



North American Tungsten Corporation Ltd.

ISSUED FOR USE

**MACTUNG PROJECT
2008 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

W23101021.014

December 2008

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better solutions



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EXECUTIVE SUMMARY

North American Tungsten Corporation Ltd. (NATC) is considering opening a tungsten mine near McMillan Pass, YT. NATC retained EBA Engineering Consultants Ltd. (EBA) to continue baseline studies, originally initiated in 2005 and continued through 2007, at the Mactung Property. Throughout this study, the wildlife baseline program was designed to target woodland caribou, moose, Dall's sheep, grizzly bear, raptors, and wetland birds; using both aerial and ground-based surveys. For 2008, the wildlife baseline study program was expanded to address a larger baseline study area to accommodate a new proposed access road route, located to the southeast of the existing

Aerial ungulate surveys were conducted on July 14 (post-calving survey) and October 6 (rut/post-rut survey), 2008. The aerial raptor survey was completed on July 16, 2008. Wetland identification and wetland bird surveys, which include both an aerial reconnaissance survey and a ground-based survey, were completed on July 16, 2008.

Caribou composition and abundance were the focus of the ungulate aerial surveys. During the post-calving surveys, 307 Caribou were observed in 33 groups. Rut surveys, conducted in October, resulted in the observation of 14 caribou in two groups. Incidental caribou observations were also recorded throughout the 2008 program. A total of 496 caribou were recorded in the study area during the 2008 program.

Observations of moose were recorded during the aerial ungulate surveys and as incidental observations throughout the survey season. In total, EBA observed 34 moose. No moose were observed during the July aerial survey and eight moose were observed during the October aerial survey. Twenty-six moose were observed as incidental observations (6 observed in July, 10 in September and 10 observed in October).

Aerial raptor surveys resulted in the observation of two golden eagles and a number of unused nest sites and perch sites. An additional 17 raptor observations (13 golden eagles; one northern hawk owl; one rough-legged hawk; one bald eagle and sign of gyrfalcon activity) were recorded during the summer of 2008.

Twenty six wetlands were identified during the wetland and wetland bird surveys. Of these, two were classified as fens and the remainder were classified as shallow water wetlands. Twelve wetland bird surveys were conducted which resulted in the observation of 198 birds among 27 species.

Other wildlife observations during the 2008 program include one Dall's sheep, two wolves and 13 grizzly bears.



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1.0 INTRODUCTION

North American Tungsten Corporation Ltd. (NATC) retained EBA Engineering Consultants Ltd. (EBA) to continue baseline studies, originally initiated in 2005 and continued through 2007, at the Mactung Property, located approximately 100 km North of Ross River, Yukon (Figure 1). For 2008, the wildlife baseline study program was expanded to address a larger baseline study area to accommodate a new proposed access road route, located to the southeast of the existing property.

The scope of the wildlife baseline program, as outlined below, was designed to address the anticipated regulatory requirements for the proposed Mactung development. The 2008 program consisted of ungulate, breeding bird, raptor, and waterfowl studies. Other complementary environmental studies, such as fisheries, hydrology, and water quality studies, were conducted concurrently and the results are presented in separate baseline reports.

1.1 BASELINE STUDIES BACKGROUND

In October 2005, environmental baseline studies were initiated at the Mactung property to document wildlife in an area of approximately 800 km² surrounding the proposed development project. This area was defined and used as the wildlife regional study area (RSA) for EBA's 2005, 2006 and 2007 wildlife studies (EBA 2006, 2007, and 2008a). In 2008, a new access road route for the mine development was proposed. A portion of the proposed road is located outside the existing 2005-2007 RSA where it connects to the North Canol Road. The 2008 baseline studies focused on the area surrounding the proposed road footprint (Figure 2).

1.2 OBJECTIVES

The overall objective of the 2008 wildlife baseline studies program was to document and characterize wildlife and wildlife habitat use within the project area, focusing on the proposed access road route. This data will be used to establish baseline conditions for the Mactung Project assessment and regulatory submissions, and to assist in forming the basis for future monitoring programs associated with project implementation and operation.

Specific objectives for EBA's 2008 studies were to:

- Describe the abundance and distribution characteristics of major wildlife species within the project area and vicinity.
- Identify and describe periods of habitat use in the project area and vicinity.
- Identify and describe key habitats in the project area, and their seasonal usage.

2.0 PROJECT SCOPE

2.1 EXPANSION OF STUDY AREAS

EBA's RSA for the previous (2005-2007) baseline studies focused on the proposed mine site, and covered an area of ~800 km² (Figure 2). In 2008, a new study area was established along the proposed access road. EBA delineated this study area as extending 10 km to each side of the centerline for the entire length of the proposed road. This new study area overlapped with a portion of the original RSA (approximately 280 km²), and expanded the RSA by approximately 550 km². The revised RSA covers approximately 830 km² (Figure 2).

2.2 2008 BASELINE STUDIES

In order to meet the objectives outlined in Section 1.2 above, the 2008 program encompassed field studies to target woodland caribou (*Rangifer tarandus caribou*), moose (*Alces alces*), Dall's sheep (*Ovis dalli*), grizzly bear (*Ursus arctos*), breeding birds, and raptors. This program included the following targeted and non-targeted components:

Aerial Surveys:

Post-Calving Survey – An aerial survey that targeted caribou in their summer range, and was also used to assess moose, Dall's sheep, grizzly bears, raptors, and other non-targeted species.

Rut Survey – An aerial survey that targeted caribou rutting habitat use, and was also used to assess moose, Dall's sheep, grizzly bear, raptors, and other non-targeted species.

Raptor Survey – an aerial survey that focused on locating raptors, raptor nests, and perches within the study area.

Waterfowl and Wetland Survey – an aerial survey that focused on documenting the distribution of wetlands in the RSA, as well as the presence of waterfowl within those wetlands.

Ground-based Surveys:

Waterfowl and Wetland Surveys – a ground-based survey that documented the characteristics of area wetlands, as well as the resident and transient waterfowl species using them.

3.0 METHODS

As described above, the 2008 wildlife baseline field program focused primarily on ungulates, waterfowl, wetland birds, wetland habitats and raptors. Components of this program included aerial and ground-based surveys completed in July and aerial surveys completed in October 2008. A total of five days of directed wildlife studies were conducted in July and October of 2008 (Table 1). Additionally, incidental wildlife observations were recorded

during several of EBA's other baseline study components throughout the 2008 summer season (July, September and October).

3.1 UNGULATES

Aerial ungulate surveys were conducted on July 14 and October 6th 2008. Although the surveys primarily focused on the distribution and abundance of caribou and moose, all wildlife observations were recorded. EBA biologists completed the July and October surveys using a Robinson R-44 helicopter. During the surveys, a navigator/surveyor (front left), second and third surveyors/recorders (rear left and right) recorded all visible observations and wildlife sign observations. When possible, the pilot also contributed to wildlife observations. Surveys were conducted on days where visibility was appropriate and lack of cloud cover allowed for transects to be flown in mountainous terrain.

The July survey corresponded primarily to the post-calving period for caribou and post-lambing period for Dall's sheep. During the targeted time, these ungulates are expected to have settled into their summer ranges.

The rut/post-rut period was surveyed in early October for caribou and moose, providing additional information on the distribution of moose post-rut habitat use and the degree to which Caribou may be using habitat in the RSA for the rut.

EBA's 2008 ungulate survey methods were consistent with those used by EBA in 2005, 2006 and 2007 surveys (EBA 2006, 2007, and 2008a), which employed a transect based inventory procedure similar to that used for wildlife surveys in the Mactung area by Kershaw and Kershaw (1983).

Each ungulate survey was based on a target of 15 east–west oriented transects ranging from 14 to 33 km long and spaced 2 km apart, resulting in a target linear effort of 380 km within the 830 km² RSA (Figure 2). Transects were flown in a straight line, although flight patterns sometimes deviated due to mountainous terrain. As a consequence, circular paths to regain or drop elevation were used, which made it difficult to maintain consistent effective survey widths in mountainous areas. Although this deviated from the straight line transect, this allowed EBA to reduce survey bias between species occupying different elevation within the RSA. A handheld GPS was used to record observations and to record survey tracks (Figure 3 and 4). For each observation, group size, composition (sex or age), time, and local habitat were recorded. From this data, relative abundance indices such as number of animal per hour and animal per kilometre were calculated. These indices were selected for 2008 and previous Mactung aerial survey data as they help avoid bias that is associated with surveying mountainous terrain.

