



**MINTO EXPLORATIONS LTD.**

*A Subsidiary of Capstone Mining Corp.*

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WILDLIFE PROTECTION PLAN

September 2011

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## **1.0 INTRODUCTION**

Minto Mine is a high-grade copper and gold mine that is located 240 km north of Whitehorse, Yukon. Operations are ongoing at this time and began in October 2007. Numerous wildlife surveys have been completed in the area surrounding the site since 1994 by the Government of Yukon, Department of Environment; Hallam Knight Piesold Ltd. (HKP); and Access Consulting Group (ACG). These studies, along with observation logs during operational time, formed the basis of the Wildlife Protection Plan. A baseline report was prepared and submitted as part of the Phase IV Expansion environmental assessment. It summarizes the results of the surveys conducted to date, comments on the distribution of species in the area and identifies species at risk. The Minto Wildlife Baseline study is attached to this report for reference.

The mine itself is located in the boreal forest at an elevation of about 760 m ASL. The access road starts at the western side of the Yukon River crossing site, continues north adjacent to the Yukon River and then heads southwest up the Minto Creek valley and continues approximately 12 km up to the Minto mine site. The ecosystems surrounding the mine site consists of varying ecosystem types that range in structure and age from shrub land to forest. Much of the area has been affected by fire. Riparian zones, estimated to be up to 20 m wide, consist of fairly dense stands of shrubs and trees. Forests, some of which burned during the fires in 1980 and 1995, are in various stages of regeneration. Despite this rugged terrain, baseline studies indicate that many fauna are observed in the area including approximately 46 species of mammal (insectivores, bats, lagomorphs, rodents, carnivores and ungulates), 60 species of birds and one species of amphibian (wood frog).

### **1.1 Wildlife Protection Plan Objectives**

The purpose of the Wildlife Protection Plan (WPP) is to develop a monitoring program that will yield information about wildlife use in the area. This information will feed into closure planning and help refine closure objectives related to ensuring unobstructed passage through the area by wildlife. It will also describe the methods to be used at Minto Mine to ensure protection of wildlife, minimize disturbance to animals and

minimize adverse impacts on wildlife habitat to the extent possible during the active life of the mine.

## 1.2 Site History

The mineral deposits mined at the site were identified during exploration programs occurring in the area in the 1970's. Exploration activities occurred sporadically since that time until construction of the mine and related facilities began in earnest in 2006. From the perspective of wildlife monitoring, the site is a greenfield operation in that current mining activity represents the most significant industrial activity occurring in this area to date.

Wildfire has been a significant factor affecting the local ecosystems. Many forests are kept in younger successional stages due primarily to the frequency and/or intensity of the burn. The forests within the Yukon Plateau-Central Ecoregion in particular are often less than 100 years old due to the combination of frequent, large fires associated with thunderstorms and normally dry summer conditions. Vegetation succession following fire will differ depending on a number of different factors. This also affects the ability of the area to support wildlife species.

The area surrounding the Minto Mine site has been burned by two major fires in the past 30 years (GYWFM 2009). The first and oldest fire burned approximately 7,236 ha in 1980, while the second and more extensive fire occurred in 1995 and burned approximately 55,521 ha.

Of the wildlife surveys conducted in the area, one predates the 1995 fire and the other five occurred since that time. The surveys are summarized below.

<b>DATES</b>	<b>TYPE OF SURVEY</b>	<b>CONDUCTED BY</b>
February, 2010	Late Winter Moose Survey	Access Consulting Group
December, 2010	Post-rut Moose Survey	Access Consulting Group

<b>DATES</b>	<b>TYPE OF SURVEY</b>	<b>CONDUCTED BY</b>
June 2009	Sheep Survey	Yukon Government, Department of Environment
2007	Moose Survey	Yukon Government, Department of Environment
2003	Klaza Caribou Survey	Yukon Government, Department of Environment
1994	Aerial Wildlife Survey (June 4) Aerial Sheep Survey (June 4) Aerial Raptor Survey (July 5) Ground Pellet Survey (July)	Hallam Knight Piesold Ltd.

## 2.0 WILDLIFE MONITORING AND PROTECTION MEASURES

The table below outlines processes in use at Minto Mine to track wildlife observations at the site and various protective measures that have and will be used to meet the objectives of this plan.

<b>Issue</b>	<b>Planned or Ongoing Activities to Address the Issue</b>
Wildlife Monitoring	<ul style="list-style-type: none"> <li>• All incidents and interactions with wildlife shall be reported to the District Conservation Officer Dean Mclean, Department of Environment, Carmacks, (867) 863-2411. As well as any other communication regarding wildlife.</li> <li>• Every effort shall be made to avoid disturbing wildlife.</li> <li>• The provisions of the <i>Quartz Mining Land Use Regulations</i> Schedule 1 Operating Conditions (MLUA Class 3 LQ00186) will be adhered to.</li> </ul>

**Table 2. Wildlife Monitoring and Protection Measures**

Issue	Planned or Ongoing Activities to Address the Issue
Wildlife Protection – Site Access Management	<ul style="list-style-type: none"> <li>• Speed limits are enforced for mine traffic along the access and site roads (maximum 60 km/hr). Traffic between the Yukon River and the mine site is radio controlled for safety and speed control.</li> <li>• Existing disturbed areas will be used where possible in an effort to minimize the mine footprint and associated impacts to wildlife habitat.</li> <li>• All personnel coming to site are accounted for and must be on a daily manifest to gain access across the barge/ice bridge</li> </ul>
Wildlife Protection - Harassment	<ul style="list-style-type: none"> <li>• As required in sections 92 and 93 of the <i>Wildlife Act</i>, the proponent shall not harass wildlife or encourage wildlife to become a nuisance.</li> <li>• All employees and visitors to the mine undergo orientation, which includes review of basic mine practices including no wildlife feeding, wildlife avoidance, and bear awareness among other topics.</li> <li>• Mine personnel are not allowed to have pets in camp.</li> </ul>
Wildlife Protection- Hazing Program	<ul style="list-style-type: none"> <li>• Minto safety department have been trained by Bear Scare Ltd. In lethal and non-lethal hazing (training by Dan LeGrandeur). This program has been reviewed and supported by Dean McLean (C.O, Carmacks)</li> <li>• Two site services employees trained in non-lethal hazing, and one in lethal</li> <li>• Site employees and contractors received Bear Safety Awareness and non-lethal hazing training on site by Bear Scare Ltd.</li> <li>• Continued wildlife safety is offered by the Safety Department by of Staying in Bear Country video</li> </ul>
Wildlife Protection- Deterrents & Hazing Equipment	<ul style="list-style-type: none"> <li>• Wildlife deterrent and Hazing Equipment      Standard compress bottle air blast horns</li> <li>• Standard 225g canisters of Bear Spray</li> <li>• Penlight spring activated, single launch bear bangers</li> <li>• One RG 59 Pistol Launcher, 9mm 5 shot hazing revolver (only fires blank caps</li> <li>• One Remington 12 gauge pump action shotgun with bean bag capabilities for non-lethal hazing and lethal rounds for emergency situations</li> </ul>

<b>Table 2. Wildlife Monitoring and Protection Measures</b>	
<b>Issue</b>	<b>Planned or Ongoing Activities to Address the Issue</b>
Wildlife Protection - Ecologically Sensitive Areas	<ul style="list-style-type: none"> <li>• Every precaution will be taken to avoid disturbance of wildlife sensitive areas, including but not limited to calving, denning or nesting sites. Such areas have been made aware to mine personnel by local community members and work plans have been altered to suit the wildlife use of the area.</li> <li>• Vegetative buffer zones will be maintained around stream riparian areas and facilities to minimize wildlife disturbance and protect wildlife corridors.</li> </ul>
Wildlife Protection – Animal Egress	<ul style="list-style-type: none"> <li>• Measures are implemented and incorporated into day-to-day work to reduce any impediment of wildlife movements. For example, when earthworks are planned (berm or road construction, etc.), designs accommodate wildlife by ensuring any animals entering the construction area have a means of egress and building slopes no steeper than the surrounding natural terrain to avoid hazards to wildlife.</li> <li>• Windrows are created so that wildlife movements are not restricted, and fire hazards are minimized with the exception of roll over protective berms on haul roads.</li> <li>• During development of underground workings MintoEx will ensure that the adit is blocked in the event that the workings are left unattended for long periods (delays) in order to prevent wildlife entrapment. All refuse will be removed and incinerated.</li> <li>• The Detailed Decommissioning and Reclamation Plan (MintoEx, 2009) includes wildlife protection objectives for closure and post closure.</li> </ul>
Wildlife Protection - Animal Mortality	<ul style="list-style-type: none"> <li>• Speed limits are enforced in order to minimize vehicle/wildlife collisions.</li> <li>• Food waste is burned in an incinerator to minimize wildlife attractants.</li> <li>• Hunting at the site is prohibited.</li> </ul>
Wildlife Monitoring	<ul style="list-style-type: none"> <li>• Wildlife monitoring consists of maintaining a wildlife observation log onsite; reporting wildlife encounters; monitoring measures to ensure birds do not settle in ponds. Safety and Environmental personnel on site will monitor project activities and modify operations to address wildlife concerns.</li> </ul>
Hunting and Fishing	<ul style="list-style-type: none"> <li>• Mine personnel will not be permitted to have firearms on the project site, unless authorized as a safety precaution.</li> <li>• Employees are not permitted to hunt or fish while on the mine site or in the vicinity of the project area, including during travel to and from the site. Infringement of this policy will be reported and may result in disciplinary actions.</li> </ul>



