volumes of dead standing fuelwood and sufficient regeneration.
- High intensity ground fires leave high volumes of blowdown, high levels of site disturbance resulting in abundant natural regeneration.

Minto Area 2 has a southwest aspect between 550 m ASL and 900 m ASL. Development is proposed in areas of low intensity ground fires; the higher elevations and south facing aspects were impacted by high intensity ground fires. Natural regeneration tends to be stocked white spruce on mid to lower slopes; southern aspects tend be stocked to over stocked pine that have reached free-to-grow status.

Minto Area 6 varies transitioning from a southwest aspect to a northeast aspect between 600 m ASL and 750 m ASL. Fire skips, on lower to mid elevations, are mature aspen\white spruce. South aspects where intense ground fires occurred have high volumes of blow down and are regenerating back to 60% spruce and 40% pine. Upper slopes and crests have low volumes of blow down and are regenerating back to 90% pine, 10% white spruce. The northeast aspects have low volumes of blow down and are regenerating to 100% black spruce.

5.0 Wildlife

The frequency of wildfires has impacted wildlife habitat. Fires in 1985 and 1995 have created an early succession spruce pine forest. The current fire area is in a young to early seral stage of forest succession. Typically, there are fire skips that are predominantly mature black spruce (lower elevations), mature aspen white\spruce (mid elevations) and mature spruce\pine (upper elevations). This stand diversity is important to wildlife. Wildlife considerations for Minto Fuelwood THP are presented in general terms in this section.

5.1 Ungulates

5.1.1 Moose

Moose is a species with great ecological, as well as cultural and recreational importance in this area.

Mid-to-lower slopes with northern aspects have evidence of high use by moose. Willow and pine regeneration are browsed (moderate to heavy). Management objectives include retaining connectivity in these “high use” areas. Streams have a minimum 200 m buffer. Lakes, greater than 1 hectare in size, have a minimum buffer of 400 m.

90% of the fuelwood harvest will occur on mid to upper slopes with southern aspects. These slopes have higher recoverable volumes (standing dead and blowdown). Fuelwood operations will encourage utilization of blow down to create travel corridors for moose and other ungulates.

5.1.2 Caribou

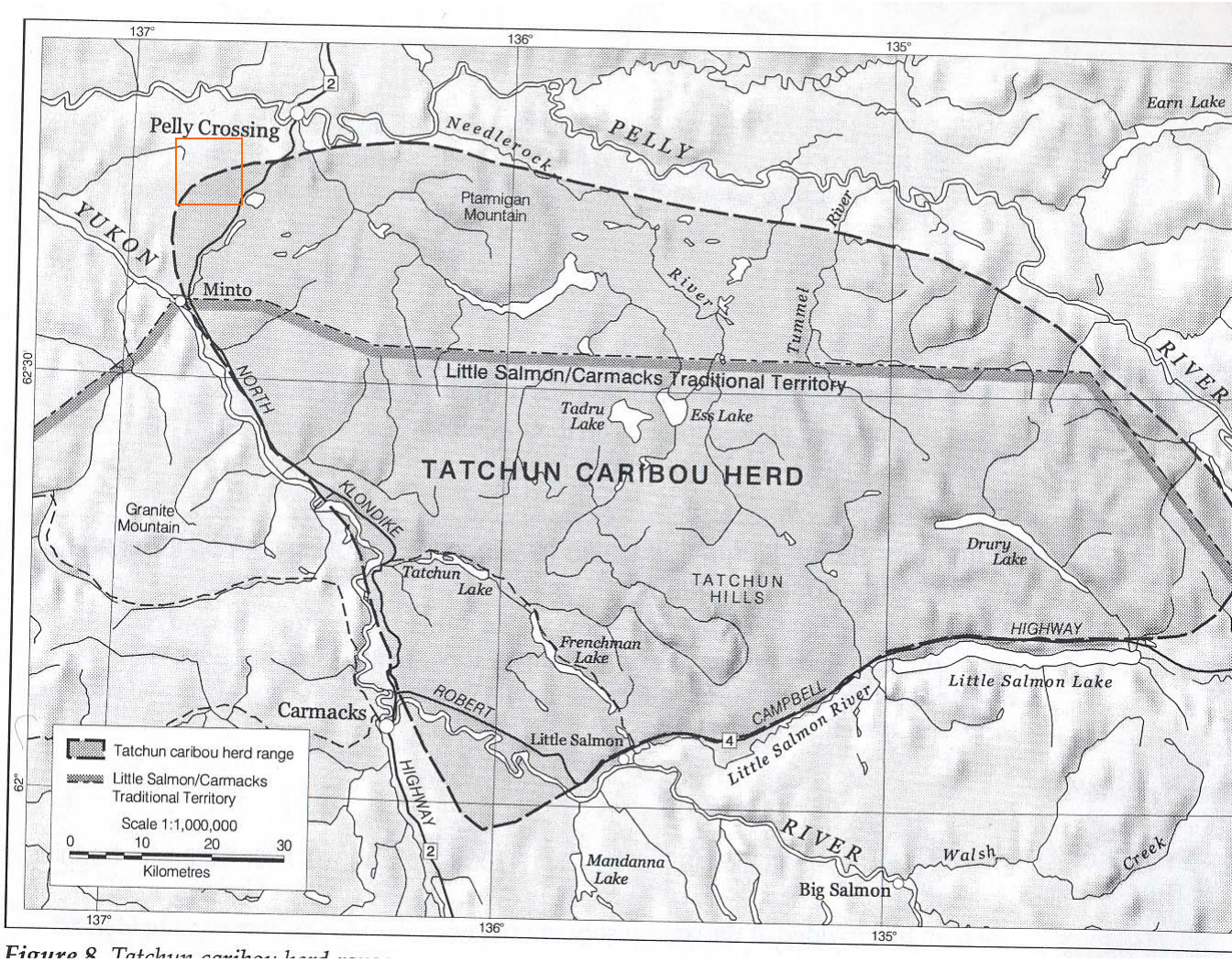
There are two caribou herds whose winter ranges overlap an area north of Carmacks and south of Pelly Crossing.

The Minto Fuelwood THP is outside the known range of the Klaza caribou herd range. (Little Salmon/Carmacks First Nation, 2004)

Minto Area 6 is within the known winter range of the Tatchun caribou herd. Since the 1995 Minto fire, there have been few sightings. The intensity of the fire and the subsequent early forest succession provide poor habitat for the herd.

The Minto Fuelwood THP should not impact this herd as the proposed harvest activities will be complete in 5 years. Access to the area will be restricted with the removal of the Highway access in the year 2012/2013, or after the fuelwood volumes have been harvested.

Figure 2 Tatchun Caribou Herd Range Map (Red area is Minto Area # 6)



(p 14 Community-based Fish and Wildlife Management Plan, Little Salmon Carmacks First Nation Traditional Territory, 2004-2009)

5.1.3 Mule Deer

The Yukon Plateau-Central ecoregion provides suitable habitat for deer. Deer prefer south-facing grassy slopes and grass covered road right-of-ways. South facing

slopes in the Minto Burn Area 2 are suitable habitat for deer. Currently, there is little evidence of deer use. In Minto Area 6, evidence of deer was noted during field work. It is anticipated that the proposed development will not impact deer habitat. Intact corridors and maintaining the fire-skips within the development provide adequate forage and cover.

5.2 Large Carnivores

5.2.1 Bear

Limited bear sign was noticed in the proposed fuelwood areas. Shrub layers on north facing slopes were not well developed and lacked berry producing species (Soap berry, common blueberry, dwarf blueberry, and currant). Bear sign (digging for ants) occurred on the south facing slopes. No rub trees or marked trees were identified.

5.3 Small Mammals

There was little to no sign of small mammals in the fuelwood areas. Minto Area 2 Bench has a south slope and good habitat. The pine regeneration, which is very dense (17,000 stems/ha) had no signs of rodent damage.

Trap line concession holders indicate that fur-bearing mammal populations are beginning to recover. Proposed fuelwood harvest is concentrated and covers a very small area. The harvest activities and volume removed will minimize impact to habitat.

5.4 Birds

This ecoregion is an important fly way for migratory waterfowl. (Lutsaw Wetland, 2006). The Lutsaw SMA is frequented by 18 bird species, including swans, geese, cranes, ducks and loons (Lutsaw Wetland, 2006). The North Klondike Highway separates Minto Area 6 from the SMA. Similar waterfowl species are known to use the small lakes north of Minto Area 6.

This region is also home to a variety of raptors. Bald eagle, golden eagle, peregrine falcon, gyrfalcon and American kestrel are known to inhabit various locations within the ecoregion. Habitat, primarily used by these species, is concentrated along sections of the Yukon River and the Pelly River.

Two raptor nests were located during reconnaissance work in Minto Area 2. These sites are 1000 m north of Block 4 (see Minto Area 2 map) and proposed development will not affect these sites. If nesting sites are discovered during harvesting operation, activities will stop immediately, and appropriate buffers and operating constraints will be applied.

Resident forest birds known to inhabit this region include Great horned owl, three-

toed woodpecker, grey jay, black-billed magpie, common raven and boreal chickadee (Yukon Ecoregions Working Group, 2004). Spruce grouse are also common in this area, with lesser numbers of ruffed grouse and ptarmigan (Lutsaw Wetland, 2006).

Environmental Dynamics Inc. completed a Sharp-tailed grouse habitat suitability survey in Minto Area 6. FMB requested this as local trappers had reported sightings within the last 2-year period. Sharp-tailed grouse were not found; however, as a pre-cautionary measure harvest activities are to occur outside the mating season (April 1 to May 31) (EDI 07-YC-0051, 2007).

6.0 Riparian and Water Resources

The Minto Burn is situated within the Yukon River watershed. The operating units are 1-2 km's from the Yukon River. The streams are tertiary (small or intermittent) draining into small lakes and wetlands. These eventually drain into the Yukon River.

Minto Area 2 has two ephemeral draws which flow seasonally during periods of high water. The soils tend to be well drained on upper to mid slopes; lower slopes are receiving sights that have perched water tables during spring run off.

Minto Area 6 (North, South and West) drain into the Lutsaw Wetland Habitat Protection Area near the northern boundary of the fire (east side of highway). In May 2006, this HPA became a Special Management Area in accordance with Chapter 10 of the Selkirk First Nation Final Agreement. The SMA covers 3,206 hectares (2790 ha is Category A Settlement Land; 416 ha is Crown Land). Access to the south, west and part of the north operating units is restricted to winter only. This minimizes disturbance of the sensitive soils, eliminating downstream impacts. In August 2007, a stream assessment was completed by Environmental Dynamics Inc. This stream assessment indicated that the proposed development is low risk to the SMA (EDI, Project 07-YC-0051, 2007)

7.0 Recreation and Visual Impact

There are no significant visual concerns within the boundaries of this project. All proposed fuelwood areas are situated at sufficient distance and with significant buffers and will not alter the viewscape along the Klondike Highway or nearby waterbodies.