3.2 RAPTORS

The objective of EBA's 2008 raptor survey was to identify the presence of cliff-nesting raptors and their breeding territories within the RSA. This survey was conducted within areas adjacent to the proposed road alignment, and focused on suitable habitat consisting of

stable cliffs, ledges, overhangs and other steep mountainous terrain. Raptors such as Peregrine Falcon (*Falco peregrinus*), Gyrfalcon (*Falco rusticolus*), Golden Eagles (*Aquila chrysaetos*) and Rough-Legged Hawk (*Buteo lagopus*) were the primary focal species. Some nesting habitats identified during previous years were also revisited to confirm their use for nesting activities. The survey route was planned prior to survey using a 1: 50,000 map to determine areas with potential nesting habitat.

The raptor survey was conducted on July 16, 2008 using a Robinson R-44 helicopter. The survey crew consisted of the pilot, a left front-seat navigator/observer and a left rear-seat observer/recorder. Potential nesting areas were initially scanned during a slow fly-by of suitable habitats at a distance of approximately 100–150 m from the mountain side. Any bird activity and nesting indicators such as nests, eggs, fledglings, perch sites, whitewash (guano), and orange lichen were recorded and geo-referenced. Where necessary, further passes were used to confirm observations or to cover vertically extensive terrain. In addition to those targeted observations recorded during the raptor survey, all incidental raptor observations made during EBA's related baseline studies in the area were also recorded.

3.3 WETLAND IDENTIFICATION AND WETLAND AREA BIRD SURVEYS

EBA biologists performed a wetland survey on July 14, 2008 for waterfowl, shorebirds and passerines. The survey area consisted of a corridor extending roughly 2 km laterally along the entire length of the proposed access road footprint (~190 km²). Wetland and waterfowl surveys consisted of two components: 1) an aerial reconnaissance survey and 2) a ground-based survey. The aerial reconnaissance survey was conducted using a Robinsons R44 helicopter. During this survey, wetlands were identified from the air and were classified using the Canadian Wetland Classification system (Environment Canada, 2006) into one of the wetland types from the following five categories: fen, bog, shallow water, marsh and swamp. Also, the presence of waterfowl was noted, and waterfowl density and species composition was estimated where possible.

Next, ground-based surveys were conducted at a portion of the earlier identified wetlands. Ground-based surveys consisted of further classifying wetland types, and recording several visually estimated habitat features including:

- Percentage of open water;
- Bank slope and abundance of mud flats; and,
- Vegetation cover (shrub/herb) and dominant species (% cover).

All bird observations were recorded during a one hour survey with two observers. Birds were identified by sight (using a spotting scope) and/or song/call. The species, sex, age, number of individuals and location (GPS location) were recorded. Breeding territories were confirmed through the presence of eggs, chicks, or from behaviour (such as an agitated pair). Presence of fish and wildlife were recorded during this survey.

3.4 OTHER WILDLIFE

In addition to those species specifically targeted above, all other wildlife observations were recorded during the 2008 field program, including work for other disciplines (i.e. fisheries, aquatics, hydrogeology, etc.). For each observation, species, sex, habitat and a GPS location were recorded when possible.

4.0 RESULTS

Results of the 2008 wildlife study program are presented in the following sections according to target species or group. Incidental observations for targeted species are presented in the species/group specific sections while the results of all observations of non-targeted species are presented in Section 4.4.

Background information for the focal species, such as wildlife behaviour, preferred habitats and seasonal movements, has been previously provided in the 2006 Mactung Wildlife Report (EBA 2007). The 2008 report presents only the data collected during the 2008 wildlife surveys.

4.1 UNGULATES

4.1.1 Woodland Caribou (Northern Mountain Ecotype)

Woodland caribou, Northern Mountain Ecotype (*Rangifer tarandus caribou*), form 23 distinct herds in the Yukon (Caribou Management Team 1996). The proposed Mactung mine site lies within the range of the Redstone herd.

EBA conducted two aerial surveys to target the caribou post-calving and rut periods (Figures 3 and 4).

The post-calving survey was conducted on July 14, 2008. Weather and visibility during this survey were acceptable, with moderate cloud cover (70%), occasional slight drizzle and minimal snow cover (<5%). Average temperature during the survey was 9°C, with a light East wind. The survey was conducted between 11:57 and 21:00, with 6.78 hours of actual survey time.

The rut survey was conducted on October 6, 2008. Although not optimal, weather conditions were acceptable for surveying with cloud cover ranging from 70 to 100%, and ceiling at approximately 2400 m, temperatures ranging from -1 to -5°C and wind speed ranging from 8 to 24 kph coming from the southeast. Light to heavy snow and dense fog were occasionally encountered throughout the survey. This survey had previously been attempted on October 1, 2008, but was postponed due to inclement weather, namely high winds (in excess of 70 kph).

Caribou Abundance

In total, 496 caribou were observed within the RSA during the 2008 baseline studies (Table 2). Of these observations, 321 caribou were observed in the RSA during the aerial surveys and 175 were incidental observations. During the post-calving survey (July), 307 caribou were observed in 33 groups (Figure 5). Only 14 caribou, in two groups, were recorded during the aerial rut/post-rut survey in October (Figure 6). The 175 caribou observed incidentally consisted of 19 groups recorded throughout both the RSA and the proposed mine area during July, September and October of 2008. Although caribou were typically observed in groups, a few solitary caribou were observed throughout the season.

Caribou observations were lowest during the rut/post-rut survey (both incidental and on transect) and were most frequently observed during post-calving (both incidental and on transect) and in September (incidental only). Sex and age were determined in the field when possible to allow for calculation of ratio indices, however only those animals successfully aged and sexed during transect surveys were included in the indices, as indicated below.

Caribou Composition

During the post-calving survey conducted in July, caribou group size ranged from 2 to 49 with an average group size of 11 animals (Photo 1). Five solitary caribou were observed during this time. Seventy-nine calves were recorded mainly in mid- to high-alpine habitat, relating to a ratio of 24 calves per 100 cows. Only nine bulls were observed on transect, giving a sex ratio of 3 bulls/100 cows (Photo 2). Most caribou observed during this survey were occupying predominantly alpine/subalpine habitat between 1100 m and 2300 m asl (above sea level). It should be noted that the lower valleys in the RSA extend down to an elevation of 1100 m and the airstrip is at 1200 m.

No aerial ungulate surveys were conducted in September. However, during this time, EBA was conducting fisheries and aquatics field surveys in and around the RSA, and recorded a total of 44 caribou. Group size at this time varied from two to 10 animals (mean group size of four), and three solitary animals were observed (Table 2).

The rut/post rut survey conducted on October 6, 2008 indicated a greatly reduced group size and reduced number of caribou when compared with the earlier survey. Fourteen (14) animals were observed on transect in two groups (with group sizes of six and eight animals) (Figure 6). As expected, the bull/cow ratio was higher than in summer surveys, with 23 bulls per 100 cows observed (Table 3). No calves were observed either on transect or as incidental observations during the October surveys. All animals were occupying vegetated alpine and subalpine habitats between 1100 m and 2300 m asl.

Abundance Indices

For comparability to previous work completed in the area, EBA calculated relative abundance indices based on a straight transect length of the survey route. However, in reality the mountainous terrain resulted in flight paths that often covered more distance than would be covered on flat land (the helicopter was required to go around mountain peaks or to

circle down into the valleys to allow observers to get the best view of the landscape). The resulting density estimates may be conservative in over-estimating the actual number of animals in the area. During the post-calving surveys, a relative abundance of 45.3 caribou/hour and 0.81 caribou/km (based on survey time of 6.78 hours) were observed. The relative abundance for the rut/post-rut survey was 2.9 caribou/hour and 0.04 caribou/km (based on survey time of 4.81 hours) (Table 3).

4.1.2 Moose

During the 2008 terrestrial wildlife program, the majority of moose observations occurred as incidental observations while travelling between sites in the RSA. Moose are not considered a target species during summer surveys because they are often in forested habitats and it is difficult to consistently observe moose when there is no snow on the ground. However, all moose encountered during the transect surveys, including number of individuals and composition, were recorded. A total of 34 moose were observed throughout the 2008 season (Table 4).

No moose were observed during the post-calving surveys conducted on July 14, 2008. Three moose were observed as incidentals during the wetland and waterfowl surveys and three moose were observed by the pilot during helicopter transport time (Figure 7). All July observations were of single animals, mostly bulls (four bulls, one cow and one unidentified) which were mainly located in valleys within the proposed road area (Table 4).

While working in the RSA in September, incidental observations were made of seven cows, two bulls and one calf (a total of ten moose) (Photo 3). Two bulls were observed using a mineral lick during the attempted survey on October 1 (Table 4).

During the rut/post-rut aerial survey conducted on October 6, 2008, 16 moose were observed (eight on transect and ten incidentals) (Figure 7). Most observations consisted of one or two animals, however, one group of five animals was noted (two bulls and three cows). The moose observed during this survey were noted in a mixture of habitat types including vegetated subalpine-willow slopes and in scrub birch – lichen willow – sedge habitats located in the subalpine valleys. Calculated moose density for the rut/post rut survey was 1.66 moose/hour or 0.021 moose per kilometre (Table 5).