**Table 2. Wildlife Monitoring and Protection Measures**

Issue	Planned or Ongoing Activities to Address the Issue
Wildlife Protection - Migratory Birds	<ul style="list-style-type: none"> <li>• Monitoring to ensure waterfowl and shorebirds do not settle in the Water Storage Pond. Environmental personnel on site will monitor project activities and modify operations to address wildlife concerns.</li> </ul>
Wildlife Protection - Bears	<ul style="list-style-type: none"> <li>• MintoEx addresses bear safety with employees on a regular basis as part of toolbox meetings in seasons wherein the likelihood of bear encounters increases (spring, summer) and posts warnings in high traffic areas around camp when bears have been spotted to encourage increased awareness.</li> <li>• The camp is equipped with bear deterrent devices and the devices are maintained in good working.</li> <li>• The incinerator and burn pit currently in use at the site are equipped with electric fences. Garbage and debris destined for disposal is collected daily and prior to incineration stored in wildlife proof containers so that it does not attract wildlife to the mine site. Nuisance bears are reported to the Carmacks Region Conservation Officer.</li> </ul>
Wildlife Monitoring - Caribou	<ul style="list-style-type: none"> <li>• Any caribou observations will be reported to the Conservation Officer in Carmacks</li> </ul>
Habitat Protection - Riparian Areas	<p>To avoid major erosion and sedimentation problems the following general practices will be implemented:</p> <ul style="list-style-type: none"> <li>• The area of clearing and disturbed soil will be minimized – existing trails and disturbed areas will be used where possible to minimize the addition of new linear corridors and there will be no unnecessary disturbance to the organic mat and soils;</li> <li>• Erosion protection measures (riprap, earth breaks or cross ditches) will be implemented as required;</li> <li>• Early construction of diversion ditches and sediment control ponds to manage runoff and provide for settling of suspended solids will be implemented with inspection to ensure effectiveness;</li> <li>• Construction activities will be completed efficiently to minimize the length of time disturbed soils are exposed;</li> <li>• Site clearing will be timed to minimize soil compaction. To the maximum extent possible, disturbances will be restricted to times when soils are dry or frozen and avoid or delay construction during wet site conditions;</li> </ul>

**Table 2. Wildlife Monitoring and Protection Measures**

Issue	Planned or Ongoing Activities to Address the Issue
	<ul style="list-style-type: none"><li data-bbox="574 331 1424 443">• Riparian areas will not be unnecessarily disturbed – a minimum buffer of 30 m will be maintained from surface watercourses to protect riparian areas.</li></ul>
Trapping and Traditional Use	<ul style="list-style-type: none"><li data-bbox="574 499 1214 527">• Trap line trails and trapping areas will not be disturbed;</li><li data-bbox="574 541 1289 569">• Continued access to traditional harvest areas will be provided;</li></ul>

### 3.0 CONCLUSION

By nature, mining activities will impact wildlife habitat in the direct vicinity of the mine. The Wildlife Protection Plan as described here will guide mining activities to ensure that the loss of wildlife habitat or displacement of animals is minimized during the operational life of the site. Further measures have been put forward in the Decommissioning and Reclamation Plan to address closure and post-closure methods for re-establishing wildlife corridors and restoring habitat to the extent possible.



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**Appendix A – Minto Wildlife Baseline Report (EBA, 2010)**

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**Minto Explorations Ltd.**

**ISSUED FOR USE**

**MINTO MINE  
ENVIRONMENTAL BASELINE STUDIES  
WILDLIFE REPORT**

**W14101068.023**

**August 2010**



**EXECUTIVE SUMMARY**

Minto Mine Explorations Ltd. (MintoEx) is considering expanding the Minto Mine, which is located in the central Yukon. In anticipation of regulatory requirements, MintoEx retained EBA Engineering Consultants Ltd. (EBA) to collate all relevant existing information about wildlife baseline conditions within the vicinity of the mine site.

Numerous wildlife surveys have been completed in the area surrounding the Minto Mine site since 1994 by the Government of Yukon, Department of Environment; Hallam Knight Piesold Ltd; and Access Consulting Group. These surveys have focused mainly on Moose, Sheep, and Raptors. This baseline report summarizes the existing wildlife information for the Minto Mine site and surrounding area. No additional wildlife surveys were completed by EBA as part of this report. A summary is also provided for the known habitat (ecosystem) types located in the Minto Creek watershed.

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## 1.0 INTRODUCTION

Minto Explorations Ltd. (MintoEx) is considering the expansion of the currently operating Minto Mine, located in the central Yukon. In anticipation of regulatory requirements, MintoEx retained EBA Engineering Consultants Ltd. (EBA) to collate all relevant, existing information about wildlife baseline conditions within the vicinity of the mine site. The Minto Mine has been in production since 2007 (Capstone 2010).

Numerous wildlife surveys have been completed in the area surrounding the Minto Mine site since 1994 by the Government of Yukon, Department of Environment; Hallam Knight Piesold Ltd. (HKP); and Access Consulting Group (ACG). This baseline report summarizes the existing wildlife information for the Minto Mine site and surrounding area. No additional wildlife surveys were completed by EBA as part of this report.

## 2.0 OBJECTIVES

The overall objective of this summary wildlife baseline report is to compile all relevant, existing wildlife baseline information for the Minto Mine project site and to determine the current baseline conditions for wildlife using the area surrounding the Minto Mine site.

## 3.0 ENVIRONMENTAL SETTING

### 3.1 STUDY AREA LOCATION

The Minto Mine site is a high-grade copper and gold mine that is located 240 km north of Whitehorse, Yukon (Figure 1). Access to the site is via the Klondike Highway and the mine access road, which includes a barge (summer) or ice (winter) crossing across the Yukon River. The UTM location of the Minto Mine is Zone 8, 385443E, 6945147N (NAD 83).

### 3.2 GENERAL ECOLOGICAL SETTING

*Section 3.2 was summarized from EBA's Vegetation Baseline report completed in April 2010.*

The Minto Mine is located within the Boreal Cordillera Ecozone and the Yukon Central Plateau Ecoregion (Smith et al. 2004).

#### 3.2.1 Boreal Cordillera Ecozone

The Boreal Cordillera Ecozone is an extension of the boreal forest zone that spans across much of Canada (Smith et al. 2004). It has a cold climate, characterized by short, warm summers and long, cold winters. Temperatures are moderated over much of the ecozone by the Pacific maritime influence, as well as by variations in elevation and aspect.

Vegetation of the Boreal Cordillera Ecozone is typically represented by various conifer species, including white and black spruce (*Picea glauca* and *P. mariana*, respectively), lodgepole



pine (*Pinus contorta*), and subalpine fir (*Abies lasiocarpa*). Several deciduous tree species are also fairly common, and include balsam poplar (*Populus balsamifera*), trembling aspen (*Populus tremuloides*), and paper birch (*Betula papyrifera*) (Smith et al. 2004). In the central Yukon portion of this ecozone, grasslands commonly develop on steep, dry, south-facing slopes, particularly along the Yukon and Pelly Rivers. More typical boreal forest vegetation occurs on north-facing slopes.

### 3.2.2 Yukon Plateau – Central Ecoregion

The Yukon Plateau – Central Ecoregion is characterized by undulating, rolling hills and plateaus, broad valleys, and isolated high mountain ranges (Smith et al. 2004). Much of the ecoregion lies to the northeast of the St. Elias-Coast mountain rain shadow, resulting in generally lower precipitation levels overall.

Different vegetation zones within the Yukon Plateau – Central Ecoregion can be broadly delineated along elevation gradients. The boreal forest occurs largely at elevations below approximately 1,200 m above sea level (ASL). A subalpine zone generally occurs at elevations ranging between 1,200 m ASL and 1,370 m ASL, above which the treeline becomes increasingly discontinuous and is eventually replaced by alpine communities.

Valley bottoms and floodplains also support forests composed of white spruce and feathermoss, however, depending on the substrate, understory vegetation can range from a mixture of roses, horsetails (*Equisetum* spp.), willows, and alder (*Alnus* spp.) on recent floodplain units, to kinnikinnick (*Arctostaphylos uva-ursi*), grasses (various species), and lichen (various species) if parent materials are particularly coarse (Smith et al. 2004). Kinnikinnick, grasses, and lichen are also common understory associates in drier, post-fire communities.