Minto Area 2 is three kilometres north of Macgregor Creek and will not impact the Little Salmon Carmacks First Nation traditional use areas.

Minto Area 6 blocks cannot be seen from the Selkirk First Nations camp between Lutsaw Man (Lutsaw Lake) and Tthe Ndu Man (Rock Island Lake). Lutsaw and Tthe Ndu Man (Rock Island Lake) recreation sites, on the east side of Klondike Highway, will not be impacted by the proposed development.

8.0 Cultural Values

The proposed project falls within the traditional territories of the Selkirk First Nation and Little Salmon Carmacks First Nation.

Minto Area 2 is north of any known LSCFN traditional use areas. Minto Burn Area 6 is adjacent to SFN Settlement Lands and the Lutsaw Wetland SMA.

Various cultural activities occur in this region. Berry picking and hunting are two of the more common activities. There are some areas within the Minto burn where these activities are common.

Lutsaw Man (Lutsaw Lake) and Tthe Ndu Man (Rock Island Lake) is an important subsistence fishery to the SFN. Proposed activities are low risk to this fishery.

There are two trapping concessions overlapping the proposed fuelwood areas although no trapping has been pursued within the burn since the 1995 fire.

9.0 Other

9.1 General

The development has been developed according to best practices and guidelines in the Timber Harvest Planning and Operating Guidelines (Forest Resources, 1999)

The Little Salmon Carmacks First Nation Wildlife Management Plan provided management considerations specific to connectivty corridors for ungulates. These were incorporated into block and road design.

As a capacity building process Forest Management Branch staff and Selkirk First Nation staff completed layout of the proposed development in Minto Area 6.

9.2 Trapline Concessions

The THP falls with in Register Trapline Concession #143 (Minto Area 2) and #137 (Minto Area 6). FMB staff contacted and consulted the RTC holders. Meetings with holder of RTC # 142 were held in summer 2006. Meetings with the holder of RTC # 137 were held in fall of 2007.

This proposed THP has incorporated measures to mitigate the concerns raised by the RTC holders.

Minimizing the impact of access and protection of food sources for fur bearing mammals were two significant concerns. To mitigate these concerns, construction of access with heavy equipment will be minimal. The road running surface will be a maximum of 3m wide for all season access and 5m wide for winter access.

Active squirrel middens will be protected by a 10 meter buffer.

10.0 Minto Area 2 Site Prescriptions

The proposed development is located at km 406.4 on the east side of the Klondike Highway (50 km north of Carmacks).

10.1 Access Management

The current access at km 406.4 will be upgraded to meet the Department of Highways standards. The mainline is 1.9 km long and will be upgraded to a 3 m wide dry season road. If Block 4 proceeds, a gate will be installed at 1+440 m (junction of Area 2 mainline with Spur 1).

Access to Block 4 is not flagged in the field. This will be completed once Blocks 1, 2 and 3 have been completed. Spur 1 is approximately 2.2 long and will be a 3 m wide dry season road.

10.2 Harvesting Activities

Harvestings activities will be completed in during the summer season. This was determined by considering:

- Operability:
  Slopes within the proposed blocks range from 2 to 10%. These are favourable for slopes for operation of pick-ups and heavy equipment. All access has grades less than 10% slope. Average grade is approximately 8%.
- Soils, drainage and position on slope:
  The soils are silts and sands originating from glacial fluvial deposits. Upper slopes are well drained; mid to lower slopes are moderately well-drained; and lower slopes are moderately to poorly-drained. The proposed blocks are situated on mid to upper slopes. Culverts and ditch blocks are being installed to keep water from running on the road surface. Culverts are also being installed to prevent the road from becoming a barrier during peak flow periods (spring run-off and fall rains).
- Ground disturbance:
  In block ground disturbance is expected to be minimal.
- Terrain stability:
  Slopes are less than 10% and there are no terrain stability concerns

10.3 Minto Area *2* Blocks 1-3 Summary

Total proposed area is approximately 7.7 hectares with an estimated volume of 503 m^3 or 222 cords.

Table 2 Proposed Blocks 1- 3

Minto Area 2 Blocks 1 to 3		Total Area (Ha)	Volume m^{3*}/ha	Total Harvest Volume (m^3)*	Total Harvest Equivalent in Cords*	Season of Harvest
Access	**Mainline**					
Mainline	1	3.6	55	200	88	summer
Mainline	2	2.3	65	150	66	summer
Mainline	3	1.8	85	153	68	summer
Total		**7.7**		**503**	**222**	

*Merchantable volume pine and spruce = or >12cm dbh

10.4 Minto Area 2 Block 4 Summary (Future Consideration)

Block 4 will be developed as the demand arises. It will access approximately 11.2 ha with an estimated volume of 896 m^3 or 396 cords.

Table 3 Proposed Blocks 4

Minto Area 6 North		Total Area (Ha)	Volume m^{3*}/ha	Total Harvest Volume $(m^3)^*$	Total Harvest Equivalent in Cords*	Season of Harvest
Access	**Mainline**					
Spur 1	4	11.2	80	896	396	summer
Total		**11.2**	**80**	**896**	**396**	

*Merchantable volume pine and spruce = or >12cm dbh

11.0 Minto Area 6 Site Prescriptions

Access to Area 6 is fifteen kilometers south of Pelly Crossing on the west side of the North Klondike Highway. Area 6 North is access is at km 448 (west side) and Area 6 South and West acces is at km 447.7 (west side). The development is within a small watershed that drains into the Lutsaw Wetland Habitat SMA. Environmental Dynamics Inc. completed a stream assessment in August 2007 and determined that possible impacts to streams and the wetland are very minimal (EDI, 2007).

11.1 Access Management

The cleared right of way for roads within this THP is 8 m. Dry season roads will have a 3 m running surface. Winter roads will have a 5 m running surface to allow for snow removal. All roads will have pull outs to allow for the safe passing of vehicles working in the fuelwood areas.

11.1.1 Area 6 North

The current access at km 448 will be upgraded to meet the Department of Highways and Public Works standards. FMB has applied for a permit to modify currently approved access. The road will be a 3 m wide dry season road. A gate will be installed at approximately km 1 (junction of North mainline and cat-guard).

The 2.5 km of road is required to access the blocks. The first 2.0 km will be a 3 m wide dry season road. There are no drainage concerns in this section. Soils are sandy clays originating from glacial fluvial deposits.

The last 500 m will be a 5 m wide winter road. The 5 m width is recommended to allow for plowing of snow. The soils are silty clay covered with a 20 to 30 cm duff layer. The road will cleared (stumps cut to moss layer) and used during frozen conditions to minimize siltation and compaction and protect the established spruce regeneration.

11.1.2 Area 6 South and Area 6 West

Two access points were considered for accessing the proposed harvest area. SFN has an access to a fuelwood area at km 446 on the west side of the N. Klondike Highway. This access would not meet standards required to meet line-of-sight requirements required to obtain an approved access point by the Department of

Highways and Public Works.

Access to Area 6 (south and west) is at km 447.7 on the west side of the N. Klondike Highway. FMB has applied for a permit to construct approved access. This access will be gated.

The first 30 m of access will require heavy equipment to establish the required grades for an approved access point. The remaining 2.2 km is winter access only to protect the sensitive soils. The road will be a 5 m wide trail (stumps cut to moss layer) and used during frozen conditions to minimize siltation and compaction and protect the established spruce regeneration.

Area 6 West is a future development to be developed as the demand requires. All blocks are for winter harvest only. Access will be an additional 1.6 km west of Block 11(Area 6 South). The access was designed to keep adverse grades to less than 8% slope. The road will be a 5 m wide trail (stumps cut to moss layer) and used during frozen conditions to minimize siltation and compaction and protect the established spruce regeneration. The 5 m width is recommended to allow for plowing of snow.

11.1.3 Harvesting Activities

Harvesting activities will be completed in during the winter season. This was determined by considering:

- Operability:
  Slopes within the proposed blocks range from 2 to 10%. These are favourable for slopes for operation of pick-ups and heavy equipment. All access is less than 10% slope. Average grade is approximately 8%.
- Soils, drainage and position on slope:
  The soils are silts and sands originating from glacial fluvial deposits. Upper slopes are well drained; mid to lower slopes moderately well and lower slopes poor.
  Area 6 South, blocks 3 and 4 and Area 6 West, blocks 1 to 4 are on well drained sandy soils with southern aspects. There are no drainage concerns within these blocks. Winter harvesting is limited to winter because access is limited to frozen ground conditions.
  Area 6 South, blocks 1, 2, 5 and 6 are on poorly drained silts and clays on lower slopes. Soils tend to be cooler and water tables can be perched as the ground remains frozen for longer periods of time. There was no surficial evidence of discontinuous perma-frost. These blocks are to be harvested in winter only to protect the soils and existing natural regeneration.
- Ground disturbance:
  The goal is to minimize ground disturbance in Area 6 South blocks 3 and 4 and Area 6 West Blocks 1 to 4.
  Area 6 South blocks 1, 2, 5 and 6 are on lower slopes with seasonally perched water tables. Sensitive soils limit operations to winter only.

Operations will occur only when the ground is frozen to protect the soils and the established natural regeneration.

- Terrain stability:
  Slopes are less than 10% and there are no terrain stability concerns.

11.2 Minto Area 6 North Summary

Minto Area 6 North has six blocks situated on the northern extent of the 1995 Minto fire. It is accessed by a cat guard at km 448 of the N. Klondike Highway Blocks 1, 2 and 6 have south facing slopes and are accessed by a proposed dry weather road. Blocks 3-5 have north facing slopes and are accessed by a proposed winter road. The total proposed area is 47.5 ha with an approximate volume of 4561 m^3 or 2013 cords.

Table 5 Proposed Area 6 North Blocks

Minto Area 6 North		Total Area (Ha)	Volume m^{3*}/ha	Total Harvest Volume (m^3)*	Total Harvest Equivalent in Cords*	Season of Harvest
Access	**Mainline**					
Mainline	1	5.3	70	371	164	summer
Mainline	2	15	90	1350	596	summer
Mainline	3	6.2	100	620	274	summer
Mainline	4	10.2	120	1224	540	summer
Mainline	5	4.8	120	576	254	winter
Spur 1	6	6	70	420	185	winter
	Total	**47.5**		**4561**	**2013**	

*Merchantable volume pine and spruce = or >12cm dbh

11.3 Minto Area 6 South Summary

Minto Area 6 south has 6 blocks situated west of the Klondike Highway adjacent to Selkirk First Nation Settlement Land. It consists of 6 blocks harvesting 3385 m^3 (1493 cords) over 44.4 ha. It is accessed on the west side of N.Klondike Highway at km 448. The development is winter access only. Harvesting activities will be conducted when frozen ground conditions exist.