4.2 RAPTORS

EBA conducted the aerial raptor survey on July 16, 2008 to document raptor and raptor nesting within the vicinity of the proposed access road footprint. Due to intermittent helicopter availability, the raptor survey was split into four individual efforts which totalled 3.5 hours in duration.

During the survey, only two golden eagles were observed. One gyrfalcon nest (identified during 2007 baseline studies) was re-visited and found to be unused, and several other unused nests and perch sites were identified (Table 6). The majority of nests observed were believed to have been common raven nests.

As with other Mactung terrestrial wildlife programs, all incidental observations of raptors were recorded. Throughout the season, a total of 17 observations amongst four species were recorded (Table 6, Figure 8). Golden eagle was the most common raptor species observed in the Mactung project area, with 13 observations made in 2008. Although no active nests were found, six juveniles were observed within the study area. Nesting signs from gyrfalcon were also present (such as scrapes and perch sites), however no active nests were identified during the 2008 surveys. A northern hawk owl (*Surnia ulula*) and a rough-legged hawk were also observed in early September and early October respectively. A single immature bald eagle (*Haliaeetus leucocephalus*) was observed in the study area in July (Table 7).

4.3 WETLAND IDENTIFICATION AND WETLAND AREA BIRD SURVEY

4.3.1 Wetlands

Twenty-six (26) wetlands were located during the aerial reconnaissance along the proposed road corridor. Of these, two were characterized as fens and the remainder were classified as shallow water wetlands (Figure 9). The shallow water wetlands identified included beaver ponds, oxbow ponds and flooded kettles. A total of nine wetlands were further assessed from the ground to refine the habitat description, record bird species presence/usage, and dominant vegetation species. Grasses and sedges were the most dominant vegetation species in the wetlands surveyed. Willow (*Salix* spp.) and dwarf birch (*Betula pumila*) were also highly abundant. Black spruce (*Picea mariana*), sphagnum (*Sphagnum* spp.) and other aquatic species were also commonly found vegetation types. Overall, wetlands had an average of 67% open water, and the majority of the soils were organic. Vegetation and Ecosystem Land Classification (ELC) was completed during the summer of 2008 within the proposed road corridor and provided further details on the ecosystem types present throughout the study area. This information is presented in a separate report (EBA 2008b).

4.3.2 Wetland Area Bird Survey

During the aerial reconnaissance survey, 46% of the wetlands surveyed (12 of 26) along the proposed road contained waterfowl or shorebirds (Figure 9). During ground-based surveys, a total of 198 individual birds among 27 species were observed. The most numerous species observed during these surveys were the green-winged teal (*Anas carolinensis*), scaup spp., red-necked phalarope (*Phalaropus lobatus*) and American widgeon (*Anas americana*) (Table 8). Based on the observation of active nests, nestlings or an agitated pair of birds, American widgeon, Bonaparte's gull (*Larus Philadelphia*), herring gull (*Larus argentatus*), horned grebe (*Podiceps auritus*), green-winged teal and wandering tattler (*Tringa incana*) were all assumed to be actively nesting in the RSA. Ten birds were identified as incidental observations.

Other shorebirds of interest that were observed using wetlands in the RSA include the short-billed dowitcher (*Limnodromus griseus*), yellowleg spp., Wilson's snipe (*Gallinago delicata*), solitary sandpiper (*Tringa solitaria*), spotted sandpiper (*Actitis macularia*) and least sandpiper (*Calidris minutilla*).

4.4 OTHER WILDLIFE

In addition to the focal species targeted during the 2008 wildlife program, numerous incidental observations were recorded.

Dall's Sheep

One Dall's sheep was observed as an incidental during the July 14 ungulate aerial surveys. The ram was occupying a similar location to one observed in 2007, roughly 3 km southwest of camp (Figure 10). The site is located above a steep rock slope consisting of mid-alpine heath – fescue habitat with a northern aspect.

No other observations of Dall's sheep were made during the October aerial survey or during other wildlife programs throughout the 2008 survey season.

Wolves

EBA observed a single wolf (*Canis lupus*) near the Mactung camp area and another along the proposed road corridor on an alpine ridge.

Grizzly Bear

EBA observed 13 grizzly bears in the study area throughout the 2008 survey program (Table 10). On July 14, EBA observed a sow with two yearlings in the southeast corner of the study area. On September 5, a sow with three cubs and a sow with one cub were observed foraging in the area down slope (and to the southwest) of the proposed mine site (Photo 4). On October 6, a bear was observed foraging on an alpine slope and a sow with one yearling was observed traversing an alpine slope. All grizzly observations are depicted in Figure 10. Potential grizzly dens, numerous diggings and scats were observed throughout the study area and are also shown in Figure 10.

Small Mammals and Furbearers

Incidental observations of the following were also made: arctic ground squirrels (*Spermophilus parryi*), beaver (*Castor canadensis*) (Photo 5), collared pikas (*Ochotona princeps*) hoary marmot (*Marmota caligata*) and snowshoe hare (*Lepus americanus*).

5.0 DISCUSSION

The primary objective of the 2008 wildlife program was to document and characterize wildlife distribution and habitat use within the proposed Mactung mine development area. This program is complementary to the 2005 to 2007 baseline wildlife programs which focused primarily on the proposed mine development area.

5.1 UNGULATES

5.1.1 Woodland Caribou (Northern Mountain Ecotype)

The proposed Mactung mine site lies within the summer range of the Redstone herd. Limited population size information is available for the herd. However, in 1982, the Redstone herd was estimated to contain between 5,000 and 10,000 caribou (Caribou Management Team 1996). The range of this herd occurs mainly in the Northwest Territories, extending towards the Mackenzie River (Yukon Government 2008). However, the majority of harvesting occurs in the MacMillan Pass area (Caribou Management Team 1996). The northern mountain caribou ecotype is of Special Concern (May 2002; COSEWIC) and is on Schedule 1 of the *Species at Risk Act* (SARA).

EBA's 2008 post-calving and post-rut surveys suggest that caribou distribution and abundance within the RSA are generally similar to that noted in earlier studies for the area adjacent to the proposed mine development. During 2008, EBA observed 307 caribou during the July survey, and only 14 caribou during the October survey (Table 2, Figures 5 and 6). During post-calving surveys, calves were found to be more numerous than during EBA's 2007 surveys in an adjacent area, with 79 calves observed compared to 22 calves in 2007 (EBA 2008a). The observed calf: cow ratio among all 2008 caribou observations was calculated to be 21.9/100, and 26.4/100 among targeted observations in the July survey only. The observed ratio of 3 bulls/100 cows during the July survey was typical for the area, as EBA has observed many bulls to be separated from maternal groups during the summer, often observed in valleys.

Average group size was larger in 2008 than in 2007, having a mean of 9 animals per group, with some individual groups containing up to a maximum of 49 caribou. The 2007 survey recorded average group size ranging from six animals in July, 1.5 animals in August, and six animals in September (EBA 2008a).

During the rut survey, all caribou observed were using vegetated alpine and subalpine habitats. The bull-cow ratio increased between summer and fall surveys, no calves were observed during the latter, suggesting that many maternal or non-breeding groups were not present. A lower relative density also supported this observation, as calculated density was reduced from 0.81 caribou/km² to 0.04 caribou/km² when compared to the July survey (Table 3). The lack of observations of caribou within the Mactung wildlife study area during the rut/post rut period survey supports previous results that suggest fall migration out of the area had begun as of the survey time, and that the majority of the Redstone herd breeds outside of the project area.

5.1.2 Moose

Of the 30 moose observations in 2008, 14 observations took place during the rut/post rut period (Figure 7). Generally, recruitment in the Yukon ranges from 5 to 40 calves per 100 cows, with a range of 10-20 being considered adequate for a stable population (Moose Management Team 1996). Among fall aerial survey observations, 20 calves/100 cows were

observed in the RSA (Table 4). It should be noted that the ungulate aerial surveys were not a structured compositional survey for moose.

Throughout the survey season, most moose were observed in scrub birch – lichen willow – sedge habitat of the subalpine valleys. Individuals were also observed near a mineral lick east northeast of the study area on numerous occasions. Areas of relatively high use for moose are located in the valleys of the Hess River Tributary, as well as Tributaries A/E, similar to observational trends from earlier years (EBA 2007, 2008a).

5.1.1 Dall's Sheep

One single ram was observed during the July 14 survey, 3 km southwest of camp. No additional observations of Dall's sheep were made during the 2008 studies. The limited aerial survey observations during the 2008 baseline study season further support EBA's earlier findings that the study area does not constitute or is not used as valued Dall's sheep lambing or summer range habitat.