Under more disturbed (e.g., post-fire) conditions, lodgepole pine and trembling aspen tend to replace the white spruce-feathermoss forest, with pine occurring on well-drained sites with warmer aspects and coarser soils and aspen occurring on steeper, south-facing slopes with finer soils.

Grasslands are a unique feature within this ecoregion and are characteristically found on steep, warm aspects, sometimes extending from the valley floor to the alpine (Smith et al. 2004). In addition to a range of grass species, these grassland communities are also often composed of sagewort (*Artemisia* spp.), kinnikinnick, rose (*Rosa* spp.), and juniper (*Juniperus* spp.). Sites with a relatively wetter moisture regime sometimes support willows (*Salix* spp.) and aspen.

Subalpine zones are composed primarily of subalpine fir and white spruce, with the occasional, stunted lodge pole pine. Shrub layers are largely characterized by shrub birch (*Betula nana*) and willows, which often occur together with blueberries (*Vaccinium* spp.) and crowberry (*Empetrum nigrum*) on mesic sites, various lichen species on drier sites, and mosses and Labrador tea (*Ledum* spp.) on moister sites (Smith et al. 2004).

### 3.2.3 Fire History

Wildfire is very influential in shaping the ecology of the Yukon, particularly with respect to the forested landscape. Many forests are kept in younger successional stages due primarily to the frequency and/or intensity of the burn. Studies of forest fire succession in the southern portion of the Yukon revealed that forests in the vicinity of the areas assessed were rarely greater than 250 years old (Oswald and Brown 1990). The forests within the Yukon Plateau-Central Ecoregion in particular are often less than 100 years old due to the combination of frequent, large fires associated with thunderstorms and normally dry summer conditions (Smith et al. 2004).

Vegetation succession following fire will differ depending on a number of different factors. Most conifers, such as lodgepole pine and black spruce, can regenerate via seed following fire (provided they are sufficiently mature), while many hardwoods (e.g., aspen, balsam poplar and birch) have the ability to reproduce vegetatively before reaching seed-bearing age. Tree species commonly seen recolonizing post-fire landscapes in the Yukon include lodge pole pine and aspen, which most often occur on moderately well to well-drained sites (Smith et al. 2004). Areas that supported black spruce or mixed black and white spruce forest, often in association with permafrost, will frequently regenerate with willows, aspen, and balsam poplar, and sometimes black spruce and paper birch, should conditions allow.

The area surrounding the Minto Mine site has been burned by two major fires in the past 30 years (GYWFM 2009). The first and oldest fire burned approximately 7,236 ha in 1980, while the second and more extensive fire occurred in 1995 and burned approximately 55,521 ha.

### 3.2.4 Project Site

The mine itself is located in the boreal forest at an elevation of about 760 m ASL. The access road starts at the western side of the Yukon River crossing site, continues north adjacent to the Yukon River and then heads southwest up the Minto Creek valley and continues approximately 12 km up to the Minto mine site.

From a broader perspective, the mine is located approximately 7 to 12 km west of the Yukon River. Bluffs and lowlands/wetlands occur along the Yukon River.

The ecosystems surrounding the mine site consists of varying ecosystem types that range in structure and age from shrub land to forest (EBA 2010). Earth Observation for Sustainable Development of Forests (EOSD) Land Cover Classification data from circa 2000 indicated that the majority of the study area consisted of low shrub (43%) and herbaceous ecosystems (37%). Exposed barren-land (10%) and sparse conifer forest (8%) represented other major ecosystem units.

Riparian zones, estimated to be up to 20 m wide, consist of fairly dense stands of shrubs and trees. Forests, some of which burned during the fires in 1980 and 1995, are in various stages of regeneration. Much of the area has been affected by fire. The ecosystem mapping, conducted by HKP in 1994, states that previously forested areas that are in the

early stages of succession consisted mainly of shrubs such as willows, alder, and aspen, with the willow-dominating regeneration commonly associated with lower slope positions. Regenerating areas that supported a tree layer were mostly composed of aspen, with alder and willow in the understory. Older regenerating sites enabled the establishment of pine and spruce in the shrub layer. In some areas, notably south aspects in the upper reaches of the Minto Creek watershed, juvenile lodge pole pine formed dense stands, thus limiting the development of a more continuous ground cover. Areas that had not been burned in many years often contained both lodge pole pine and aspen in the tree layer, with willows comprising the understory. White spruce was again present in the understory as well, and barring any future fires, would be likely to reach maturity on these particular sites.

Ecosystems associated with (presumably) undisturbed conditions supported forests dominated by black spruce or composed of a mix of white and black spruce (Minto Explorations Ltd. 1994).

Grass dominated ecosystems mainly occurred on steep, south facing slopes.

## 4.0 WILDLIFE BASELINE ASSESSMENT

### 4.1 ENVIRONMENTAL INFORMATION SOURCES

Information included in this section has been drawn from various environmental studies undertaken in the general area over the past 16 years. The following section summarizes known information about the existing biophysical conditions and wildlife resources in the terrestrial area of interest, which is centered on the Minto Mine site (Figure 1). Table 1 provides a summary of wildlife surveys that have been conducted within close proximity to the Minto Mine site between 1994 and 2010.

TABLE 1. WILDLIFE SURVEYS UNDERTAKEN IN THE GENERAL PROJECT AREA		
DATES	TYPE OF SURVEY	CONDUCTED BY
February, 2010	Late Winter Moose Survey	Access Consulting Group
December, 2010	Post-rut Moose Survey	Access Consulting Group
June 2009	Sheep Survey	Yukon Government, Department of Environment
2007	Moose Survey	Yukon Government, Department of Environment
2003	Klaza Caribou Survey	Yukon Government, Department of Environment
1994	Aerial Wildlife Survey (June 4) Aerial Sheep Survey (June 4) Aerial Raptor Survey (July 5) Ground Pellet Survey (July)	Hallam Knight Piesold Ltd.

## 4.2 SPECIES OCCURRING OR HAVING POTENTIAL TO OCCUR IN THE PROJECT AREA

Table 2 lists wildlife species observed in the vicinity of the project area during previous and recent surveys, or having the potential to occur in the project area based on known life histories, distributions and habitat associations. Separate tables are provided for mammals, birds, and amphibians/reptiles.

### 4.2.1 Mammals

The study area lies within the boreal forest of the Yukon Central Plateau Ecoregion. Approximately 46 species of mammals may occur in this region (Table 2). Of these, 19 species have been observed in the vicinity of the project area.

TABLE 2. MAMMALS OBSERVED OR POTENTIALLY OCCURRING IN THE PROJECT AREA	
Common Name	Scientific Name
<b>INSECTIVORES</b>	
Arctic Shrew	<i>Sorex arcticus</i>
Cinereus Shrew	<i>Sorex cinereus</i>
Montane Shrew	<i>Sorex monticolus</i>
Pygmy Shrew	<i>Sorex hoyi</i>
Water Shrew	<i>Sorex palustris</i>
<b>BATS</b>	
Little Brown Myotis	<i>Myotis lucifugus</i>
<b>LAGOMORPHS</b>	
Collared Pika	<i>Ochotona collaris</i>
Snowshoe Hare*	<i>Lepus americanus</i>
<b>RODENTS</b>	
Arctic Ground Squirrel	<i>Spermophilus parryii</i>
Beaver*	<i>Castor canadensis</i>
Brown Lemming	<i>Lemmus sibiricus</i>
Bushy-tailed Woodrat	<i>Neotoma albigula</i>
Deer Mouse	<i>Peromyscus maniculatus</i>
Heather Vole	<i>Phenacomys intermedius</i>
Hoary Marmot	<i>Marmota caligata</i>
Least Chipmunk	<i>Tamias minimus</i>
Long-tailed Vole	<i>Microtus longicaudus</i>
Meadow Jumping Mouse	
Meadow Vole	<i>Microtus pennsylvanicus</i>
Muskrat*	<i>Ondatra zibethicus</i>
North American Porcupine	<i>Erethizon dorsatum</i>
Northern Bog Lemming	<i>Synaptomys borealis</i>

TABLE 2. MAMMALS OBSERVED OR POTENTIALLY OCCURRING IN THE PROJECT AREA

Common Name	Scientific Name
Northern Flying Squirrel	<i>Claucomys sabrinus</i>
Northern Red-backed Vole	<i>Clethrionomys rutilus</i>
Red Squirrel*	<i>Tamiasciurus hudsonicus</i>
River Otter*	<i>Lutra canadensis</i>
Taiga Vole	<i>Microtus xanthognathus</i>
Tundra Vole	<i>Microtus oeconomus</i>
Woodchuck	<i>Marmota monax</i>
<b>CARNIVORES</b>	
American Marten*	<i>Martes americana</i>
Black Bear*	<i>Ursus americanus</i>
Coyote*	<i>Canis latrans</i>
Cougar	<i>Puma concolour</i>
Ermine	<i>Mustela erminea</i>
Gray Wolf*	<i>Canis lupus</i>
Grizzly Bear*	<i>Ursus arctos</i>
Lynx*	<i>Lynx canadensis</i>
Least Weasel*	<i>Mustela nivalis</i>
Mink*	<i>Mustela vison</i>
Red Fox*	<i>Vulpes vulpes</i>
Wolverine*	<i>Gulo gulo</i>
<b>UNGULATES</b>	
Dall Sheep*	<i>Ovis dalli dalli</i>
Elk	<i>Cervis canadensis</i>
Mule Deer *	<i>Odocoileus hemionus</i>
Moose*	<i>Alces alces</i>
Woodland Caribou*	<i>Rangifer tarandus</i>

\* indicates that the species was observed in the project area by either visual observation or sign.