Table 6 Minto Area 6 South Proposed Blocks

Minto Area 6 South		Total Area (Ha)	Volume m^{3*}/ha	Total Harvest Volume $(m^3)^*$	Total Harvest Equivalent in Cords*	Season of Harvest
Access	**Block**					
Mainline	1	8.6	85	730	322	winter
Mainline	2	8.8	75	660	291	winter
Mainline	3	5.4	55	300	132	winter
Mainline	4	7.0	85	600	265	winter
Mainline	5	6.2	75	465	205	winter
Spur 1	6	8.4	75	630	278	winter
Total		**44.4**		**3385**	**1493**	

*Merchantable volume pine and spruce = or >12cm dbh

11.4 Minto Area 6 West Summary (Future Consideration)

Minto Area 6 has four blocks west of the the Klondike Highway and adjacent to Selkirk First Nation Settled Land. It is accessed from Minto Area 6 South; it is winter access only and will be developed as demand requires. There are four proposed blocks harvesting 1629 m^3 (719 chords) over 15.2 ha. This development is winter access only.

Table 7 Minto Area 6 West Proposed Blocks

Minto Area 6 West		Total Area (Ha)	Volume m^{3*}/ha	Total Harvest Volume $(m^3)^*$	Total Harvest Equivalent in Cords*	Season of Harvest
Access	**Mainline**					
Mainline	7	4.3	75	323	143	winter
Mainline	8	4.3	130	560	247	winter
Mainline	9	3.6	115	415	183	winter
Mainline	10	3.0	110	331	146	winter
Total		**15.2**		**1629**	**719**	

*Merchantable volume pine and spruce = or >12cm dbh

12.0 Timber Permitting

Client Services and Inspections will be responsible for issuing and monitoring the timber permits for the Minto Commercial Fuel Wood project. It is anticipated that fuelwood permits could be issued starting November 2007. Proponents interested in obtaining permits are to contact:

Client Services and Inspection Branch, Mayo Office @ 867- 996-2343
Client Services and Inspection Branch, Carmacks Office @ 867-863-5271

13.0 Monitoring

Forest Management Branch, Forest Operations is responsible for monitoring the harvest activities to ensure forest management objectives are met.

Upgrading of the existing roads and construction of the new access roads will be contracted and monitored by FMB staff. Any additional roads required by permit holders will be constructed by the permitee and must be approved by CS&I branch staff.

Harvest operations will be subject to permit terms and conditions and will be monitored by CS&I Branch. Post-harvest retention requirements will be made clear to all permitees prior to the commencement of operations. This may be followed up by a post-harvest retention assessment as specified in FMB silviculture guidelines.

14.0 Reforestation

The FMB has measured and evaluated regeneration in all of these areas during the summer of 2007. This formal survey allows the comparative assessment of any harvesting impacts. The objective is to minimize ground disturbance and damage to the regeneration. If heavy equipment is used, skid trails will be assessed for stocking and planted as required.

The Minto burn is 12 years old. Natural seed sources were affected by intense fire and natural regeneration will likely be sporadic. The fire skips will likely provide some seed (veteran white spruce and black spruce). It is likely that planting will be required within these operating units to meet the stocking standards outlined in the Yukon Silviculture Manual.

15.0 References

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Appendix A

136°38'0"W
136°36'0"W
136°34'0"W
62°26'0"N
62°24'0"N
R I V E R
3
4
4
2
1
Access
50.0 KM to Carmacks

Appendix B:
Minto Area 2

Y08 - Salmon

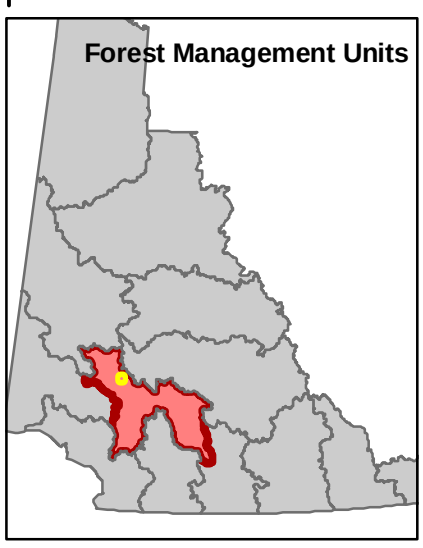
1:20,000

0 0.5 1

Kilometers

Albers Equal
Area projection

Forest Management Units



Proposed Access
Highway
Existing Road
Stream
Contour
Waterbody
Wetland
Vegetation
Proposed Harvest Blocks
Lhutsa Habitat Protection Area
First Nation Settlement Lands
Agricultural Applications
Map Notation (Pipeline)
Land Reservation
Surveyed Lots
Land Applications

Yukon
Forest Management Branch

Minto Burn Commercial Fuelwood
Timber Harvest Project
Minto Burn Area, Yukon

October 2007

Yukon
Energy, Mines and Resources
Énergie, Mines et Ressources

136°48'0"W
136°46'0"W
136°44'0"W
136°42'0"W
62°44'0"N
62°42'0"N
Gravel Pit
Gravel Pit
Gravel Pit
Von Wilczek Lakes

Appendix A:
Minto Area 6

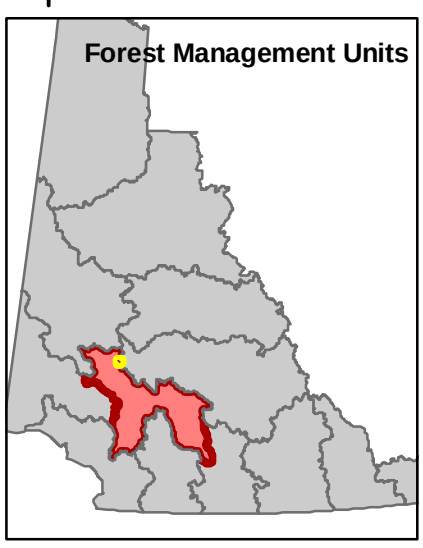
Y08 - Salmon

1:25,000

0 0.5 1
Kilometers

Albers Equal
Area projection

Forest Management Units



Proposed Access
Highway
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Yukon
Forest Management Branch

Minto Burn Commercial Fuelwood
Timber Harvest Project
Minto Burn Area, Yukon

October 2007

Yukon
Energy, Mines and Resources
Énergie, Mines et Ressources

Appendix B

Letter Report: Stream Assessments within the Minto Fuelwood Salvage Area.

Prepared for:

Forest Management Branch (K-918)
Energy Mines and Resources
Yukon Government
Box 2703
Whitehorse, YT
Y1A 2C6

Prepared by:

EDI ENVIRONMENTAL DYNAMICS INC.
Natural Resource Consultants

402 Hawkins St.
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August 2007

EDI Project No.: 07-YC-0051

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EDI ENVIRONMENTAL DYNAMICS INC.
Natural Resource Consultants

August 21, 2007

Dwayne Muckosky
Forest Management Branch (K-918)
Energy, Mines and Resources
Yukon Government
Box 2703
Whitehorse, YT
Y1A 2C6

Dear Dwayne:

Re: Stream Assessments within the Minto Fuelwood Salvage Area.

We assessed a small unnamed watershed (2,200 ha) associated with the commercial fuelwood development near the Lhutsaw wetlands. This watershed flows into Tthu Ndu (Rock Island) Lake approximately 15 km south of the community of Pelly Crossing (Figure 1). The purpose of the assessment was to determine the fisheries values of this watershed. In addition, the proposed winter road (to the south of the drainage) was investigated to determine possible impacts of winter firewood salvage operations upon this drainage system (located south of the watershed).

The Lhutsaw wetlands are made up of a several lakes including Lhutsaw, Von Wilczek and Tthu Ndu (Rock Island) lakes. FISS (2007) documents the presence of Arctic grayling (*Thymallus arcticus*) and northern pike (*Esox lucius)* in 'Von Wilczek Lakes' although it does not specify an exact location. However, 2004 gillnetting in Rock Island Lake (8 sets for 1 hour in duration with standard, variable mesh sizes) only resulted in the capture of 2 pike (Ferguson Pers. Comm. 2007). This is consistent with discussion we had with some local area residents who said only pike are present in the lake. Rock Island Lake has a maximum depth of 3.5 m (gleaned from a bathymetric map provided by Ferguson (Pers. Comm. 2007) and as such, would likely not have high oxygen levels in the winter (i.e., overwintering may be questionable). During this present study, numerous shrimp were observed near the lake, possibly indicating that there are low numbers of fish in the lake. It should be noted that the 1:50,000 and 1:250,000 NRCAN maps do not show an outlet for Tthu Ndu (Rock Island) Lake; however, given the pike documented in the lake it may be possible that they can migrate from the other lakes during high water levels.

Fish sampling was conducted in the lower reaches of the unnamed tributary watershed (Figure 1) to Rock Island Lake using a backpack electrofisher and minnow traps. The minnow trapping included 5 hour sets of 6 baited traps (with roe) in the lower 200 m of the stream, including two within 50 m of the

lake. In addition, several minnow traps were also set (overnight) in various locations in both unnamed ponds in the upper portions of the watershed. Electrofishing was completed along the lower 1,500 m of the stream. No fish were captured or observed in the surveyed watershed.

Originally it was thought that the ponds in the upper watershed may provide the only overwintering habitat in the watershed; however, field investigation revealed that the ponds were quite shallow and not suitable for overwintering. No fish were captured or observed in any of the streams and ponds, nor was there any signs of overwintering habitat within the watershed.

While no fish were captured during this study, Reach 1 of the mainstem (Stream A; Figure 1) was defaulted to fish bearing status due to some suitable rearing habitat for small fish and its accessibility from Rock Island Lake (Table 1). This stream would be most suitable to juvenile grayling, burbot (*Lota lota)* slimy sculpin (*Cottus cognatus)* and perhaps lake chub (*Couesius plumbeus)* and given that these species may not be present in Rock Island Lake or the watershed, it is possible that it is not used much by fish. However, given that it is possible that juvenile pike would use the lower section of the reach and there is not enough information known to rule out the presence of the other species in the watershed, the entire reach should be considered fish bearing. Regardless, treatment of this reach as a fish bearing reach will aid with the protection of water quality in downstream areas including the wetlands.