5.2 RAPTORS

The majority of raptor observations made during 2008 program were of golden eagles (13 of 17), a trend similar to previous years (EBA 2007, 2008a). During the raptor survey on July 14th, no active nests were found but several older gyrfalcon and golden eagle nests/scrapes and other potentially valuable habitats were identified. Numerous immature golden eagles (6) were observed throughout the season, suggesting potential nesting in the RSA or beyond (Figure 8). None of the actual species observed during 2008 studies are protected under Federal or Territorial legislation (Table 7).

5.3 WETLAND IDENTIFICATION AND WETLAND AREA BIRD SURVEY

5.3.1 Wetland Identification

Twenty-six wetlands (both open water and fens) were identified within the proposed Mactung access road corridor, providing breeding and foraging habitat for waterfowl, shorebirds and avian species during the migration or nesting periods. Most of these identified habitats were concentrated along the first section of access road (leading from the North Canol Road to roughly km 17.5), and were associated with the lower elevation and wide valley in that area. Toward the mine footprint, the road traverses narrower, higher elevation habitat which is characterized by steeper, more readily drained terrain (Figure 9).

5.3.2 Wetland Area Bird Survey

EBA identified generally good quality habitat for waterfowl, water birds, or shorebirds occurring in wetlands along the proposed road corridor. 27 species of birds were identified among 12 wetlands (Figure 9). While no nests were found, both waterfowl and shorebirds appear to be using several areas for nesting. Either apparent mated pairs or nestlings of six species were observed during the survey, while evidence of the remaining species was

limited to feeding or presence only. Overall, the density of both suitable wetlands and the species within them as observed by EBA was moderate, and does not appear to represent key or otherwise limiting habitats within the greater RSA.

5.4 OTHER WILDLIFE

Wolves were observed on two occasions in the vicinity of the mine camp as well as along the proposed road during aerial surveys. Hoary marmot and collared pika inhabit rocky microhabitats, located below camp, in alpine and subalpine zones. Arctic ground squirrel was common and numerous throughout most of the project area where vegetation is present. Beaver as well as snowshoe hare were also observed in the project area (Figure 10).

EBA's observations of grizzly bears were primarily incidental in nature, and were recorded through the course of various baseline study components in 2008. Observations of grizzly bears in 2008 occurred primarily above the treeline in herbaceous-dominated valleys and alpine slopes, habitat similar to that observed in 2006 and 2007 (EBA 2007, 2008a). Overall, occurrence of grizzly bears or their sign appeared similar in characteristic to that observed in the proposed mine area.

6.0 QUALIFICATIONS OF CONTRIBUTORS

Mr. Christopher Jastrebski, M.Sc., R.P.Bio., P. Biol. coordinated and conducted the 2007 baseline studies program. Mr. Jastrebski is a biologist with EBA's Whitehorse Environment Group, and has over eight years of professional experience. Mr. Jastrebski has been involved in numerous baseline study programs in the north, as well as research programs focusing on mammals, avifauna, and biodiversity indicators.

Ms. Audrey Sanfaçon, B.Sc., contributed to the data analysis and report production for the 2008 wildlife baseline studies program. Ms. Sanfaçon is a biologist with EBA, and has over 5 years of professional experience in the natural sciences field. Ms. Sanfaçon has been involved in conducting numerous species inventories and habitat assessments, as well as other aspects of baseline study programs.

Ms. Lea Menzies, B.Sc., B.I.T., A.Sc.T., conducted portions of the baseline assessment and contributed to the production of the report for the 2008 wildlife baseline studies program. Ms. Menzies is a biologist with EBA, and has over 5 years of professional experience in the natural sciences field. Ms. Menzies has been involved in numerous wildlife related projects for a variety of sectors including mining, forestry, wind farms, and industrial and residential development. She has specialized in wildlife habitat suitability assessments and species at risk monitoring and inventory.

Mr. George Carlson, M.Sc., C.W.B.[®] provided technical review of the 2008 wildlife baseline report. Mr. Carlson is a Senior Ecologist at EBA with over 30 years of experience in multiple areas of natural resource assessment and management. He is a Certified Wildlife Biologist[®] (CWB) in the United States and specializes in environmental impact assessment, wildlife-habitat relationships, habitat assessment/modeling, watershed assessment, sustainable use applications, biodiversity monitoring, protected species, and managing strategic project teams to provide unique solutions to resource issues.

7.0 LIMITATIONS AND CLOSURE

This report and its contents are intended for the sole use of North American Tungsten Corporation Ltd. (NATC) and its 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 NATC, 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 and in the General Conditions included in this report.

The observations, information, and interpretations presented in this report are based on information collected during baseline studies at the site during the time of field surveys, from other background information reviewed, and on the field conditions experienced at the project site during survey components. The best possible professional effort has been made to interpret this data based on other existing data.

EBA is pleased to present North American Tungsten Corporation Ltd. with this 2008 wildlife baseline studies report for the Mactung Mine. This report provides information regarding the abundance, distribution, and habitat use of various wildlife species in the Mactung area, and has been prepared according to current professional standards.

We trust that this report meets your requirements at this time. If you have any questions or require additional information, please contact the undersigned.

Respectfully Submitted,
EBA Engineering Consultants Ltd.



Chris Jastrebski, M.Sc., R.P.Bio., P.Biol.
Biologist, Natural Sciences Team Leader
Whitehorse Environment Group
Direct Line: 867.668.2071 ext. 243
cjastrebski@eba.ca

A handwritten signature in blue ink, consisting of a series of loops and a long horizontal stroke extending to the right.

George Carlson, M.Sc., CWB®
Senior Ecologist
Kelowna Environment Group
Direct Line: 250.862.4832 x236
gcarlson@eba.ca

REFERENCES

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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.



TABLES



TABLE 1. SUMMARY OF 2008 MACTUNG WILDLIFE BASELINE STUDY FIELD COMPONENTS AND EFFORT

Dates	Number of Days	Purpose of Visit
July 14-16, 2008	3	Aerial ungulate surveys, waterfowl surveys, aerial raptor surveys
October 1&6, 2008	2	Aerial ungulate surveys (attempted survey and completed survey)

TABLE 2. SUMMARY OF CARIBOU OBSERVATIONS DURING 2008 BASELINE STUDIES

Number of Caribou Observations	July	September	October	Total Observations
On Transect During Aerial Surveys	307	N/A	14	321
Incidentals, Including Off-transect during Aerial Surveys	131	44	0	175
Total	438	44	14	496

TABLE 3. SUMMARY OF 2008 CARIBOU RELATIVE DENSITY AND ABUNDANCE INDICES

	July Survey*	October Survey**
Caribou Observations		
Number of Caribou Observed on transect	307	14
Composition		
Calves per 100 cows	24	0
Bulls per 100 cows	3	23
Relative abundance Indices		
Density estimate (animals/km ²)	0.81	0.04
Caribou per Hour	45.3	2.9
Caribou per Kilometer	0.81	0.04

* assuming approximate survey time of 6.78 hours and approximately 380km of straight line transects flown.

**assuming approximate survey time of 4.81 hours and approximately 380km of straight line transect flown

TABLE 4. SUMMARY AND COMPOSITION OF THE 2008 MOOSE OBSERVATIONS IN THE MACTUNG STUDY AREA							
Month	Total	Bull	Cows	Calves	Unknown	Survey type	Incidental
July	1	1				Pilot's Incidentals	✓
July	1	1				Pilot's Incidentals	✓
July	1		1			Pilot's Incidentals	✓
July	1	1				Wetland/waterfowl survey	✓
July	1				1	Wetland/waterfowl survey	✓
July	1	1				Wetland/waterfowl survey	✓
September	1		1			Fisheries Baseline	✓
September	1	1				Fisheries Baseline	✓
September	2		1	1		Fisheries Baseline	✓
September	2	1	1			Fisheries Baseline	✓
September	1		1			Fisheries Baseline	✓
September	3		3			Fisheries Baseline	✓
October	2	2				Aerial Ungulate Survey	✓
October	2		1	1		Aerial Ungulate Survey	
October	5	2	3			Aerial Ungulate Survey	
October	1	1				Aerial Ungulate Survey	✓
October	1		1			Aerial Ungulate Survey	
October	1		1			Aerial Ungulate Survey	✓
October	2		2			Aerial Ungulate Survey	✓
October	4	1	3			Fisheries Baseline	✓
Total	34	12	19	2	1		

TABLE 5. SUMMARY OF 2008 CALCULATED MOOSE ABUNDANCE INDICES		
	July*	October**
Moose Observations		
Number of Moose Observed on transect	0	8
Relative abundance Indices		
Moose per Hour	0	1.66
Moose per Kilometer	0	0.021

* assuming approximate survey time of 6.78 hours and approximately 380km of straight line transects flown.