Species distributions were evaluated using range maps in Smithsonian Book of North American Mammals (Wilson and Ruff 1999)

#### 4.2.2 Birds

The Yukon is home to over 303 species of birds, the majority of which are seasonal migrants. Breeding has been confirmed for 195 species, and the Yukon provides winter habitat for 41 species (Yukon Bird Club 2008).

Within the Yukon Plateau Central Ecoregion, and more specifically around the Minto Mine site, considerably fewer species are expected to occur. Table 3 summarizes bird species that have the potential to occur in the study area.

The landscape surrounding the immediate project area consists mainly of low shrub and herbaceous ecosystems (EBA 2010) which likely provides suitable open, foraging habitat for many raptor species and provides nesting sites for ground nesting passerines. Further from the project site, the Minto Bluffs and other cliff areas provide nesting habitat for cliff nesting species such as peregrine falcons and golden eagles (O'Donoghue, pers. comm.).

#### 4.2.2.1 Raptors

Raptors, also known as “Birds of Prey,” make up a small but important group of birds frequenting the study area. Although this group covers a small number of species, it is diverse and includes hawks (*Accipitridae*), falcons (*Falconidae*) and owls (*Strigidae*). A total of 13 raptor species (Table 3) have the potential to occur within the study area. Raptors may breed throughout the study area, with select areas attracting higher breeding densities (e.g. riparian zones) than other areas (e.g. pine stands). Raptors can be expected to breed wherever their habitat requirements are met. Some species are year-round residents, while others are transient migrants. Little is known about the population status of many individual species. Seasonally and locally they can be abundant, common, or occasional.

#### 4.2.2.2 Passerines

Passerines (upland nesting birds) are a specific group of birds belonging to the largest avian Order, *Passeriformes*. The passerines are also known as perching or songbirds. Approximately 43 species have the potential to occur in the study area, as summer or year round residents (Table 3).

Some passerines are year-round residents, while the majority are migratory and are present only during their reproductive phase. Studies indicate upland nesting birds are very common in the study area during spring, summer and fall, and are expected to occur in all habitat types. Most species in this group have relatively small home ranges or territories, and are generally good indicators of local and regional habitat change (i.e., conversion or fragmentation) (Stantec 2010). All of the passerines species listed in Table 3 are potentially present during the summer, but are not necessarily present during the winter.

#### 4.2.2.3 Waterfowl

The term “waterfowl” is used in a general sense and is interchangeable with “waterbirds”. Species are grouped together and treated collectively. Waterfowl are typically used in the context of swans, geese and ducks (*Anseriformes*); however, for this report it also includes loons (*Gaviiformes*) and grebes (*Podicipediformes*). A total of 29 waterfowl species may occur within the study area (Table 3). Waterfowl breed throughout much of North America with select areas attracting high breeding densities. Waterfowl breed throughout the boreal forest to varying densities and they can be expected to breed wherever their habitat requirements are met.

TABLE 3. BIRDS OBSERVED OR POTENTIALLY OCCURRING IN THE PROJECT AREA

Common Name	Scientific Name
Alder Flycatcher	<i>Empidonax alnorum</i>
American Coot	<i>Fulica americana</i>
American Kestrel	<i>Falco sparverius</i>
American Robin	<i>Turdus migratorius</i>
American Tree Sparrow	<i>Spizella arborea</i>
American Widgeon*	<i>Anas Americana</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Bank Swallow	<i>Riparia riparia</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Parus atricapillus</i>
Blackpoll Warbler	<i>Dendroica striata</i>
Blue-winged Teal	<i>Anas discors</i>
Bohemian Waxwing	<i>Bombycilla garrulus</i>
Bohemian Waxwing*	<i>Bombycilla garrulus</i>
Bonaparte's Gull	<i>Larus phildelphia</i>
Boreal Chickadee	<i>Parus hudsonicus</i>
Boreal Owl	<i>Aegolius funereus</i>
Bufflehead	<i>Bucephala albeola</i>
Canada Goose*	<i>Branta canadensis</i>
Canvasback	<i>Aythya valisineria</i>
Chipping Sparrow	<i>Spizella passerina</i>
Cliff Swallows*	<i>Petrochelidon pyrrhonota</i>
Common Goldeneye	<i>Bucephala clangula</i>
Common Loon	<i>Gavia immer</i>
Common Merganser*	<i>Mergus merganser</i>
Common Nighthawk	<i>Chordeiles minor</i>
Common Raven	<i>Corvus corax</i>
Common Redpoll	<i>Carduelis flammea</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Fox Sparrow	<i>Passerella iliaca</i>
Gray Jay	<i>Perisoreus canadensis</i>
Great Gray Owl	<i>Strix nebulosa</i>
Great Horned Owl	<i>Bubo virginianus</i>
Greater Scaup	<i>Aythya marila</i>
Greater White-fronted Goose	<i>Anser albifrons</i>
Green-winged Teal*	<i>Anas crecca</i>
Hermit Thrush	<i>Catharus guttatus</i>
Hoary Redpoll	<i>Carduelis bornemanni</i>

TABLE 3. BIRDS OBSERVED OR POTENTIALLY OCCURRING IN THE PROJECT AREA

Common Name	Scientific Name
Horned Grebe	<i>Podiceps auritus</i>
Least Flycatcher	<i>Empidonax minimus</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Long-tailed Duck	<i>Clangula hyemalis</i>
Mallard*	<i>Anas platyrhynchos</i>
Merlin	<i>Falco columbarius</i>
Nighthawk*	<i>Chordeiles minor</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Goshawk	<i>Accipiter gentilis</i>
Northern Harrier	<i>Circus cyaneus</i>
Northern Hawk Owl	<i>Surnia ulula</i>
Northern Pintail*	<i>Anas acuta</i>
Northern Shoveler	<i>Anas clypeata</i>
Northern Shrike	<i>Lanius excubitor</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Pacific Loon	<i>Gavia pacifica</i>
Palm Warbler	<i>Dendroica palmarum</i>
Peregrine Falcon*	<i>Falco peregrinus anatum</i>
Pine Grosbeak	<i>Pinicola enucleator</i>
Pine Siskin	<i>Carduelis pinus</i>
Purple Finch	<i>Carpodacus purpureus</i>
Red Crossbill	<i>Loxia curvirostra</i>
Red-breasted Merganser	<i>Mergus serrator</i>
Redhead	<i>Aythya americana</i>
Red-necked Grebe	<i>Podiceps grisegena</i>
Red-necked Phalarope	<i>Phalaropus lobatus</i>
Red-tailed Hawk*	<i>Buteo jamaicensis</i>
Red-throated Loon	<i>Gavia stellata</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Ring-necked Duck	<i>Aythya collaris</i>
Rock Ptarmigan*	<i>Lagopus Mutus</i>
Ruby-crowned Kinglet	<i>Regulus calendula</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>
Ruffed Grouse*	<i>Bonasa Umbellus</i>
Rusty Blackbird	<i>Euphagus carolinus</i>
Sandhill Crane	<i>Grus Canadensis</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>



**TABLE 3. BIRDS OBSERVED OR POTENTIALLY OCCURRING IN THE PROJECT AREA**

Common Name	Scientific Name
Sharp-shinned Hawk	<i>Accipiter striatus</i>
Sharp-tailed Grouse*	<i>Tympanuchus Phasianellus</i>
Short-eared Owl	<i>Asio flammens</i>
Snow Bunting	<i>Plectrophenax nivalis</i>
Snow Goose	<i>Chen caerulescens</i>
Sora	<i>Porzana carolina</i>
Spruce Grouse*	<i>Dendragapus Canadensis</i>
Surf Scoter	<i>Melanitta perspicillata</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
Tennessee Warbler	<i>Vermivora peregrina</i>
Tree Swallow	<i>Tachycineta bicolor</i>
Tundra Swan	<i>Cygnus columbianus</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
White-tailed Ptarmigan*	<i>Lagopus Leucurus</i>
White-winged Crossbill	<i>Loxia leucoptera</i>
White-winged Scoter	<i>Melanitta fusca</i>
Willow Ptarmigan*	<i>Lagopus Lagopus</i>
Wilson's Snipe	<i>Capella gallinago</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>

\* indicates that the species was observed in the project area by either visual observation or sign.  
 Species distributions were evaluated using range maps in Birds of the Yukon Territory (Sinclair et al. 2003)

#### 4.2.3 Amphibians and Reptiles

Of the five amphibian species known to occur in the Yukon and Northern British Columbia, only one species is known to occur in the project area: the wood frog (*Rana sylvatica*) (Government of Yukon 2005). No reptiles are known to occur in the Yukon (CARNET 2009).