Several notable barriers to fish passage were encountered in the upper section of Reach 1 and throughout Reach 2 (Table 2). Several falls ranging from 0.5 m to 1.0 m were documented. Although they were not flowing over bedrock (i.e. they could change over time), the high number of them will combine to restrict fish passage into the upper reaches of the watershed for many years to come. In addition, the habitat upstream of Reach 1 is very limited. The stream is generally small with a moderate gradient (4-6%), and the bed material is dominated by fines. There is no spawning habitat for salmonids and no overwintering habitat in the watershed. As such, the watershed upstream of the northern limit of Stream A, Reach 1 (see map; Figure 1) has been determined to be non-fish bearing.

The results of the stream assessments are summarized in the text and tables below as well as on the attached map. All classifications are described per ‘reach’, which is a homogenous section of a drainage (i.e. has consistent characteristics). We have also included photocopies of site cards for each stream reach sampled (attached).

Table 1. Summary of Stream A, Reach 1.

Stream Name	Stream A
Reach	1
Survey Date	August 4 and 10, 2007
Channel Width	1.2 m
Sampling Methods (and Effort)	Electrofishing, approximately 650 m of stream. Minnow trapping, 6 traps set of 5 hours each.
Fish Species Captured	No Fish Captured
Fish Bearing Status	Defaulted to Fish Bearing
Drainage Type	Stream

Description and Rationale: This section of the stream (Reach 1) exhibited patches of alluvial substrates (gravels, cobbles and boulders) some in stream cover in the form of deep pools, undercut banks, woody debris and overhanging vegetation. The lower 700 m was accessible to fish from Rock Island Lake and would provide some juvenile rearing habitat for species that use small stream habitat. Several falls ranging from 0.5 – 1.0 m were located 300 m upstream of this reach and combined were thought to be a barrier to fish passage.

The culvert at the highway crossing appeared suitable for fish passage. Most of the reach is located in an area that was burned in 1995. A dense cover of deciduous vegetation has formed around the stream channel.

Photo 1. Upstream view of the culvert (behind the dense brush cover) at the highway crossing; Stream A, Reach 1.

Photo 2. Downstream view of Stream A, Reach 1.

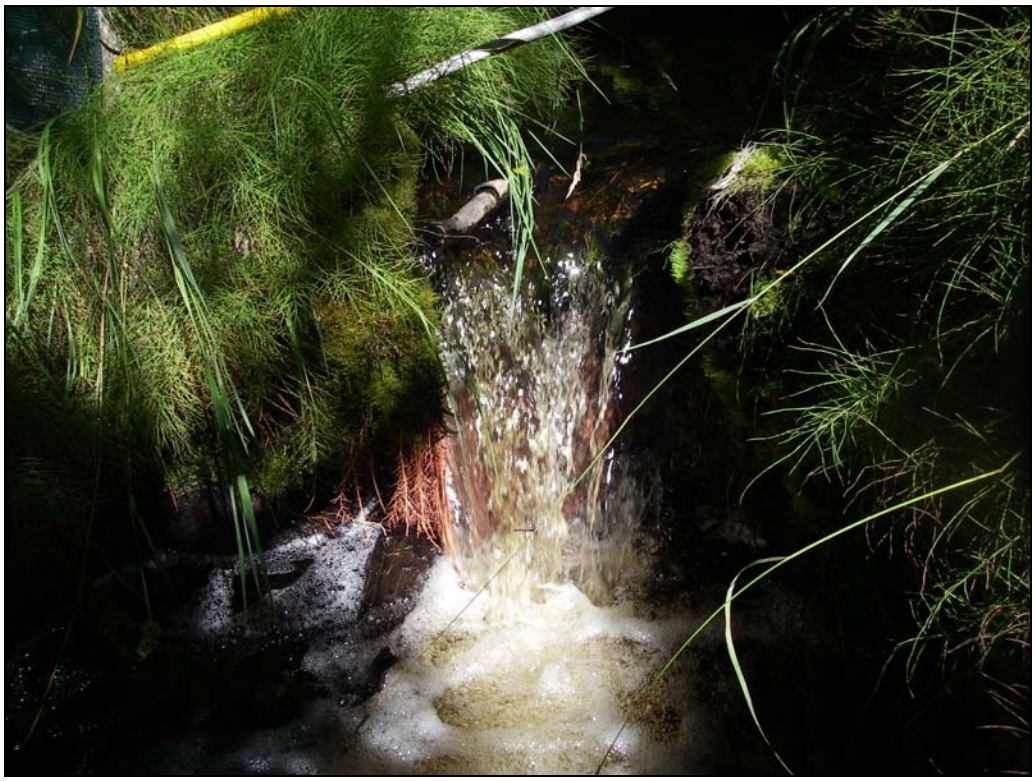

Photo 3. Example of one of several potential fish barriers located at the upper locations of Stream A, Reach 1.

Table 2. Summary of Stream A, Reach 2.

Stream Name	Stream A
Reach	2
Survey Date	August 4 and 10th, 2007
Channel Width	2.9 m
Sampling Methods (and Effort)	Electrofishing, approximately 700 m of stream.
Fish Species Captured	n/a
Fish Bearing Status	Non fish bearing
Drainage Type	Stream

Description and Rationale: Reach 2 is wider and had a slightly lower gradient than Reach 1. Bed materials were dominated by fine materials. Throughout this reach, the stream had numerous small falls and drops that would impede fish passage. In general, the stream had fair to poor rearing habitat and no notable spawning gravels or overwintering habitat. This stream reach was sampled via electrofishing with no fish being captured or observed.

This reach is considered non fish-bearing given the barriers in Reach 1, and the lack of overwintering habitat in this reach or upstream within the watershed.

Photo 4. Downstream view of Stream A, Reach 2.

Photo 5. Downstream view of Stream A, Reach 2.

Table 3. Summary of Stream A, Reach 3.

Stream Name	Stream A
Reach	3
Survey Date	August 4, 2007
Channel Width	3.7 m
Sampling Methods (and Effort)	None conducted
Fish Species Captured	N/A
Fish Bearing Status	Non Fish Bearing
Drainage Type	Stream
Description and Rationale: This reach had shallow flow over bed material made up of fines and organics. Cover for fish was limited and dominated by overhanging vegetation. The channel often spread out into multiple channels in many locations and had areas with wide shallow pools with slow moving water. The reach had poor rearing habitat, no spawning gravels or overwintering habitat. This reach has been determined to be non-fish bearing due to the presence of downstream barriers (see Reach 1) and no overwintering habitat upstream of the barriers. Although this reach was not sampled, no fish were captured/observed in the watershed (upstream and downstream of this location).	

Photo 4. Example of heavy vegetation along Stream A, Reach 3. Crown closure along most sections of the stream was high (>50%).

Photo 5. View of upper section of Stream A, Reach 3. Vegetation along the stream at upper sections was variable, composed of a mixture of grass, willow and white and black spruce (*Picea mariana*).

Table 4. Summary of Stream A, Reach 4.

Stream Name	Unnamed Pond
Reach	4
Survey Date	August 3-4, 2007
Channel Width	n/a
Sampling Methods (and Effort)	Minnow Trapping (3 traps set for 18 hrs 15 min each)
Fish Species Captured	No fish captured
Fish Bearing Status	Non Fish Bearing
Drainage Type	Pond
Description and Rationale: This pond is fed by a small stream entering at the western side and a small seepage to the north (Reach 5). It was very shallow (max depth of approximately 1 m), small in size, with algae and significant amount of plant growth throughout. It is very unlikely that this pond could provide overwintering habitat for fish. Minnow traps were set and left overnight, no fish were captured or observed.	

Photo 6. Northeast view of 'unnamed lower pond', Reach 4.

Photo 7. View of 'unnamed lower pond', Reach 4.

Table 5. Summary of Stream A, Reach 5.

Stream Name	Stream A
Reach	5
Survey Date	August 3-4, 2007
Channel Width	N/A
Sampling Methods (and Effort)	None conducted (no fish habitat)
Fish Species Captured	N/A
Fish Bearing Status	Non Fish Bearing
Drainage Type	Seepage Area
Description and Rationale: This mapped drainage enters the unnamed pond (Reach 4) on the eastern side. This is an open vegetated seepage area dominated by willow (*Salix* sp.*)* and white spruce (*Picea glauca*). The area was characterized primarily by wet ground with a few small areas of pooled water. There was no definitive channel and no alluvial substrates. There is no surface connectivity between the ponds. There are no fish values associated with this seepage area. This does not meet the definition of a stream[1].	

[1] as per the Timber Harvest Planning and Operating Guidebook, May 1, 1999.

Photo 8. View of seepage; Stream A, Reach 5.

Photo 9. View of Stream A, Reach 5, showing low lying wet area with no surface flow.

Table 6. Summary of Stream A, Reach 6.

Stream Name	Unnamed Pond
Reach	6
Survey Date	August 3-4, 2007
Channel Width	N/A
Sampling Methods (and Effort)	Minnow trapping (4 traps set for 20 hrs 15 min each)
Fish Species Captured	N/A
Fish Bearing Status	Non Fish-Bearing
Drainage Type	Pond
Description and Rationale: This unnamed pond (Reach 6) is very shallow and would not provide notable overwintering habitat for fish. The outflow (Reach 5) is a seepage and as such does not provide a surface flow connection to any other fish habitat.	

Photo 10. North view of upper unnamed pond. Note placed minnow trap in lower left of photo; this location was one of the deeper areas of the pond.

Table 7. Summary of Stream B, Reach 1.

Stream Name	Stream B
Reach	1
Survey Date	August 4, 2007
Channel Width	3.1 m
Sampling Methods (and Effort)	None conducted
Fish Species Captured	N/A
Fish Bearing Status	Non Fish Bearing
Drainage Type	Stream
Description and Rationale: This mapped stream flows though the 1995 Minto Burn into Stream A. This stream is characterized by small cascades, substantial instream debris and bed materials made up of fines and organics. The stream had poor rearing and no spawning or overwintering habitat. The stream banks are significantly vegetated with sedges (*Carex* sp.) and willow (*Salix* sp.)	

Photo 12. Downstream view of Stream B, Reach 1.

Table 8. Summary of Drainage C, Reach 1.

Stream Name	Drainage C
Reach	1
Survey Date	August 4, 2007
Channel Width	N/A
Sampling Methods (and Effort)	None conducted
Fish Species Captured	N/A
Fish Bearing Status	Non-Fish Bearing
Drainage Type	Seepage area
Description and Rationale: This drainage had no channel, no signs of flow or alluvial substrates. It is not a stream[2], rather a low area with some pockets of standing water.	

Photo 13. Overview of Drainage C near the confluence with Stream A.

[2] as per the Timber Harvest Planning and Operating Guidebook, May 1, 1999.

Impacts of Winter Road

Impacts of the proposed winter road south (the first 300 m) of the unnamed drainage were assessed during our August 4, 2007 field visit. The winter road runs through the Minto Burn and provides access to some fuelwood blocks located to the south of the above mentioned study watershed. While the area is low lying, it was not considered a wetland area. The vegetation was similar to other parts of the burn and there were standing and downed dead conifer stems throughout. Between the unnamed stream and the winter road, there is a high point of land that would prevent any mobilization of sediments from entering the stream (Photo 14). Possible impacts to streams and wetlands are considered very minimal given the following points.