**assuming approximate survey time of 4.81 hours and approximately 380km of straight line transect flown.

TABLE 6. SUMMARY OF 2008 RAPTOR OBSERVATIONS RECORDED IN THE MACTUNG STUDY AREA.					
Species	Bald Eagle	Golden Eagle	Rough-legged hawk	Northern Hawk owl	Unknown Raptor
Number of Observations during the Survey		2			
Number of Incidental Observations	1	11	1	1	1
Total number of Observations	1	13	1	1	1

TABLE 7. SUMMARY OF 2008 RAPTOR OBSERVATIONS IN MACTUNG STUDY AREA AND CONSERVATION STATUS.

Species	Conservation Status (Federal and Territorial)	Total number of observations
Bald Eagle (<i>Haliaeetus leucophalus</i>)	Not at Risk	1
Golden Eagle (<i>Aquila chrysaetos</i>)	Not at Risk	13
Gyr Falcon (<i>Falco rusticolus</i>)	Not at Risk / Yukon Wildlife Act	Nesting signs
Rough-legged Hawk (<i>Buteo lagopus</i>)	Not at Risk	1
Northern Hawk Owl (<i>Surnia ulula</i>)	Not at Risk	1

TABLE 8. SUMMARY OF JULY 14-15, 2008 BIRD OBSERVATIONS DURING WETLAND/WATERFOWL SURVEYS

sSpecies	Number of Observations during the Survey	Number of Incidental Observations	Total number of Observations
American Tree Sparrow		2	2
American Wigeon	26		26
American green-winged teal	62		62
Blue-winged Teal	1		1
Bonaparte's Gull	5		5
Common Merganser		2	2
Harlequin Duck	1		1
Herring Gull	3		3
Horned Grebe	2		2
Least Sandpiper	1		1
Mallard	2		2
Mew Gull	4		4
Northern Pintail	4		4
Northern Shoveler	6		6
Ptarmigan spp.	1		1
Ring-necked Duck	1		1
Red-necked Phalarope	26		26
Savannah Sparrow		2	2
Scaup spp.	30		30
Short-billed Dowitcher	1		1
Solitary Sandpiper	2		2
Spotted Sandpiper	1		1
Unk Duck	2		2
Unk Duckling	1		1
Wandering Tattler	4		4
Wilson's Snipe	2		2
Yellowleg spp.	9		9
Total of observations	198	10	208

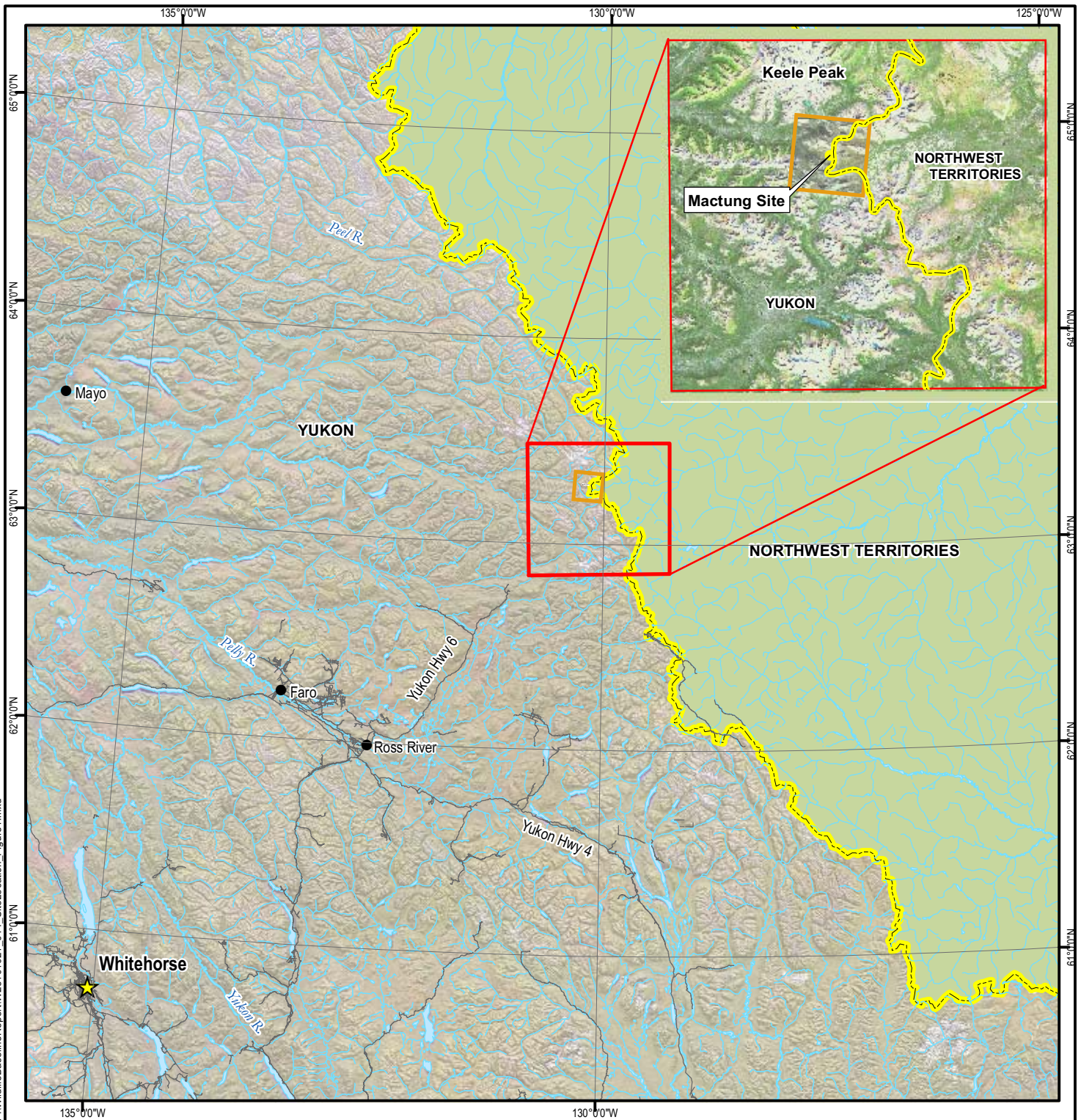
TABLE 9. SUMMARY OF 2008 GRIZZLY BEAR OBSERVATIONS

	Number of Sows	Number of Cubs	Number of Yearlings	Unknown	Total
July	1		2	1	4
September	2	4			6
October	1		1	1	3
Total	4	4	3	2	13



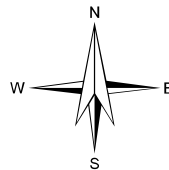
FIGURES





LEGEND

- Territorial Boundary
- Local Study Area
- Watercourse
- Waterbody
- Roads



**MACTUNG
2008 WILDLIFE BASELINE STUDIES**

Site Location

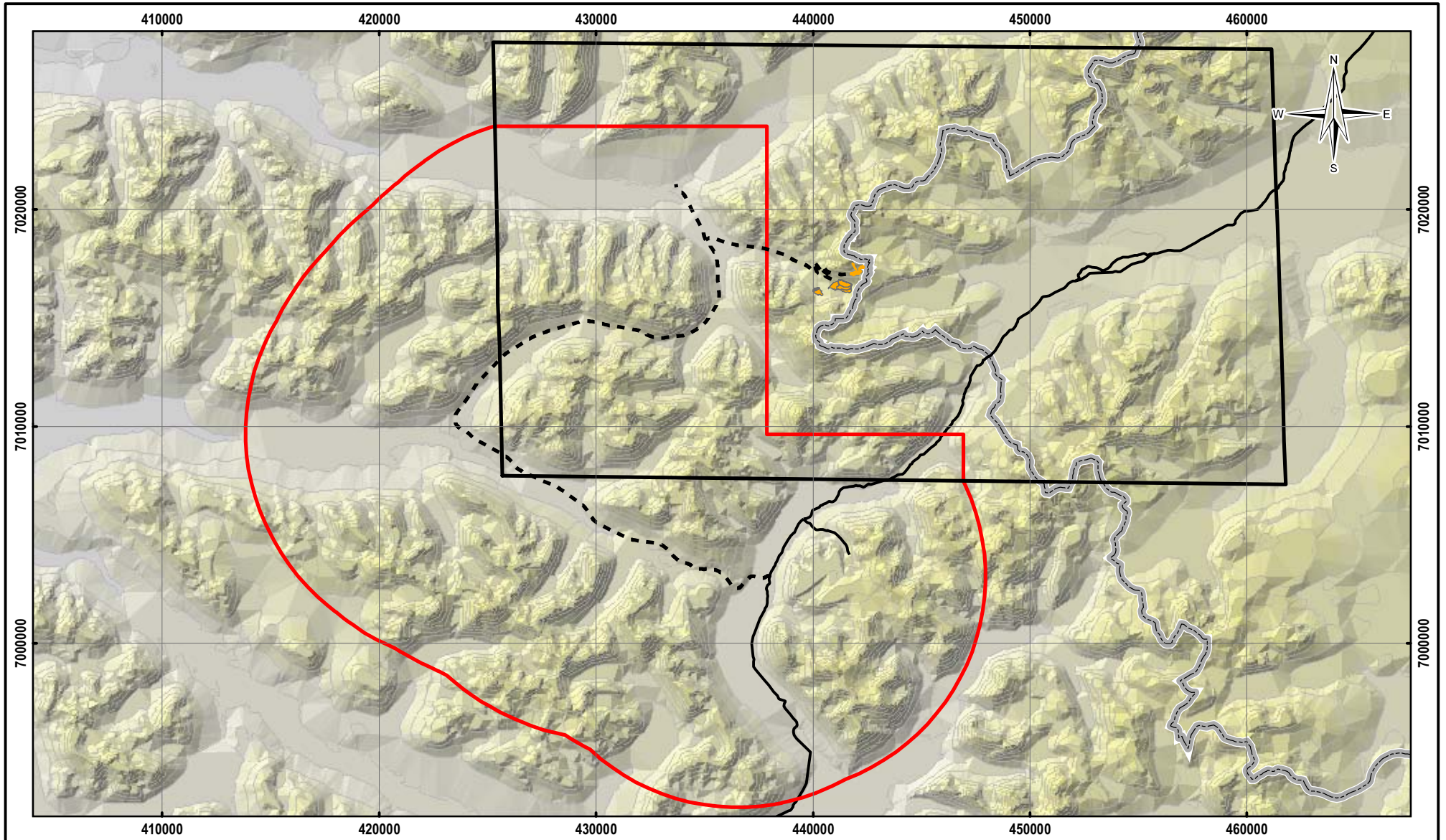
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OFFICE EBA-VANC	DATE December 8, 2008		