**TABLE 4. AMPHIBIANS HAVING THE POTENTIAL TO OCCUR IN THE PROJECT AREA\*.**

Common Name	Scientific Name
Wood Frog	<i>Rana sylvatica</i>

\*Species distributions were evaluated using range maps provided in Government of Yukon (2005).

#### 4.2.4 Species at Risk

Table 5 lists those species that are of conservation concern in the Yukon that have the potential to occur in the study area.

TABLE 5. SPECIES OF CONSERVATION CONCERN IN THE YUKON THAT HAVE THE POTENTIAL TO OCCUR IN THE STUDY AREA			
Species	Yukon Status <sup>1</sup>	COSEWIC <sup>2</sup>	SARA <sup>3</sup>
Caribou ( <i>R.t. caribou</i> ) Northern Mountain Population	-	Special Concern (2002)	Special Concern
Grizzly Bear	Special Concern	Special Concern (2002)	No Status
Wolverine	Special Concern	Special Concern (2003)	No Status
Mule Deer	At Risk	-	-
Cougar	At Risk	-	-
Peregrine Falcon ( <i>F. p. anatum</i> )	Threatened	Threatened (2007)	Threatened
Short-eared Owl	Special Concern	(Special Concern (2008))	Special Concern
Common Nighthawk	-	Threatened (2007)	Threatened
Olive-sided Flycatcher	-	Threatened (2007)	Threatened
Rusty Blackbird	-	Special Concern (2006)	Special Concern

NOTE: 1 Status as identified under the *Yukon Wildlife Act* (Yukon Environment 2009); 2 Status as identified by COSEWIC 2010; 3 Status as identified by Government of Canada 2008. Species distributions were evaluated using range maps in the Wilson and Ruff 1999 and Sinclair et al. 2003.

##### 4.2.4.1 Mammals

Six species of mammals that have a potential to occur in the study area are considered to be of conservation concern in the Yukon Territory. Of these, three species (woodland caribou - Northern Mountain Population, grizzly bear and wolverine) are listed as “Special Concern” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2009). Woodland caribou - Northern Mountain Population are also identified as “Special Concern” under the Federal *Species at Risk Act* (SARA). The mule deer and cougar are considered to be “At Risk” in the Yukon, as identified under the *Yukon Wildlife Act*, but not elsewhere (Government of Yukon 2009). Of these, grizzly bear and wolverine have a high probability of occurrence. Grizzly bear have been observed on site (Capstone 2007, HKP 1994). Caribou and mule deer are considered to have a moderate probability of occurrence. The range of both the Tachun and Klaza herds do not overlap with the study area (Yukon Environment 2005). Mule deer pellets were observed during the 1994 pellet counts (HKP 1994). Cougar have a low probability of occurrence. Both the mule deer and cougar are at the northern extent of their range and have only been observed occasionally in this region.

#### 4.2.4.2 Birds

Five species of birds are considered to be of conservation concern: the peregrine falcon, short-eared owl, common nighthawk, olive-sided flycatcher, and rusty blackbird. Of these species, the peregrine falcon, common nighthawk, and olive-sided flycatcher, have a moderate probability of occurrence. Suitable nesting habitat for the peregrine falcon is located in close proximity to the project site, on the bluffs along the Yukon River (O'Donoghue, pers. comm.), and a historical record of nesting for this species was documented at the Pelly – Yukon River confluence (Mossop, pers. comm. as cited in HKP 1994). This reference also mentioned one pair of Peregrines that were once known to use the Yukon River near the Minto Project area. Common nighthawks are often found near open lodge pole pine forests, old burn areas and open mixed forests and near wetlands or rivers (Sinclair et al. 2003) and many of these habitat types occur in the project area. The olive-sided flycatcher often occurs in black and white spruce, lodge pole pine, and mixed forests from lowland areas to tree-line. The short-eared owl and rusty blackbird are considered to have a low probability of occurrence in the project area. The short-eared owl is often associated with open wetland and meadow, alpine, and alpine tundra habitat, which is limited within the project area. The rusty blackbird is also associated with wetland habitat (Sinclair et al. 2003), which is not abundant within the project area itself, but may occur along the margins of the Yukon River.

### 4.3 SUMMARY OF EXISTING INFORMATION

Wildlife baseline conditions for the Minto project area were assessed in HKP's Initial Environmental Evaluation (IEE) (1994), prior to operation of the mine site, but have not been thoroughly re-assessed since then. The following section summarizes relevant, known wildlife information for species that are considered to be highly valued.

#### 4.3.1 Moose

Moose surveys that were specific to the Minto project area, or overlapped with the project area, have been completed. The following section summarizes the existing information on moose in the project area.

##### **Aerial Moose Survey – Winter 2009/2010**

Aerial moose surveys were completed on December 15, 2009 (post-rut) and February 23, 2010 (late winter) by ACG (2010). For both of these surveys, the study area was delineated to include the Minto Creek and McGuinty Creek drainages (Figure 3). Both surveys were contour based surveys, conducted using a Bell 206 helicopter and were completed in a single day. Survey times were 3.3 hours for the December survey and 3.2 hours for the February survey.

Results of the 2009 and 2010 moose surveys are presented in Table 6, with observed moose locations for both surveys are shown in Figure 3. Figure 3 also shows the locations of fresh

moose tracks that were observed, but without a moose observation. More detailed information for these surveys can be found in ACG 2010.

Assuming a sightability distance of 600 m on both sides of the helicopter, the total area surveyed was 112 km<sup>2</sup>. Using this survey area, the moose density for the post-rut survey was estimated to be approximately 125 moose per 1000 km<sup>2</sup>. The calf to cow ratio estimated from this data was 25 calves and no sub adults for every 100 adult cows, and the estimated adult sex ratio was 50 mature bulls for 100 cows.

For the late winter survey, estimated densities were approximately 45 moose per 1000 km<sup>2</sup>. The yearling to cow ratio was 1:1 sub adults to cows, and no calves were observed during this survey. The estimated adult sex ratio was 300 mature bulls for 100 cows. It should be noted that on seven occasions during this survey fresh tracks were observed without an associated moose observation.

**TABLE 6. SUMMARY AND COMPOSITION OF MOOSE OBSERVATIONS DURING THE WINTER 2009 AND 2010 SURVEYS**

Survey	Total	Adult Male	Adult Female	Sub-adult	Calf	Unknown
Post-rut Survey December 15, 2009	14	4	8	0	2	0
Late Winter Survey February 23, 2010	5	3	1	1	0	0

### 2007 Early Winter Moose Survey

The early winter 2007 moose survey for the Carmacks West Moose Management Unit was conducted by Yukon Department of Environment. The following information has been summarized from O'Donoghue et al. (2008).

The above mentioned survey was conducted in a much larger study area than the surveys conducted by ACG during the winter of 2009/2010, which were specifically focused on the area surrounding the Minto Mine site. However, the densities should be comparable as there are similar habitat types and Yukon Government's survey did include the study area of the ACG 2010 surveys. The total survey area within this management unit is 4206 km<sup>2</sup>, of which 4081 km<sup>2</sup> was considered to be suitable moose habitat. A stratified sampling approach was used for this survey, in which the survey area is covered by a grid and each square within the grid is classified as to contain high quality moose habitat or low quality moose habitat (methods as per Kellie and DeLong 2006).

During this survey, a total of 208 moose were observed during the survey, with a total population estimate of 520 moose for the study area. The calculated moose density was 124 moose per 1000 km<sup>2</sup> for the survey area.

From the survey data, biologists estimated a ratio of 21 calves and 10 yearlings per 100 cows, which suggests that the survival rate for the two years previous was relatively low. The sex ratio of 75 bulls per 100 cows is considered to be a healthy sex ratio. The average sex ratio for other areas surveyed within the Yukon is 68 bulls per 100 cows.

### **1994 Wildlife Resources Report**

The HKP (1994) report summarized moose assessments conducted in previous years. A survey conducted in January 1994 by the Yukon Government estimated a moose density of 40 moose per 1000 km<sup>2</sup> in the Minto area.