- The unnamed stream upstream of the highway has defined banks and channelized flow (it is not within wetland as initially presumed). Rather the wetland in the area is northeast of the stream and should not be affected by salvage operations.
- The area between the stream and the proposed winter road location is dry with a topographic break that separates the two areas.
- The winter road is on relatively flat ground and there is no indication or evidence of significant surface flow near the winter road.

Photo 14. View of area taken from the unnamed stream (upstream of the highway) towards the winter road location. Vegetation is not characteristic of a wetland area.

I trust this information will provide assistance in future development planning for the Minto Firewood Cutting Areas. If you have any questions or require additional information please me at (867) 393-4882.

Yours truly,
EDI Environmental Dynamics Inc.

Patrick Tobler, B.Sc., R.P.Bio.
Branch Manager/ Senior Biologist

Attachments: Figure 1. Map of Stream Assessment Area.
Photocopies of Site Cards for Stream Reaches
Key to Site Card Codes

References Cited:

Ferguson, N. Personal Communications 2007. Fisheries Technician, Yukon Environment. Phone conversation on August 21, 2007.

FISS 2007. Fisheries Information Summary System. Web database. http://habitat.rhq.pac.dfo-mpo.gc.ca/fiss/dcf01.cfm Fisheries and Oceans Canada.

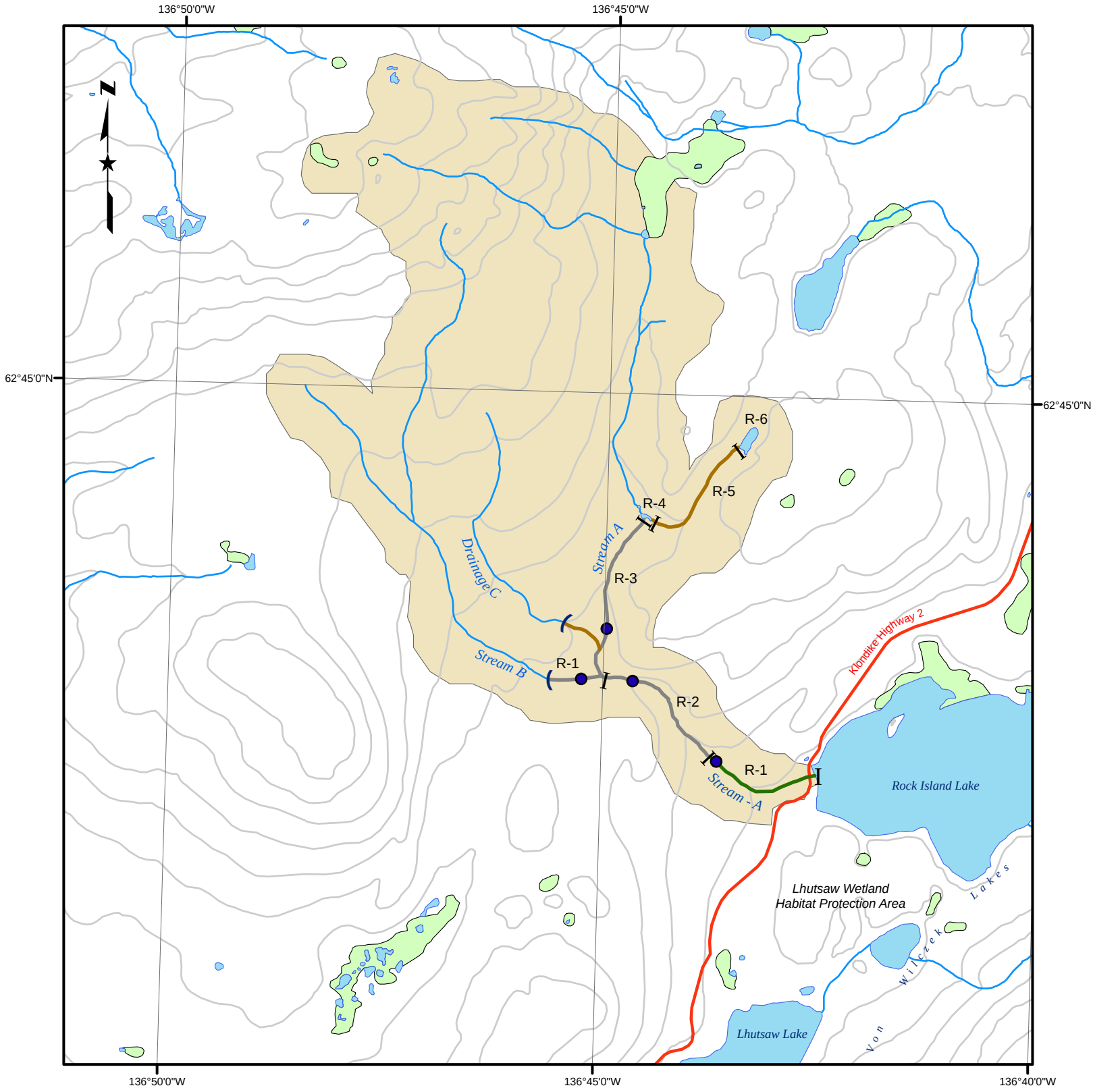

Figure 1. Map of Stream Assessment Area.

0 500 1,000 2,000 Metres

Legend

- Reach Break
- Site Card Location
- Fish Bearing Stream (defaulted)
- Non Fish Bearing Stream (surveyed)
- Seepage - Non Fish Bearing
- Survey Limit
- Wetland
- Waterbody
- Watershed Area
- Stream (not surveyed)
- Contour

Data Input: M. Power
Drawn By: M. Power
Date: 21 August 2007

Digital Data Sources:
NTDB 1:50,000

EDI ENVIRONMENTAL DYNAMICS INC.
Natural Resource Consultants

YESAA Designated Office Evaluation Report

1) Environmental and Socio-economic Assessment File Information

Project Title	**Project File Number**
Minto Burn Commercial Fuelwood Timber Harvest Project	2007-0187
Proponent Name	**Evaluation Start Date**
YG – EMR – Forest Management Branch	October 15, 2007
Contact Person	**Evaluation Finish Date**
Scott Cole	November 28, 2007

Designated Office Recommendation Summary

Pursuant to Section 56(1) of the Yukon Environmental and Socio-economic Assessment Act it is recommended to the decision body(ies) that the project be allowed to proceed, subject to specified terms and conditions, as the Mayo Designated Office has determined that the project will have significant adverse environmental or socio-economic effects in or outside Yukon that can be mitigated by those terms and conditions.

2) Designated Office Assessment Officer Identification

Designated Office	**Assessment Officer**
Mayo	Loralee Johnstone

3) Decision Body or Bodies and Potential Authorization Identification

Decision Body	**Potential Authorization(s) Required**	**Act or Regulation**
Highways and Public Works	Highway Access Permit	*Highways Act*

4) Project Activity or Activities Included in Schedule 1 of the Regulations* and not Excepted

Proposed Activity	**Part**	**Item**
Clearing of land using a self-propelled power-driven machine	13	12
Construction of a road	13	13b

**** Assessable Activities, Exceptions, and Executive Committee Projects Regulations***

5) Project Location

Latitude and Longitude or UTM Coordinates		
NW Boundary Area 2 – 416947, 6922411	**NE Boundary** Area 2 – 418005, 6922361	
SW Boundary Area 2 – 416947, 6922411	**SE Boundary** Area 2 – 418005, 6954030	
NTS Map Sheet # 115I07	**Nearest Community** Carmacks	**Distance** 50km
First Nation Traditional Territories Involved Little Salmon Carmacks First Nation		
Watershed(s) and Drainage Region Major Drainage Area: Yukon River		

Sub-Sub Drainage: Macgregor Creek Sub-Drainage: Nordenskiold
Nearby Watercourse(s) or Waterbody(s) MacGregor Creek

6) Statement of Project Scope

The principal activity of this project is clearing of land for road development to provide access to commercial firewood harvest blocks. The proposal includes construction and upgrading of access roads to 4 proposed cut blocks in an area of fire killed wood. The proposed area is located approximately 50 kilometers north of Carmacks on the east side of the North Klondike Highway (referred to as area 2).

Principal activities:

- Construction and upgrade of roads using heavy machinery

Accessory activities:

- Reclamation of roads
- Tree planting

7) Project Notification List

Proponent – YG – EMR – Forest Management Branch
DB - YG – EMR – Forest Management Branch
YFN Government – Selkirk First Nation & Little Salmon Carmacks First Nation
District RRC – Mayo – Barb Shannon

YOR Admin	Deb Hadwen	Willaim Polonsky
Sam Ahad	Michael Hale	Collin Remillard
Michael Anderson	Jeff Hamm	Stephen Reynolds
Development Assessment	Bill Harris	Travis Ritchie
Branch	Kelly Hayes	Heather Saggers
Karen Baltgailis	Eric Hellsten	Roxanne Schofield-Wray
Jim Beacon	Mac Hislop	Michael Setterington
Cameron Beemer	Dick Horne	Judy Shannon
Joe Bellmore	Sandra Horvath	Roy Slade
Dorothy Bradley	Bonnie Huebschwerlen	James Smith
Bev Brown	Nicole Hulstein	Nichole Speiss
Kirk Cameron	Torrie Hunter	Pat Tobler
Randy Carey	Stephen Hureau	Felix Vogt
Robbie Cashin	David Isopo	Sam Wallingham
Sam Cheng	Dave Joe	John Witham
Kim Cholette	Sue Kemmett	Evalina Zamana
Scott Cole	Greg Kent	
Diarmuid Collins	H. Leo King	
Sean Collins	Jerry C Kruse	
Gerry Couture	Annick Le Henaff	
Tom Cove	Nancy Leblond	
Brian Crist	Leonard Linklater	

Dave Croft Emma Cunningham Doug Davidge Corey De La Mare Heather Desmarais Kimberly Dolhan Jesse Duke Mark Evans Andrea Fischer James Frolich Edward Gates Albert Genier Peter Gerasch Benoit Godin	Derek Loots Arthur Lotz Scott McAllister Lorna McCutcheon Bernard Menelon Anne Middler James Miller Andrea Morgan Viola Mullett Donald Murphy Mark O'Donoghue Sandra Orban Lee Persinger Mikolay Peter	

*See Appendix I - Summary of Responses from Interested Persons and Others

8) Potential Effects Assessment Summary and Reasons for Recommendation

Context of this assessment:

1. The assessment of environmental and socio-economic effects, including cumulative effects is in accordance with Section 42 of *YESAA.*
2. The mitigations identified herein are proposed to address project effects that the assessor believes to be potentially significant and adverse. They do not preclude the application of other mitigations as required by relevant legislation.