EBA Engineering
Consultants Ltd.

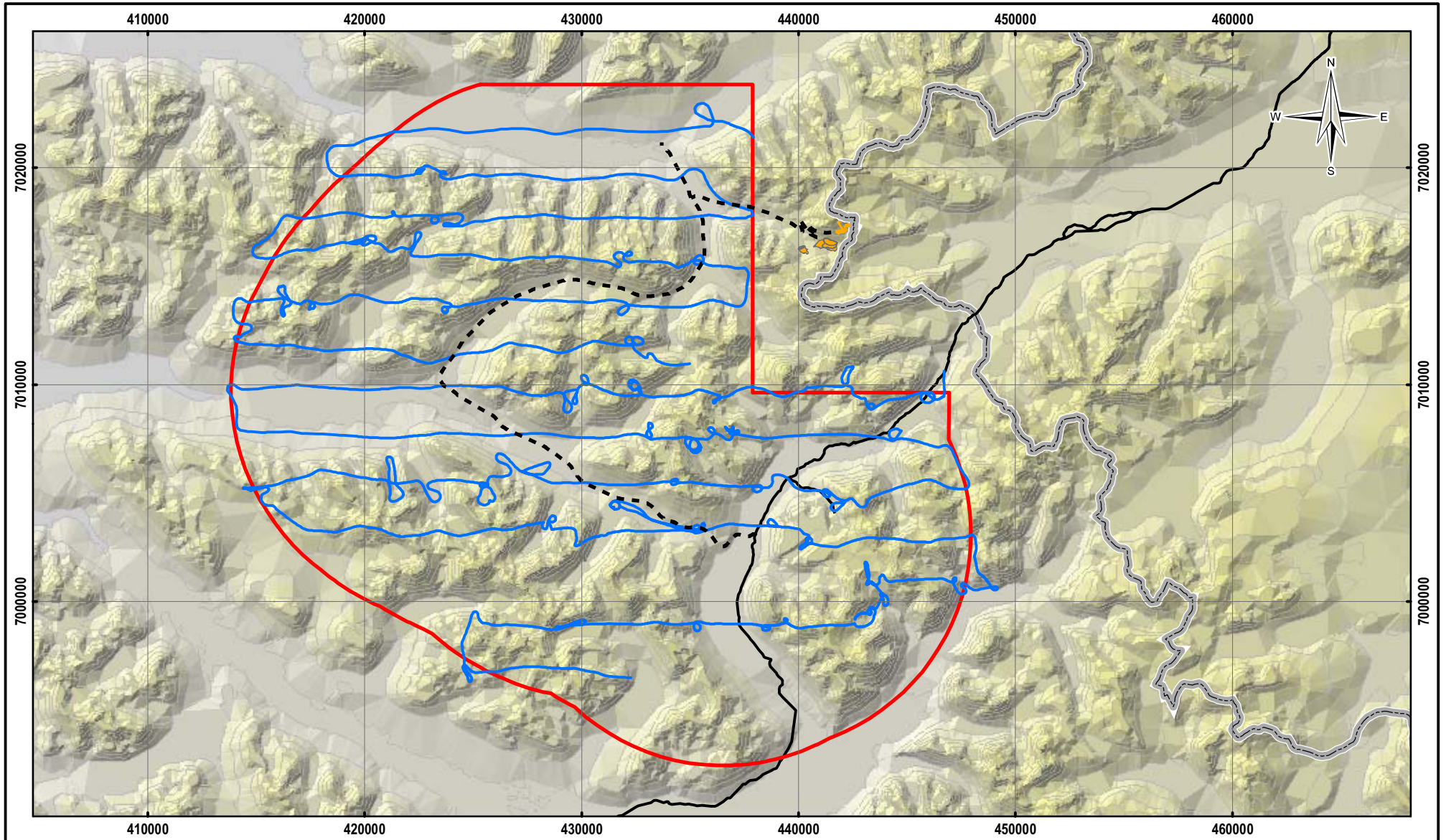
Figure 1

ISSUED FOR USE

NOTES Landsat TM imagery Earthsat acquired Sept.17, 1995
Bands 432 enhanced



<p>LEGEND</p> <ul style="list-style-type: none"> - - Proposed Access Road ▭ 2008 Wildlife Regional Study Area (RSA) ▭ Previous (2005-2007) Wildlife Study Area ▭ Proposed Mine Site Infrastructure — Existing Roads — NWT - Yukon Border 	<p>ISSUED FOR USE</p> <p>NOTES Base data source: Access road alignment provided by Wardrop</p>	<p>Scale: 1:250,000</p>	<p>MACTUNG 2008 WILDLIFE BASELINE STUDIES</p>				
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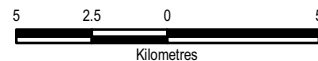
- Proposed Access Road
- Proposed Mine Site Infrastructure
- July Aerial Ungulate Survey Route (Caribou Post Calving Survey)
- 2008 Wildlife Regional Study Area (RSA)
- Existing Roads
- NWT - Yukon Border

ISSUED FOR USE

NOTES

Base data source:
Access road alignment provided by Wardrop

Scale: 1:250,000



PROJECTION UTM Zone 9	DATUM NAD83
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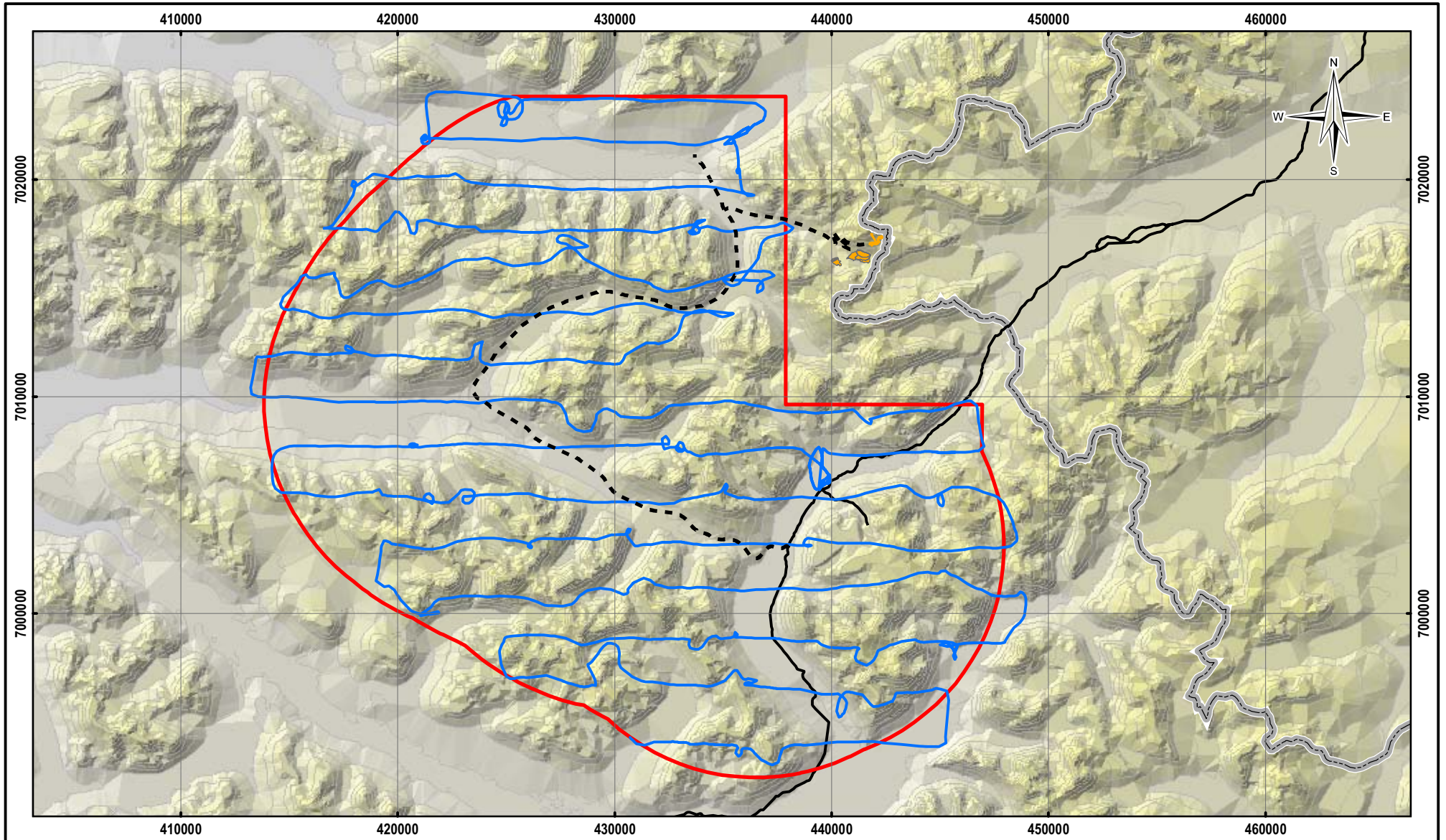
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**MACTUNG
2008 WILDLIFE BASELINE STUDIES**