### **Additional Information**

The Ingersoll Islands, located in the Yukon River (Figure 3), downstream of the project site, are used for calving during the spring and as rearing habitat during the summer (Magrum 1994). The burn areas in the Minto Creek Valley, the banks of the Yukon River and the swamp lands below Minto Creek are often used by moose during the spring and summer.

#### **4.3.2 Caribou**

Two woodland caribou herds have the potential to occur within the Minto Mine area: the Klaza and Tachun. The range of the Klaza herd is located to the west, and population of this herd was estimated to be 650 animals in 2005 (Yukon Environment). The range of the Tachun herd is located to the east of the project site, on the eastern side of the Yukon River (Yukon Environment 2005). A Wildlife Key Area (WKA) for woodland caribou winter range was identified approximately 9 km to the east-northeast of the project area (Yukon Environment 2010). In 2005, the population estimate for the Tachun herd was 500 animals. A rutting season composition survey, that focused in the Tachun herd range, was conducted in 2007 and indicated that the count was much lower than previous years, but may have been a result of caribou congregating in areas where they were not detected, such as in the trees (Yukon Environment 2007).

Although the ranges for both the Klaza and Tachun herds do not overlap with the project area, caribou may still occasionally pass through, as documented by HKP during baseline surveys in 1994. No caribou were observed in the project area during the 2009 and 2010 aerial surveys conducted by Access Consulting Group (S. Keeseey, pers. comm.).

#### **4.3.3 Sheep**

Dall's Sheep are known to use habitat near the project area, particularly the Minto Bluffs along the Yukon River (O'Donoghue 2009). Although the access road to the Minto Mine passes near sheep habitat, sheep habitat within the project area itself is limited and sheep are not expected to occur in the project area for any extended length of time.

Between 2000 and 2009, the Government of Yukon, Department of Environment has conducted annual sheep surveys within close proximity of the Minto Mine site. The survey

area extends from the Minto airstrip downstream (north) along the Yukon River to Fort Selkirk (O'Donoghue 2009). Surveys have also been conducted opportunistically by air (in 1989, 1991, 1994 and 2000) and by boat (2000-2009). Between 2000 and 2008, sheep surveys of the Minto-Pelly Bluffs resulted in the observations of between 31 and 91 sheep annually; with the majority of observations being ewes, yearlings and lambs. During the 2009 survey, 97 sheep were observed, of which 34 were observed on the Minto Bluffs (which is located about 8 kilometres downstream of Minto, across the river from the Minto Mine site). This is the highest recorded population for this area. Most sheep observed during these surveys have been located on the Minto Bluffs, Split Mountain and Mount Hansen (O'Donoghue 2009).

Aerial sheep surveys were conducted in 1994, as part of the wildlife baseline studies conducted prior to the start-up of the Minto Mine. This survey focused on the cliffs on the north side of the Yukon River from Minto Landing. Unfortunately, the data from this survey was not included in the final report. This report did indicate that sheep were observed, but location(s) were not mentioned.

#### 4.3.4 Carnivores, Fur Bearers and Small Mammals

Fur and big game harvest statistics indicated the following species are expected to occur in the Minto project area: grizzly bear, black bear, coyote, gray wolf, red fox, wolverine, marten, least weasel, river otter, beaver, and lynx. Cougars may also have the potential to occur in the area as they are known to follow mule deer (Smith et al. 2004); however, the probability of an occurrence is considered to be low.

Of the species listed above, the following species have been observed, or sign of the species observed, on site: grizzly bear, black bear, gray wolf, lynx, river otter (HKP 1994, Capstone 2007, Capstone 2008).

The territorial estimates for grizzly and black bear populations in the Yukon are 6000 to 7000 animals and 10,000 animals, respectively (Yukon Environment 2010a). The Yukon Government (2009) has indicated that key habitat for black bears includes seasonally concentrated feeding areas, such as south aspect slopes containing sagewort, bearberry, and grassland habitat. Summer and fall feeding habitats typically consist of those areas that are productive for berries. Black bears have been observed in the project area on many occasions, including a sow with two cubs (HKP 1994, Capstone 2008).

Key habitat for grizzly bears includes areas where they concentrate seasonally, such as feeding areas, floodplains, and movement corridors. Important feeding habitat includes areas with high berry productivity and areas where salmon spawn (YTG 2009c). Although key habitat for grizzly bears has not been identified on site, they have been observed in the project area since the commencement of mine operations. Observations include a sow with two cubs (HKP 1994, Capstone 2007).

## 4.3.5 Birds

### 4.3.5.1 Raptors

Although numerous raptor species have the potential to occur in the project area, species that have been observed and documented in the project area include the red-tailed hawk (HKP 1994), peregrine falcon (Mossop, pers. comm. as cited in HKP 1994), and golden eagle (O'Donoghue, pers. comm.). It should be noted that only one aerial-based raptor survey was conducted as part of the Minto Mine baseline studies (HKP 1994).

High quality riparian cliff habitat for raptors exists along the Yukon River near the project site. A WKA for golden eagle summer nesting habitat has been identified approximately 3 km to the east of the project area (Yukon Environment 2010b). This WKA is primarily associated with the steep bluffs along the Yukon River and includes a buffer area. No cliff nesting raptor habitat has been identified within the project area itself. The access road to the Minto Mine, however, runs adjacent to potential nesting areas for cliff-nesting raptors, such as the golden eagle and peregrine falcon.

### 4.3.5.2 Waterfowl

Key habitat for waterfowl includes wetlands that are used as staging areas in the spring and fall, and for breeding and molting in the summer. Waterfowl are not known to use the Minto project area for any length of time, mainly due to the lack of suitable wetland habitat. A key habitat area, Wilczek Lakes, lies approximately 30 km east of the project site and is used for nesting and molting in the summer (YTG Fish and Wildlife Branch 1974). Waterfowl that may occasionally use the Minto Creek drainage include Canada goose, mallard, northern pintail, green-winged teal and American widgeon.

### 4.3.5.3 Game Species

Other game birds that have been observed or that have the potential to occur in the study area include grouse (spruce, ruffed, sharp-tailed) and ptarmigan (willow, white-tailed, and rock). Of the species of grouse that live in the Yukon, the sharp-tailed grouse is currently the only species of management concern. Sharp-tailed grouse have a limited distribution in the Yukon due to the lack of suitable habitat. Gravel outwashes with fairly stable aspen parkland habitat and wet sedge-hummock meadows after fire are considered suitable habitat for this species. Sharp-tailed grouse have been observed in the project area.



## 5.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Minto Explorations Ltd. and their agents. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Minto Explorations Ltd, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions are provided in Appendix A of this report.

## 6.0 CLOSURE

EBA Engineering Consultants Ltd. is pleased to provide Minto Explorations Ltd. with this Minto Mine wildlife baseline data summary. We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted,  
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## REFERENCES

- Access 2010. Sherwood Copper Wildlife Survey. Prepared for Capstone Mining Corporation.
- Canadian Amphibian and Reptile Conservation Network (CARNET). 2009. Reptile Information. Available at [www.carnet.ca](http://www.carnet.ca) [accessed on March 19, 2010].
- Capstone Mining Corporation. 2007. 2007 Wildlife Log for the Minto Mine (spreadsheet).
- Capstone Mining Corporation. 2008. 2008 Wildlife Log for the Minto Mine (spreadsheet).
- Capstone Mining Corporation. 2010. Minto, Yukon Project Summary. Available at [www.capstonemining.com](http://www.capstonemining.com) [accessed March 31, 2010].
- COSEWIC. 2009. Wildlife Species Search. Available at [http://www.cosewic.gc.ca/eng/sct1/index\\_e.cfm](http://www.cosewic.gc.ca/eng/sct1/index_e.cfm) [accessed on March 29, 2010].
- EBA Engineering Consultants Ltd. 2010. Minto Mine Environmental Baseline Ecosystems and Vegetation Report. Prepared for Capstone Mining Corporation, March 2010.
- Government of Canada. 2008. Species at Risk Public Registry Available at <http://www.sararegistry.gc.ca> [accessed on March 29, 2010]
- Government of Yukon, Community Services, Protective Services Branch, Wildland Fire Management (GYWFM). 2009. Yukon Fire History GIS Coverage and Metadata. Available for download from: [http://www.geomaticsyukon.ca/Yukon%20Coperate%20Spatial%20Data%20-%20page%202.html#Land and Natural Resources - Fire](http://www.geomaticsyukon.ca/Yukon%20Coperate%20Spatial%20Data%20-%20page%202.html#Land%20and%20Natural%20Resources%20-%20Fire)
- Government of Yukon. 2009. Yukon Species at Risk. Available at <http://www.environmentyukon.gov.yk.ca/wildlifebiodiversity/> [accessed on March 29, 2010].
- Hallam, Knight, Piesold (HKP) Ltd. 1994. Minto Explorations Limited, Minto Project: Volume II Environmental Settings. Prepared for Minto Explorations Ltd.
- Kellie, K.A. and R.A. DeLong. 2006. Geospatial survey options manual. Division of Wildlife Conservation, Alaska Department of Fish and Game, Fairbanks, Alaska, USA.
- Magrum. 1994. An impact assessment of the Minto Project. Memo from the Selkirk First Nations to the Northern Affairs Program.
- Minto Explorations Ltd. 1994. Initial Environmental Evaluation for the Minto Project.
- O'Donoghue, M, R. Ward, S. Westover, A. Reyner, J. Bellmore. 2008. Carmacks West Moose Management Unit. Summary of Early-Winter 2007 Moose Survey. Yukon Fish and Wildlife Branch, Department of Environment.