The following valued components have been considered in this evaluation of the proposed project:

1	Heritage Sites and Resources
2.	Wildlife and Wildlife Habitat
3.	Environmental Quality

1. Heritage Sites and Resources

1.1 Temporal and spatial overlap summary

The proposed project is the clearing of land for road development to provide access to commercial firewood in a fire-killed timber area. The project is planned to occur between June and October of 2008 at km 406.4 on the east side of the Klondike Highway (50km north of Carmacks). The area is known to have been utilized by aboriginal people for hundreds if not thousands of years. The land has also been used and/or traveled upon in recent past by First Nation's people, trappers, explorers and hunters.

1.2 Effects characterization and significance determination

The proposed project occurs in a previously burned area approximately 50km north of Carmacks. There are no known heritage sites in the proposed area; however heritage resources can be discovered at anytime throughout the life of the project. Heritage sites include cabins, caches, graves, bush camps and other man-made structures, features and objects that have been abandoned and are of greater than 50 years antiquity.

Historic resources include artifacts related to heritage sites and human activities. The value of historic resources rests within their context upon the land in which they are located, in essence, when they are *in situ*. Once disturbed or removed the value can not be restored. Humans have been present in the proposed project area for a relatively short period of time (hundreds to thousands of years) therefore historic resources are essentially on or near the surface of the ground. The proposed project could result in historic resources being uncovered and/or disturbed during construction of the proposed access road.

The assessor has considered the requirements of the: 1) *Historic Resources Act*, specifically sections 64 (**Destruction of historic objects or human remains**) and 71 (**Report of findings**), and; 2) the *Archeological Sites Regulations*, specifically section 4 (respecting historic resources) and is satisfied that compliance with the Act and Regulations will adequately eliminate, reduce or control the potential effects of the proposed project on historic resources so that they are not significant adverse effects.

1.3 Mitigations
n/a

Wildlife and Wildlife Habitat

2.1 Temporal and spatial overlap summary
The proposed project is the clearing of land for road development to provide access to commercial firewood in a fire-killed timber area. The project is planned to occur between June and October of 2008 at km 406.4 on the east side of the Klondike Highway (50km north of Carmacks). Wildlife in this region include moose, caribou, mule deer, coyote, wolf as well as many other small fur-bearers and bird species, occupy areas adjacent to the proposed project.

2.2 Effects characterization and significance determination
The clearing and brushing of the access road will affect wildlife by removing existing habitat. Direct habitat loss increases habitat fragmentation and isolation which may adversely affect some species. Some species of wildlife may also avoid areas of human disturbance and development. The proposed project may also disrupt and restrict wildlife movement within the area. Some concerns were raised regarding Tatchun caribou herd winter range disturbance. Discussions with the regional biologist suggest that the area is not utilized by caribou other than potentially for travel and Department of Environment had no concerns with the project as proposed. The assessor had reviewed the *Yukon Wildlife Act* and is satisfied that compliance with the *Act* (specifically but not limited to *s.92* harassment of wildlife) will adequately eliminate, reduce or control the potential effects of the project on wildlife so that they are not significant.

Concerns were raised about creating potential access to moose hunters by constructing and upgrading roads. The proponent has proposed to gate the roads for the duration of the project and to decommission or block the roads at the completion of the project. While there is potential for hunters to cut new trails to access the decommissioned roads, the proposal has been reduced to 1.9km of new access in an area that has existing trail networks. Much of the surrounding area is potential moose habitat and the Department of Environment does not have concerns with the activities proposed. It is the opinion of the assessor that the potential adverse effects on moose as a result of this project are not significant.

2.3 Mitigations
n/a

Environmental Quality

3.1 Temporal and spatial overlap summary

The proposed project is the clearing of land for road development to provide access to commercial firewood in a fire-killed timber area. The project is planned to occur between June and October of 2008 at km 406.4 on the east side of the Klondike Highway (50km north of Carmacks). The proposed project requires clearing and upgrading of an access road approximately 1.9km long. The proponent has indicated the use of heavy machinery and hand tools during the construction of the proposed access road.

3.2 Effects characterization and significance determination

Environmental quality may be affected by the proposed project activities including the removal of vegetation and the use of motorized vehicles off a road. The removal of vegetation may increase the risk of erosion. As well, the use of motorized vehicles on the access road may cause soil compaction and rutting which may lead to erosion, soil instability, and pooling water. Effects may be compounded during wet conditions.

Spills, leaks, accidents, or malfunctions during re-fueling and normal use of construction equipment during the construction of the access road may lead to fuel being released into the environment. If not properly mitigated fuel spills may potentially cause significant adverse effects on environmental quality.

3.3 Mitigations

The following mitigative measures shall be complied with in order to eliminate, reduce or control potentially significant, adverse effects of the proposed project, as it/they relates to environmental quality.

- The proponent shall at all times have on site sufficient spill clean-up equipment and materials in readiness to clean-up all spills of petroleum products or other deleterious substances.

- The proponent shall have a Spill Contingency Plan in place to provide for response to and clean-up of any spills of petroleum products or other deleterious substances.

Cumulative Effects

The assessment of cumulative effects considers the effects that have occurred, or might occur with the project, in combination with existing or proposed activities in the area. Projects and activities occurring in the area that could have an affect on historic resources include: mining, transmission line, sport and subsistence hunting; trapping; berry picking, and; recreational and educational use of the land. The discovery of historic resources may occur incidentally during the conducting of any of these activities that occur on previously undisturbed areas. It is the conclusion of this assessment that the proposed project will not result in residual effects that, in combination with the effects of the above identified projects, contribute to significant cumulative effects.

No residual effects on wildlife and wildlife habitat are anticipated as a result of the proposed project activities after the withdrawl of area 6, it is the determination of this assessment that the proposed project will not result in significant adverse cumulative effects. Through the application of mitigative measures noted above, residual effects of the proposed project on environmental quality have been determined to not be significant.

9) Designated Office Recommendation

The Mayo Designated Office, in concluding its evaluation of Project #2007-0187, pursuant to Section 56(1) of the Yukon Environmental and Socio-economic Assessment Act:		
☐	**S56 (1)(a)**	recommends to the decision body(ies) that the project be allowed to proceed, as the Designated Office has determined that the project will not have significant adverse environmental or socio-economic effects in or outside Yukon;
☒	**S56 (1)(b)**	recommends to the decision body(ies) that the project be allowed to proceed, subject to specified terms and conditions, as the Designated Office has determined that the project will have significant adverse environmental or socio-economic effects in or outside Yukon that can be mitigated by those terms and conditions;
☐	**S56 (1)(c)**	recommends to the decision body(ies) that the project not be allowed to proceed, as the Designated Office has determined that the project will have significant adverse environmental or socio-economic effects in or outside Yukon that cannot be mitigated; or
☐	**S56 (1)(d)**	refers the project to the Executive Committee for a screening, as the Designated Office cannot determine whether the project will have significant adverse environmental or socio-economic effects after taking into account any mitigative measures included in the project proposal.

56(1)(b) Recommended Terms and Conditions for the Project
The following mitigative measures shall be complied with:

- The proponent shall at all times have on site sufficient spill clean-up equipment and materials in readiness to clean-up all spills of petroleum products or other deleterious substances.

- The proponent shall have a Spill Contingency Plan in place to provide for response to and clean-up of any spills of petroleum products or other deleterious substances.

10) Certification

Assessment Report Prepared By	
Signature Loralee Johnstone	**Date** November 28, 2007
Authorized By	
Signature Loralee Johnstone	**Date** November 28, 2007

Appendix I - Summary of Responses from Interested Persons and Others

Contributor	Document Ref #	Summary of Comments	Consideration for Use - used as valued component - information - basis for information request - potential project effect - possible mitigation - expert opinion - policy or position - outside scope of evaluation - beneficial effect/consideration complete
Yukon Government Comments			
Randy Lamb (Environment)	2007-0187-030-1	- Environment had the opportunity to prescreen this project and work with the Forest Management Branch on potential wildlife and habitat issues. We have no substantial concerns with this proposal, and the proposed wildlife and habitat related mitigations appear to be sufficient. Access management, buffers and seasonal restrictions as per the plan will help to address other departmental concerns as well.	• Policy or position
Ruth Gotthardt (Tourism Heritage Branch)	2007-0187-030-1	- The project is in an area of low-moderate historic and archaeological resources potential. Should the proponent discover any historic resources they are requested to contact Government of Yukon, Heritage Resources Unit. No disturbance is permitted to historic sites encountered during land use or development activities. No objects may be removed from heritage sites.	• Information
Scott Cole (Forest Management Branch)	2007-0187-031-1	Forest Management Branch submitted the Minto Burn Commercial Fuelwood Timber Harvest Project to the YESAB Mayo Designated Office on October 4,2007. Comments were received and the Forest Management Branch, having reviewed the public comments, recognises and values the concerns raised by the effected First Nation and Registered Trapline Concession holder. In considering these concerns, Forest Management Branch is reducing the scope of the project. As of November 13, 2007, Minto Area 6 will be	• Information

		deferred. The Minto Commercial Fuelwood THP (YESAB Project # 2007-0187) will develop Minto Area # 2 only.	
Interested Persons			
Sue Kemmett (Yukon Conservation Society)	2007-0187-025-1	Thank you for the opportunity to review the above project. We have a few concerns. 1. We are not assured that gates will truly restrict access after this fuelwood operation is over. Mitigation: our experience with mining and other developments has shown that it will be necessary to pay a person to be at the gate to really control access. 2. We are not convinced that the 1995 Minto fire has rendered the area as "poor habitat for the herd". All caribou habitat is in various stages of succession after a fire or other disturbance – on its way to becoming 'current' caribou habitat again. Although caribou may not be frequenting the area (as described in the Timber Harvest Project), this does not negate the area as being valuable for winter habitat. Mitigation: work with the relevant people who have knowledge of the Tatchun Herd to ensure that the proposed harvest activities protect all of the Tatchun caribou winter habitat (regardless of how close it is to becoming 'current' habitat again) before sending recommendations to the Yukon government. 3. We do not see where the cumulative effects of the Yukon Energy Corporation application to build a transmission line from Carmacks to Stewart Crossing and this application have been considered. Mitigation: complete an assessment of the effects of the powerline and fuelwood harvesting projects on the values that have been identified in the Timber Harvest Project, namely cultural, landscape, wildlife (including trapline concessions), riparian, water, recreation and visual values before sending recommendations to the Yukon government. 4. We are concerned that the proposed fuelwood harvesting project is adjacent to the Lhutsa Habitat Protection Area. Mitigation:	• Policy or position • Used as valued component • Information • Outside scope of evaluation (area withdrawn)