July Aerial Ungulate Survey Route
(Caribou Post Calving Survey)

PROJECT NO. W23101021.014	DWN MEZ	CKD AS	REV 0
OFFICE EBA-VANC	DATE December 8, 2008		

Figure 3



LEGEND

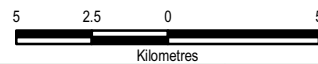
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- Proposed Mine Site Infrastructure
- October Ungulate Survey Route (Caribou Rut Survey)
- 2008 Wildlife Regional Study Area (RSA)
- Existing Roads
- NWT - Yukon Border

ISSUED FOR USE

NOTES

Base data source:
Access road alignment provided by Wardrop

Scale: 1:250,000



PROJECTION UTM Zone 9	DATUM NAD83
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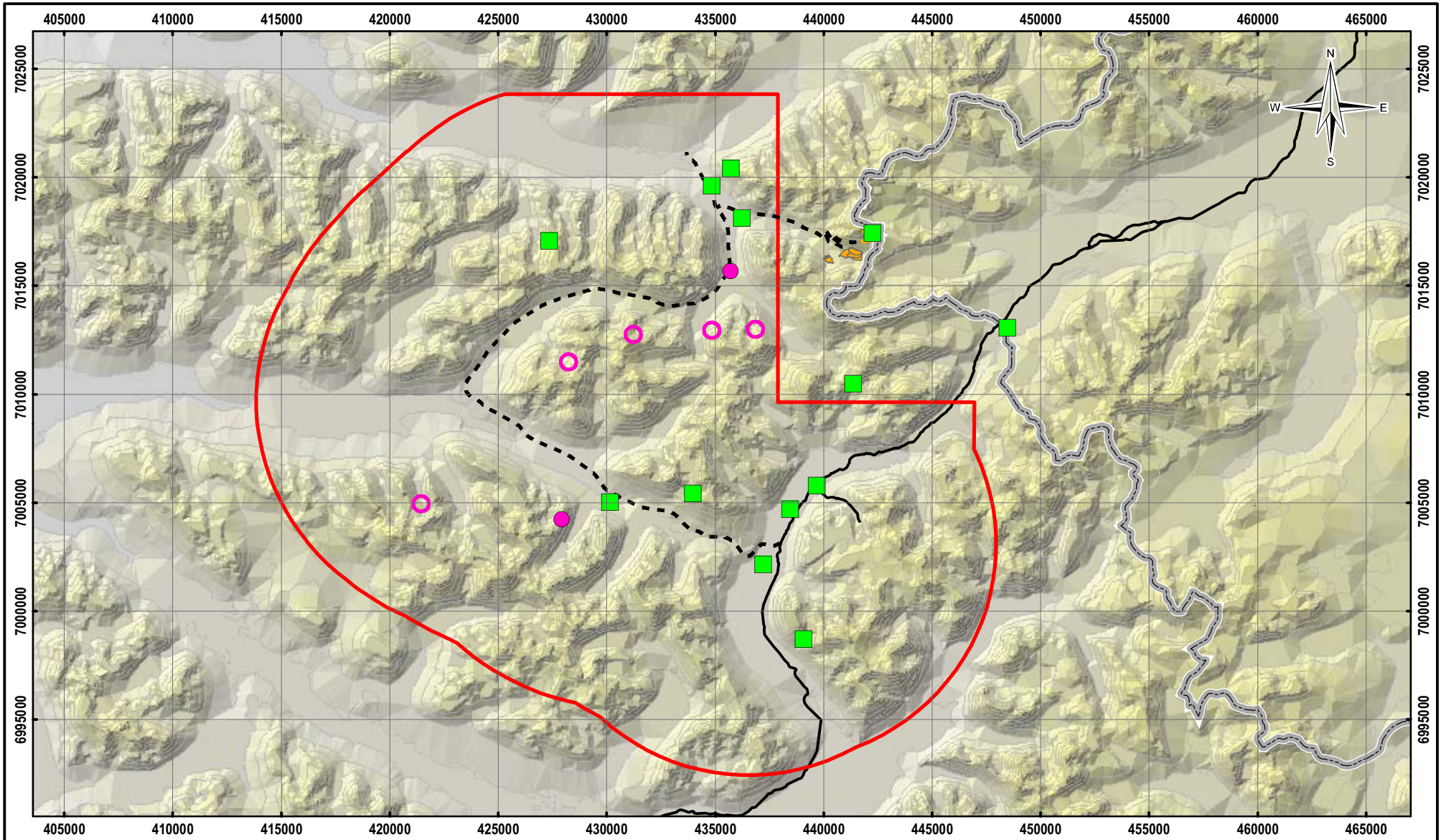
EBA Engineering
Consultants Ltd.

**MACTUNG
2008 WILDLIFE BASELINE STUDIES**

October Ungulate Survey Route
(Caribou Rut Survey)

PROJECT NO. W23101021.014	DWN MEZ	CKD AS	REV 0
OFFICE EBA-VANC	DATE December 8, 2008		

Figure 4



LEGEND

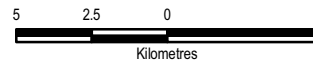
- Proposed Access Road
- Proposed Mine Site Infrastructure
- Existing Roads
- 2008 Wildlife Regional Study Area (RSA)
- NWT - Yukon Border
- Incidental Observation (Visual)
- Targeted Raptor Survey Observation (Sign)
- Targeted Raptor Survey Observation (Visual)