- O'Donoghue, M. 2009. Survey of Sheep along the Yukon River from Minto to Fort Selkirk and on Mount Hansen (GMS 3-20).
- Oswald, E.T. and J.P. Senyk. 1977. Ecoregions of Yukon Territory. Canadian Forestry Service and Environment Canada Report BC-X-164
- Sinclair, P.H., W.A. Nixon, C.D. Eckert, and N. L. Hughes (editors). 2003. Birds of the Yukon Territory. UBC Press, Vancouver, B.C.
- Smith, C.A.S., Mielke, J.C., and Roots, C.F. (editors). 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon Landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, 313, p.
- Stantec. 2010. Thor Lake Rare Earth Metals Baseline Project Environmental Baseline Report: Volume 6 – Wildlife Resources. Final Interim Report. Report prepared for Avalon Rare Metals Inc., Toronto, ON.
- Wilson, D.E. and S. Ruff. 1999. The Smithsonian Book of North American Mammals. UBC Press, Vancouver, BC.
- Yukon Bird Club. 2008. Checklist of Yukon Birds. Pamphlet produced with support from Yukon Environment and the Canadian Wildlife Service.
- Yukon Environment. 2005. Yukon Amphibians. Available at [www.environmentyukon.gov.yk.ca/viewing](http://www.environmentyukon.gov.yk.ca/viewing)
- Yukon Environment. 2005. Status of Caribou in the Yukon. Department of Environment Map ID ENV.009.
- Yukon Environment. 2007. Information for Decisions. 2007 Fish and Wildlife Inventory Program Project Summaries.
- Yukon Environment. 2010a. Yukon Mammals. Available at <http://environmentyukon.gov.yk.ca/wildlifebiodiversity/mammals.php> [accessed January 2010].
- Yukon Environment. 2010b. Wildlife Key Areas. Produced by the Wildlife Key Area Inventory Program. Environment Yukon, Habitat Programs

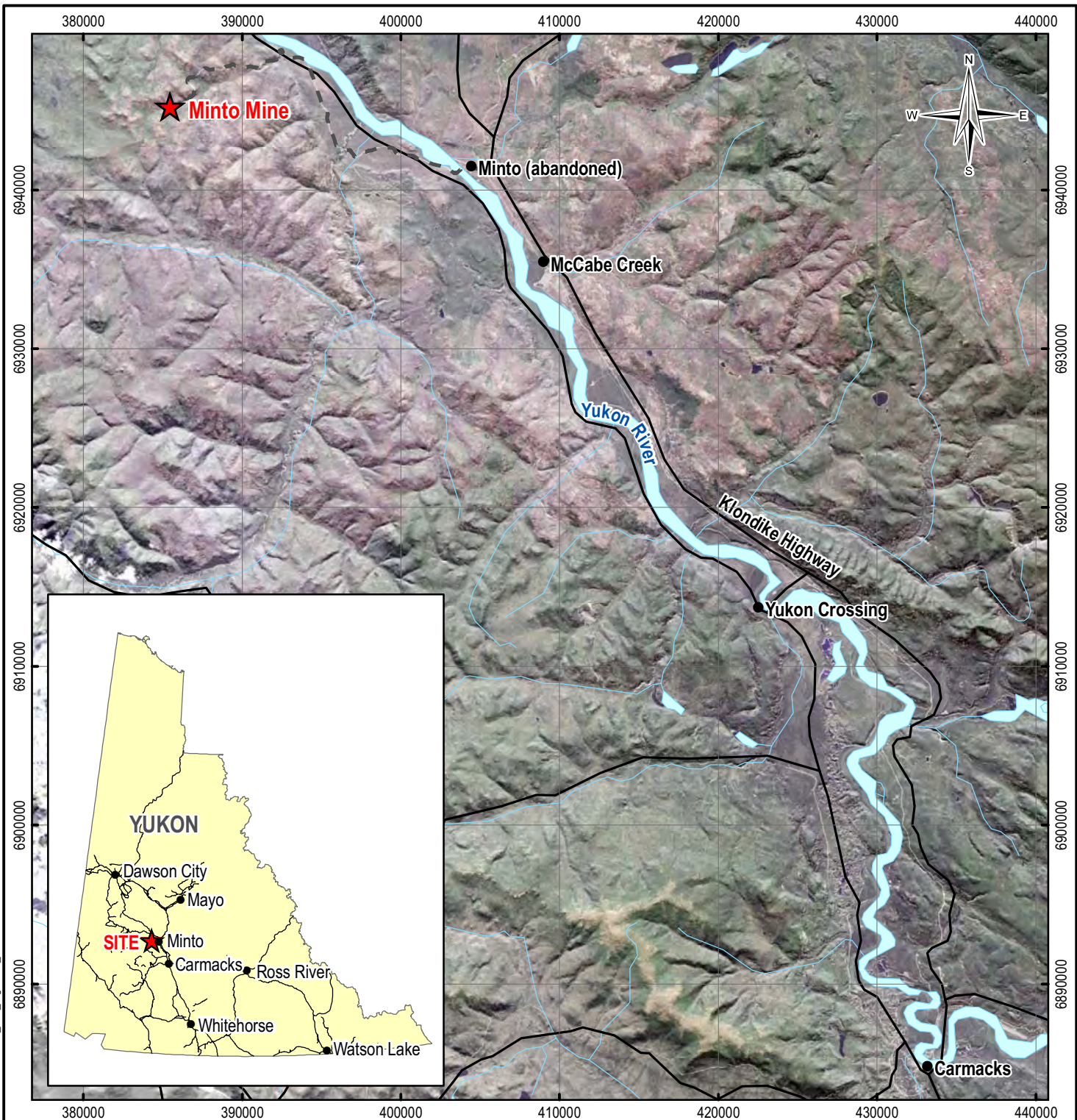
### Personal Communication

Keeseey, Scott. Access Consulting Group Ltd.

O'Donoghue, Mark. Northern Tutchone Regional Biologist. Environment Yukon.



# FIGURES



**LEGEND**

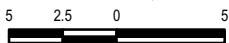
-  Minto Mine
-  Populated Place
-  Minto Mine Access Road
-  Road
-  River
-  Waterbody