		based upon a consideration of how to protect the integrity of the Lhutsa HPA, develop a substantial no-logging buffer to protect the areas of the Lhutsa HPA that are adjacent to the proposed fuelwood harvesting project. We have read the recommendations from Beverly Brown, Director, Lands & Resources for Selkirk First Nation and the letter written by Audrey and Don Trudeau. In several places, it provided information that was not in the Timber Harvest Project. Our own concerns, in addition to the concerns laid out by Ms. Brown and the Mr. and Mrs. Trudeau and the fact that the Selkirk First Nation has recently constructed access and developed firewood woodlots on Settlement Land for local commercial operators within 5 kilometres of the proposed fuelwood project cause us to question the validity of the proposed fuelwood project. In view of these collective concerns, we recommend that this project does not proceed.	• Policy or position • Policy or position
First Nation Government Comments			
Bev Brown (Selkirk First Nation)	2007-0187-024-1	Thank-you for the opportunity to submit comments to your office in regards to the current interest of the YG Forest Management Branch(FMB) to establish operating units and harvest blocks and develop road infrastructure for access, SFN would like to acknowledge the background information gathered by the proponent was helpful in our review. Our comments are limited to Minto Area 6 Lutsaw Wetland HPA, Rock Island Lake. We regret to inform you that Selkirk First Nation does not support the development of a timber harvesting project at Minto Area 6. We urge you to seriously consider the following: 1. It must be recognized concurrent to this proposal is the application by Yukon Energy Corporation (YEC) to develop a transmission line from Carmacks to Steward Crossing. The proposed transmission line route	• Information • Outside scope of evaluation (area withdrawn)

		crosses through the Minto Area 6. Through intensive consultation between YEC and the community of Pelly, Minto Area 6 was recognized as an important ecological habitat and cultural site of significant value to Selkirk First Nation members. The impact of Yukon Energy's project to this area may be mitigated; however, SFN is hesitant to support further developments that may compromise the integrity of the area's values through cumulative effects. In particular, the proposed mitigation of setting up buffers and reporting archaeological sites may not be sufficient as the nature of this proposal opens the area to commercial fuelwood operators, who despite best intentions, may not be aware of the high values in this area. Careful management of this area is mandatory therefore SFN proposes FMB should wait until the construction of the transmission line is completed to review impacts to this area. We recommend Forest Management Branch continue to review their project with Selkirk First Nation and incorporate more local and traditional knowledge. 2. There are two regional land use plans available for the areas adjacent to the proposed project that would be wise to consider, The Minto (Hetsutthat) Region Land Use Plan (June 2002) and Lutsaw Wetland Habitat Protection Area (LWHPA) Management Plan (May 2006). The Minto (Hetsutthat) Region Land Use Plan is available at both the Mayo and Cmacks EMR's Natural Resources Offices and has been recognized by dl three Northern Tutchone First Nation governments as an accepted timber management planning tool on Settlement Lands. In particular, the Minto (Hetsutthat) Region Land Use Plan grates, *"Set-up nocutting corridor across* from *Lutsaw and erect signs.* " *The* Lutsaw Wetland HPA states, "Forest *manugemenr in the settlement portions of the L WHPA will be consistent with the Minto (Hetsutthat) Land Use Plan endorsed by the Selkirk First Nation in June 2002.* " These plans speak to the many forest management values in the surrounding area by Selkirk people and should be reviewed in context with the proposed project. 3. Trapping concerns in Minto Area 6 have been recorded by our	

		Department during the Sept 26,2007 interview between the proponent, Mr. Cole and the area trappers, the Trudeaus. Our Department continued these interviews with the Trudeaus and have learned that contrary to Minto Burn Commercial Fuelwood Timber Harvest Project report, the trappers advised us that they did trap the area in 1998 and 2002 in the burned area. It is their intent to trap this area this upcoming 2007/2008 trapping season. They have already evaluated the area and see the harvestable season being in proximity to their normal catchments expectations. SFN's concern is that napping values have not been sufficiently addressed in the proposal. Fair consideration is required so that trappers can be informed how the information they provided during consultation is utilized, Mr. Cole was required to rewrite the Mint Bum Commercial Fuelwood Timber Harvest Project and deliver a copy to the Trudeaus for review to ensure the trappers issues were addressed. This remains outstanding, in particular, lynx nursery and bear denning habitat should be addressed. Please review the Trudeau's attached letter. 4. Selkirk First Nation has recently constructed access and developed new woodlots within 5km of FMB's proposal on Settlement Land, the area was chosen using local and traditional knowledge to cause the least amount of damage to the surrounding habitats. The purpose of this new development is to meet local demand for fuelwood and to provide employment/income for local commercial fuelwood operators. Whereas SFN initially was interested in learning about Forest Management Branch plans to develop harvest units in Minto Area *6*, we believe the local demands will be satisfied with our own development. We appreciate your review of our concerns and ask you reject this proposal for development in Minto Area *6* Lutsaw Wetland HPA, Rock Island Lake.	
Robert Moar (Little Salmon Carmacks First Nation)	2007-0187-029-1	The following comments are strictly limited to the proposed Minto Burn Commercial Fuelwood Timber Harvesting Project at Area 2, near McGregor Creek. In regards to a timber harvesting project at Minto Area 2, the Little Salmon Carmacks First Nation would like to document the	• Information

		concerns of the local First Nation trapper, Johnny Sam. Mr. Sam recognizes the need to cut wood for the community and thinks that it would be unreasonable to deny a cutting area here, but he would like to point out that the incremental effects of having both wood cutting and a power transmission line project occurring within such a close time frame will be detrimental to the natural habitat in his trapping area. Mr. Sam is specifically concerned about the disruption to wildlife due the increased activity, especially the effects of noise scaring off the animals both large and small. Wood cutting has been going on now for some years in Mr. Sam's area, he feels that the sooner this project can be completed, the better. He would be extremely appreciative if his concerns can be registered and kept in mind. The LSCFN would like to see a timber harvesting project in Minto Area 2 provided that any work occurring in the swampy areas is during the winter months and that the concerns of the local trapper are regarded.	• Possible mittigation
Public Comments			
Audrey & Don Trudeau	2007-0187-023-1	(Letter to Bev Brown, Lands Director for Selkirk FN) About two or more weeks ago, maybe even as far as last September a Mr. Scott Cole from the Yukon Government came and spoke with us about making two woodlot roads on the trapline 137 which we trap. We have had much time to think about what was said during that meeting and now we know from experience that a short meeting does not cover all there is to be said about an issue. We are very concerned about what this road will do to that area of the trapline. We also know that different people get to have a say about an issue and this also inclused the Selkirk First Nation and especially your office as you deal with land issues. We also know that there is some kind of a deadline that people get to say what they think and we hope this deadline time is not past yet. We did speak to Mr. Cole and our memory is pretty good, as well there are some minutes taken that I believe your department has, but we did	• Information • Outside scope of evaluation (area withdrawn)

		mention to Mr. Cole that lynx trees may be cut down by the woodcutters and he said a buffer could be made around these trees. A lynx tree is where they leave their scent so other lynx knows who was there. We were concerned about the lynx tree but there is also another concern which we were only reminded about later after the meeting with Mr. Cole when we talked about these roads with other trappers and that reminder was about all the trees in a burned area. This is where the lynx mate and have their young. There is lots of deadfall in a burned out area. The mother lynx hides her litter in these deadfall places. If the road is made then the woodcutters come and take away the trees, standing or deadfall. Then there is no safe place for the lynx and they go away. That hill where the woodlots are going to be made is a lynx nursery. This whole area where they want to make roads and take away the wood is a well known area for lynx and the lynx would like it even better now that there is a safe place for young lynx. Another trapper in the area has raised his concern to us that the trapline he has borders with 137 just a short distance away to the south from the area in question for the roads. He knows too about the abundance of lynx on that particular area of ground because some of the lynx go on his trapline too. He will be impacted as well but has no say because the roads in question to be made are not on his trapline. Over the years we have trapped a fair number of our lynx catch out of this immediate area. Now we see the potential for a big number to our trapping of lynx from this immediate area and that is of great concern to us as well as to other trappers. In the talk with Mr. Cole he said that they checked this area in question for critical habitat for we believe was the Sharptail grouse. He said they saw no signs that it was. Well that may be so but it is critical habitat for the lynx who choose this higher ground for their mating and breeding habitat.	• Information • Outside scope of evaluation (area withdrawn) • Information

		We also have a question about the Selkirk First Nation's Land Use Plan on R-3A. We thought because a Land Use Plan was made that if an activity was not to happen in a Land use Plan that it also couldn't happen so close to the border of the Land use Plan. The R-3A Land Use Plan said no commercial wood cutting. Maybe you could also check that too. Another thing, Mr. Cole brought the woodlot plan that he said he was going to or already had submitted to the screening board. I seem to remember that he said this board was the Yukon and Environmental and Socio Economic Screening Board. He said that not take offence and apologized to us about what we would find it already mentioned in the plan to be submitted that the planners had already talked with the trappers. Well they had not talked to us and even though they apologized we think that maybe our lynx critical habitat concern may have surfaced in pre-planning talks. We think that this was why he was so insistent that he meet with us in the first place so he could say yes he talked with all the trappers. We were away working all summer and maybe they tried to get in touch with us but then we still feel they should have made the effort to come see us at Fort Selkirk where we worked instead of making a false statement in the already made plan. Then there is the locally known fact that the lower ground area wet ground is a travel corridor for moose. They use this route quite a lot to traverse into the upper lakes and from the upper lakes down to the Rock Island Lake area. And this area is also known to be prime caribou habitat. We would also mention that there is a drainage from the upper level to the lower level that feeds into Rock Island Lake. Even though Mr. Cole said they would buffer to immediate stream area from wood cutting there is till the ground water drainage that may be impacted and lessen the flow into Rock Island Lake. There is the historical usage that has always been done at the South West end of Rock Island Lake, the spring gaffing of Jackfish. Lowered levels of even a little bit may cease this historical activity.	• Information • Policy or position • Used as valued component • Outside scope of evaluation (area withdrawn)

		The roads as explained by Mr. Cole would be explicitly for wood cutters and persons with large game hunting interests would not be allowed to use. He said the roads would be at first blocked with a chain and lock while the woodcutters are utilizing the area and would be made impassable, blocked at the head of the road when the woodcutters are finished and gone The upper stretches of the roadways would still be there past the blockage and area visiting hunters could easily with a chainsaw make an access around the blockage and use the roadways. Another point we thought of later, after the meeting with Mr. Cole is that the south facing slope of the upper area is a place where bears den up for the winter. They use this south slop are frequently. This is yet another critical habitat differing from the Sharptail grouse. Last but not least, is the Lutsaw Wetland Habitat Protection Area just across the highway from where these potential roads would be made. We would question is it wise to have or even allow commercial activities so close to a Habitat Protection Area. The allowing may set precedence that it is ok to have commercial activities bordering a Habitat Protection Area. Perhaps you can determine that we do not want these roads and that would be correct. We don't want to see these roads or woodcutting in this area for the many reasons we mentioned. We don't know where else to turn as Mr. Cole was supposed to get in touch with us some more but he has not done so to this date, at least not while we were home. Maybe he tried to. As members of this community we do hope that you are able to deal with our concern in some way and protect our interest on the trapline.	• Used as valued component • Used as valued component • Outside scope of evaluation (area withdrawn) • Policy or position • Information
		•	•

Kerri.Bianic

From: Scott.Cole

Sent: Tuesday, November 13, 2007 3:38 PM

To: Kerri.Bianic; Loralee.Johnstone; Robin.Sharples; Susan.Skaalid

Subject: Change in Scope for the YESAB project # 2007-0187

Forest Management Branch submitted the Minto Burn Commercial Fuelwood Timber Harvest Project to the YESAB Mayo Designated Office on October 4, 2007. Comments were received and the Forest Management Branch, having reviewed the public comments, recognises and values the concerns raised by the effected First Nation and Registered Trapline Concession holder.