**NOTES**

Base data source:  
Geomatics Yukon

**MINTO MINE  
2010 WILDLIFE BASELINE REPORT**

**Site Location**

PROJECTION UTM Zone 8	DATUM NAD83
Scale: 1:350,000	
	

FILE NO.  
W14101068\_023\_Figure01\_Site.mxd

PROJECT NO. W14101068.023	DWN MEZ	CKD LM	REV 0
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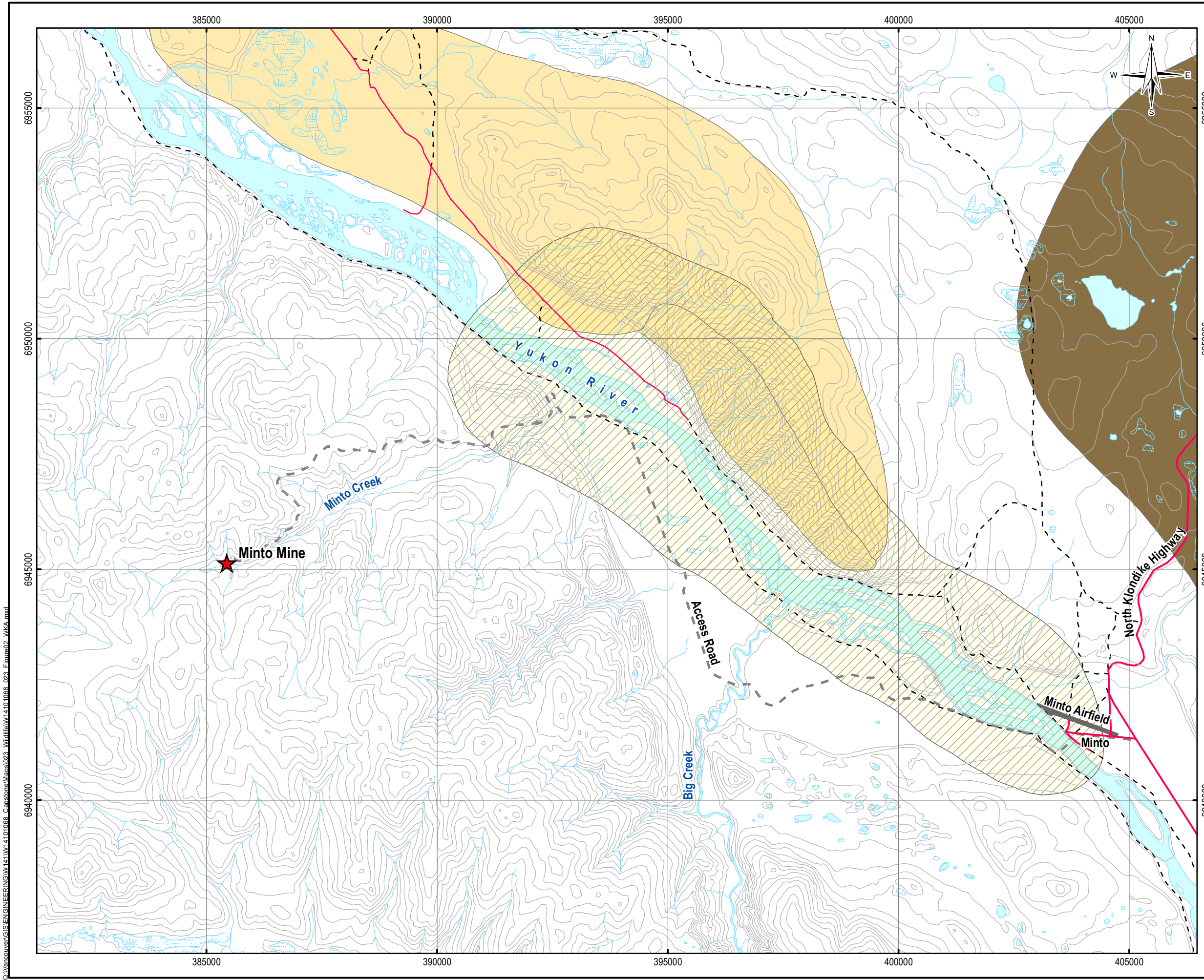
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**Figure 1**

**ISSUED FOR USE**





**LEGEND**

- Minto Mine
- Contour (100 ft)
- Minto Mine Access Road
- Road
- Limited Use Road
- Trail
- Runway
- Watercourse
- Waterbody
- Wetland
- Wildlife Key Areas**
- Golden Eagle - Summer Nesting
- Thinhorn Sheep Winter Range
- Woodland Caribou Winter Range

**NOTES**

Base data source:  
 NTS 1:50,000 (Sheets 115110 & 115111)  
 Wildlife Key Areas from Government of Yukon

**ISSUED FOR USE**

**MINTO MINE  
 2010 WILDLIFE BASELINE REPORT**

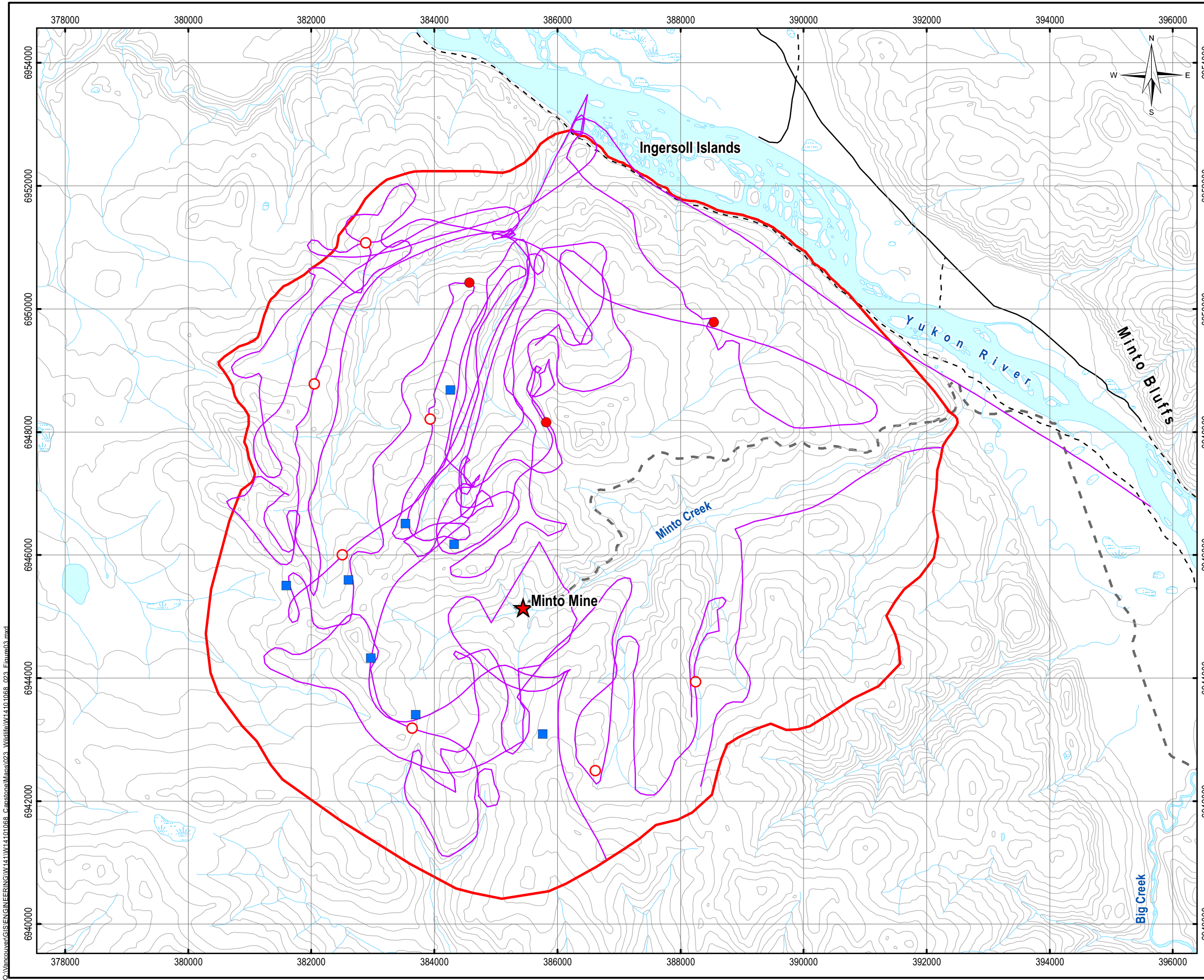
**Wildlife Key Areas**

PROJECTION UTM Zone 8	DATUM NAD83
Scale: 1:80,000	
FILE NO. W14101068_023_Figure02_WKA.mxd	 EBA Engineering Consultants Ltd.
PROJECT NO. W14101068.023	
OFFICE EBA-VANC	
DWN MEZ	CKD LM
DATE August 12, 2010	REV 0

**Figure 2**

C:\Vancouver\GIS\ENGINEERING\W14101068\_Canstone\Mapas\023\_Figure02\_WKA.mxd





**LEGEND**

- ★ Mine Site
- Winter 2009/2010 Survey Boundary
- Moose Observation (15-Dec-2009)
- Moose Observation (23-Feb-2010)
- Observation of Moose Tracks (23-Feb-2010)
- February 2010 Survey Route (Late Winter Moose Survey)
- Contour (100 ft)
- - - Minto Mine Access Road
- Limited Use Road
- - - Trail
- Runway
- Watercourse
- Waterbody
- Wetland

**NOTES**

Base data source:  
NTS 1:50,000 (Sheet 115110)

ISSUED FOR USE

**MINTO MINE  
2010 WILDLIFE BASELINE REPORT**

**2009/2010 Winter Wildlife Survey Results**

PROJECTION UTM Zone 8	DATUM NAD83		
Scale: 1:60,000			
FILE NO. W14101068_023_Figure03.mxd	EBA Engineering Consultants Ltd.		
PROJECT NO. W14101068.023	DWN MEZ	CKD LM	REV 0
OFFICE EBA-VANC	DATE August 12, 2010		



Figure 3

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# APPENDIX A

## APPENDIX A EBA'S GENERAL CONDITIONS

## GEO-ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these “General Conditions”.

### 1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA’s client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA’s Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

### 2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA’s instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

### 3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

### 4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.





**MINTO EXPLORATIONS LTD.**

*A Subsidiary of Capstone Mining Corp.*

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**Appendix B – Minto Mine Wildlife Photos, 2007 - Present**

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Figure 1 - Fox in brush along Access Road (2009)



Figure 2 Moose near Minto Mine camp (2008)



Figure 3 Porcupine near Yukon River, Minto Mine (2010)





Figure 4 Porcupine near rip rap at water retention dam, Minto Mine (2010)



Figure 5 Bear near water retention dam (2008)



Figure 6 Black bear near water retention dam (2009)