In considering these concerns, Forest Management Branch is reducing the scope of the project. As of November 13, 2007, Minto Area 6 will be deferred. The Minto Commercial Fuelwood THP (YESAB Project # 2007-0187) will develop Minto Area # 2 only.

Soils Assessment
Fuelwood Harvest Development Area
Y08/Operating Unit 6

By: Aynslie Ogden
October 3, 2006

Purpose

The purpose of this work was to carry out an assessment of soil characteristics in the proposed fuelwood harvest development area in the 1995 Minto Burn. Four soils pits were described according to the *BC Field Manual for Describing Terrestrial Ecosystems* (1998) and classified according to the *Canadian System for Soil Classification* (1998).

Soils of the Yukon Plateau – Central Ecoregion

The following description is summarized from *Ecoregions of the Yukon Territory* (2004).

The climate of the Yukon Plateau-Central Ecoregion is strongly continental and semi-arid with warm summers. Mean annual temperatures are near -4^{o}C. Annual precipitation is in the range of 250 to 300 mm, two thirds of which falls during the summer. Large soil moisture deficits early in the growing season are common.

This Ecoregion spans both widespread and sporadic discontinuous permafrost zone. However, fine-grained and moist sediments in valleys are prone to perennial freezing and occurrence of ground ice. The plateau surfaces are too low to support alpine permafrost, and most ice-rich ground is in valleys. In northern portions of the region, permafrost is found in various terrain types, even in relatively dry till under deciduous forest near Pelly Crossing. The importance of soil moisture and organic accumulation on the specidic location of permafrost develops southwards. A large portion of the Ecoregion lies west of the limits of the McConnell glaciation (the most recent glaciation in the Yukon), so the surficial deposits are coarse and dry and largely free of ground ice.

Glacial drift of various ages dominates lower slopes and valley bottoms throughout the region. Two notable features of this ecoregion are 1) the south-facing slopes that support extensive grassland communities and 2) a layer of tephra up to 35 cm thick that blankets most of the soils of the region. Mildly weathered alkaline soils form on a variety of calcareous glacial parent materials. Melanic Brunisols are common beneath open meadows, and Eutric Brunisols with thick moder humus forms are common beneath aspen stands. Mixed forests are also underlain by Eutric Brunisols with mor humus forms. Organic Cryosols and Gleysolic Turbic Cryosols form beneath wetlands in the silty alluvial deposits of major floodplains. Higher elevation uplands and north-facing slopes may also lie on permafrost, most commonly Orthic Turbic Cryosols.

Some soils in this ecoregion formed with unique features. Paleosols or relict soils (e.g. the Wounded Moose Paleosol), found nowhere else in Canada, developed in the Pleistocene glacial

drift this region. These soils exhibit deep soil development and strong reddish colours that relate to long periods of weathering under interglacial climatic conditions in the central Yukon.

Soil Description/Classification

Four soil pits were described. The soil pits were located across a gradual elevational gradient. All pits were dug to a depth of approximately 1m below the surface. Significant differences were not observed in soils characteristics other than the increasing seepage observed in the soils as we moved downslope. These soils are deep and fine-textured, the surficial material is likely glaciofluvial. The nutrient regime is medium to rich, and moisture regime is moderately well to imperfectly drained. Soils are classified as either Dystric Brunisols or Eutric Brunisols – a pH test (not conducted) is required to distinguish these two soil types. Because of the presence of pronounced mottling in three of the four soil pits, the soils are possibly Gleyed Eluviated Dystric Brunisols; however, an Ae horizon of at least 2 cm thick is required to meet this classification, and this horizon was not observed.

SP1

UTM Zone/Easting/Northing	08/041701/695460
Elevation	710m
Site Disturbance	Overstorey crown fire
Surficial Material	Glaciofluvial or Morainal
Drainage Class	Moderately well to imperfectly drained
Moisture Regime	4/Mesic to 5/Subhygric
Nutrient Regime	Medium to Rich
Soil Type	Dystric Brunisol* or Eutric Brunisol (pH needed to distinguish); possible Gleyed Eluviated Dystric Brunisol
Humus Form	Hemimor
L (depth, rooting abundance)	<0.5cm
F (depth, rooting abundance)	10cm; plentiful roots
H (depth, rooting abundance)	<1cm; plentiful roots
Ah (depth, rooting abundance)	2-4 cm; plentiful roots; no Ae horizon; no tephra layer
Bm or Bmgj (depth, rooting abundance)	>60 cm (bottom of horizon not observed); roots few to none
B Horizon – % Coarse Fragments	<10% (gravel <10%; cobbles 0%; stones 0%)
B Horizon – Colour (Matrix)	2.5Y/5/2 to 2.5Y/5/4
B Horizon – Mottles (Colour/Abundance)	2.5YR/4/8; Abundant
B Horizon – Texture	Silty loam
B Horizon – Structure	Subangular blocky/moderate (near top of horizon)
B Horizon – pH	*Not recorded
Permafrost	Not visible

SP2

UTM Zone/Easting/Northing	08/0411268/6957467
Elevation	688m
Site Disturbance	Overstorey crown fire
Surficial Material	Glaciofluvial or Morainal
Drainage Class	Moderately well drained
Moisture Regime	4/Mesic
Nutrient Regime	Medium to Rich
Soil Type	Dystric Brunisol* or Eutric Brunisol (pH needed to distinguish)
Humus Form	Hemimor
L (depth, rooting abundance)	<1cm

F (depth, rooting abundance)	10cm; plentiful roots
H (depth, rooting abundance)	<1cm; plentiful roots
Ah (depth, rooting abundance)	2-4 cm; plentiful roots; no Ae horizon; no tephra layer
Bm (depth, rooting abundance)	>60 cm (bottom of horizon not observed); roots few to none
B Horizon – % Coarse Fragments	<10% (gravel <10%; cobbles 0%; stones 0%)
B Horizon – Colour (Matrix)	2.5Y/5/2 to 2.5Y/5/4
B Horizon – Mottles (Colour/Abundance)	2.5YR/4/8; Plentiful-Few
B Horizon – Texture	Silty loam
B Horizon – Structure	Subangular blocky/moderate (near top of horizon)
B Horizon – pH	*Not recorded
Permafrost	Not visible

SP3

UTM Zone/Easting/Northing	08/041112/6957379
Elevation	683m
Site Disturbance	Overstorey crown fire
Surficial Material	Glaciofluvial or Morainal
Drainage Class	Moderately well to imperfectly drained; some seepage observed at 5cm depth in mineral soil
Moisture Regime	4/Mesic to 5/Subhygric
Nutrient Regime	Medium to Rich
Soil Type	Dystric Brunisol* or Eutric Brunisol (pH needed to distinguish); possible Gleyed Eluviated Dystric Brunisol
Humus Form	Hemimor
L (depth, rooting abundance)	<1cm
F (depth, rooting abundance)	6 cm; plentiful roots
H (depth, rooting abundance)	1-2cm; plentiful roots
Ah (depth, rooting abundance)	<2 cm; plentiful roots; no Ae horizon; no tephra layer
Bm or Bmgj (depth, rooting abundance)	>60 cm (bottom of horizon not observed); roots few to none
B Horizon – % Coarse Fragments	<10% (gravel <10%; cobbles 0%; stones 0%)
B Horizon – Colour (Matrix)	2.5Y/4/2
B Horizon – Mottles (Colour/Abundance)	2.5YR/4/8; Abundant
B Horizon – Texture	Silty loam
B Horizon – Structure	Subangular blocky/moderate (near top of horizon)
B Horizon – pH	*Not recorded
Permafrost	Not visible

SP4

UTM Zone/Easting/Northing	08/041168/695460
Elevation	685m
Site Disturbance	Overstorey crown fire
Surficial Material	Glaciofluvial or Morainal
Drainage Class	Imperfectly drained; abundant seepage observed throughout soil profile, including F Horizon
Moisture Regime	5/Subhygric
Nutrient Regime	Medium to Rich
Soil Type	Dystric Brunisol* or Eutric Brunisol (pH needed to distinguish); possible Gleyed Eluviated Dystric Brunisol
Humus Form	Hemimor
L (depth, rooting abundance)	<1cm
F (depth, rooting abundance)	8 cm; plentiful roots
H (depth, rooting abundance)	1 cm; plentiful roots
Ah (depth, rooting abundance)	<2 cm; plentiful roots; no Ae horizon; no tephra layer

Bm or Bmgj (depth, rooting abundance)	>60 cm (bottom of horizon not observed); roots few to none
B Horizon – % Coarse Fragments	<10% (gravel <10%; cobbles 0%; stones 0%)
B Horizon – Colour (Matrix)	2.5Y/4/2
B Horizon – Mottles (Colour/Abundance)	Not observed, possible gleying
B Horizon – Texture	Silty loam
B Horizon – Structure	Subangular blocky/moderate (near top of horizon)
B Horizon – pH	*Not recorded
Permafrost	Not visible

Additional Comments

This was a reconnaissance-scale survey. If a more detailed description of soils characteristics is required, a stratified random sampling scheme is recommended. Such sampling would first use air photos to identify map units based on changes in slope and surficial geology and then soil pit locations may be randomly located within each of these units. The number of pits within each map unit should be based on the variability observed in the field (e.g. more variability = more soil pits). While permafrost was not visible in any of the soil pits, permafrost may still be found within the area. Additional advice on permafrost characteristics of the soils in this region may be obtained from the Yukon Geological Survey.

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