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NOTES

Base data source:
Access road alignment provided by Wardrop

Scale: 1:250,000



PROJECTION: UTM Zone 9
DATUM: NAD83

FILE NO.: W23101021_014_Raptor_Figure8.mxd

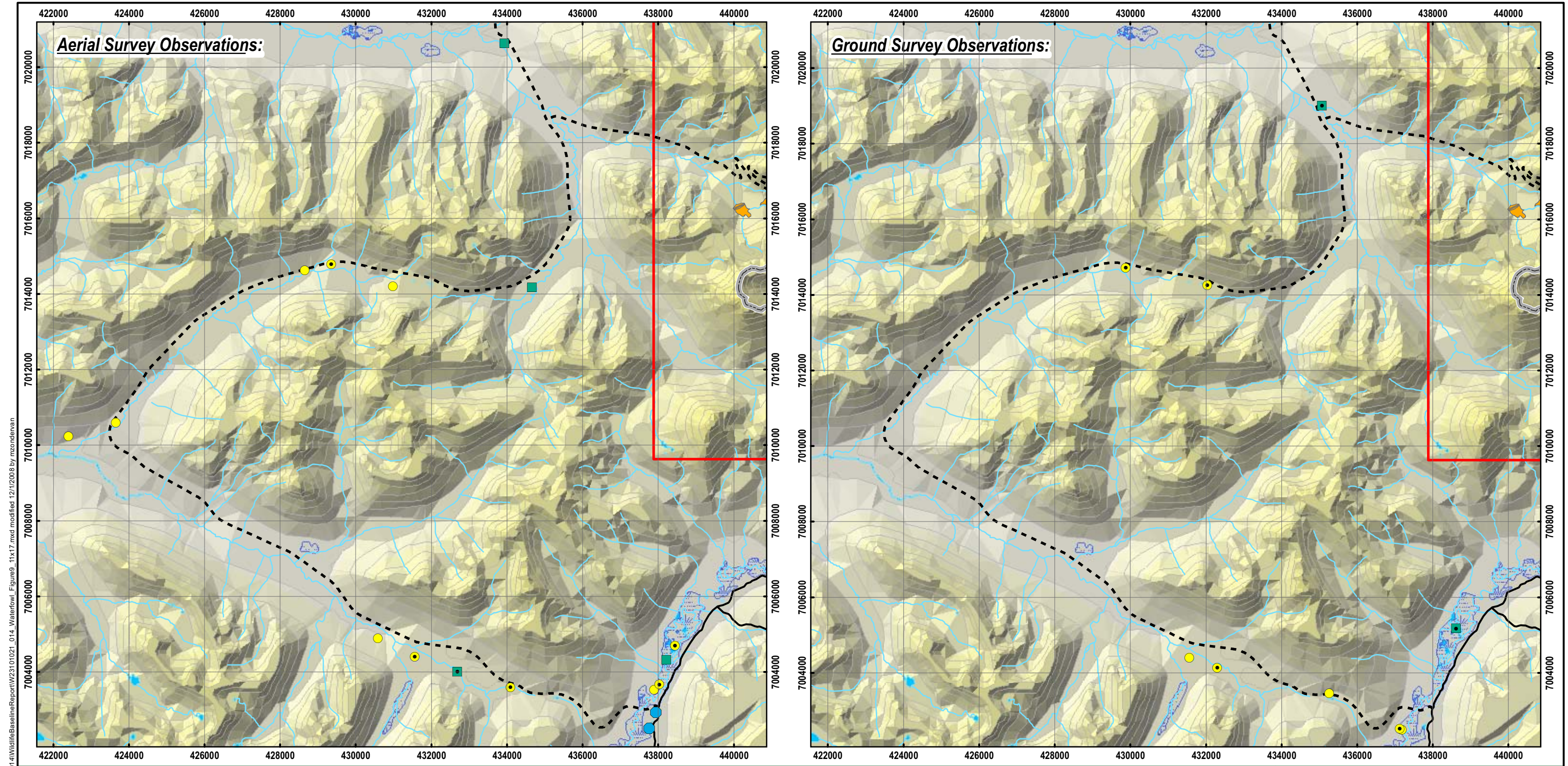
EBA Engineering Consultants Ltd.

**MACTUNG
2008 WILDLIFE BASELINE STUDIES**

Raptor Observations

PROJECT NO. W23101021.014	DWN MEZ	CKD AS	REV 0
OFFICE EBA-VANC	DATE December 8, 2008		

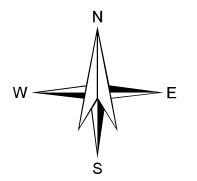
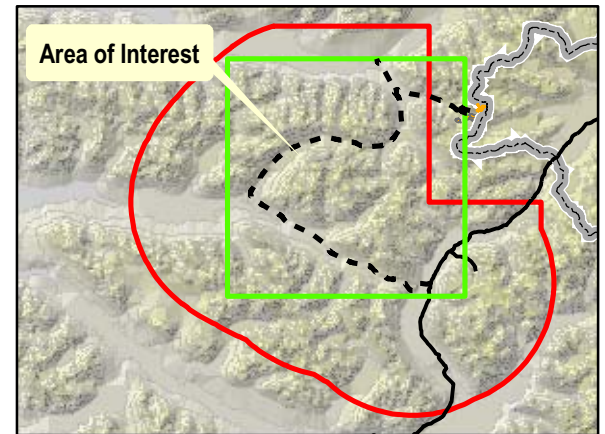
Figure 8



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- LEGEND**
- Existing Roads
 - - - Proposed Access Road
 - Proposed Mine Site Infrastructure
 - 2008 Wildlife Regional Study Area (RSA)
 - Watercourse
 - Waterbody
 - Wetland
 - Waterfowl Observed
 - Fen
 - Shallow water
 - beaver pool

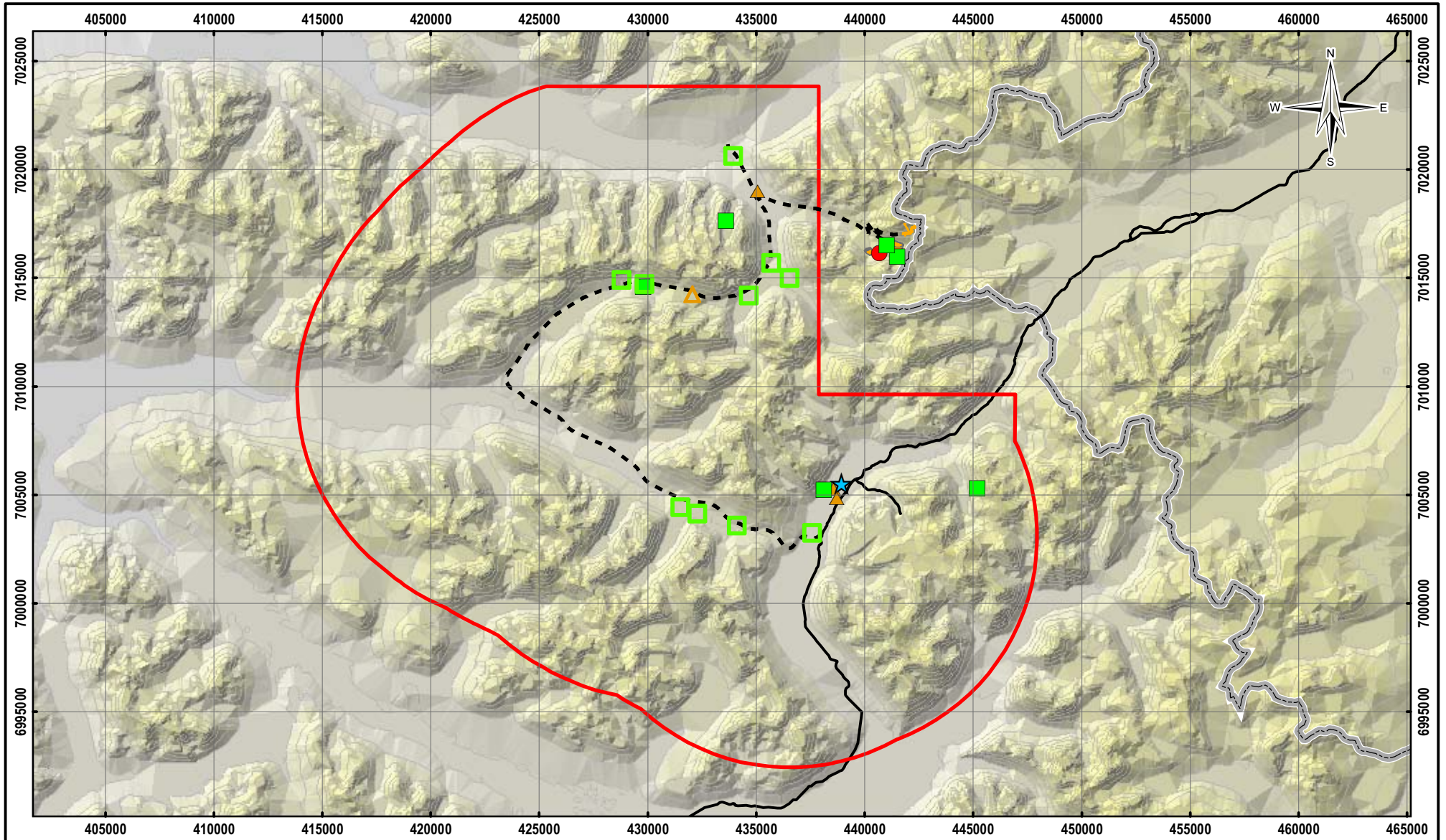
NOTES
 Base data source: NTS 1:50,000
 Access Road alignment provided by Wardrop



MACTUNG			
2008 WILDLIFE BASELINE STUDIES			
Wetland, Waterfowl and Wetland Bird Observations			
PROJECTION UTM Zone 10	DATUM NAD83		
Scale: 1:100,000 			
FILE NO. W23101021_014_Waterfowl_Figure9_11x17.mxd			
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OFFICE EBA-VANC	DATE December 8, 2008		

Figure 9

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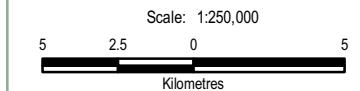


LEGEND

- Proposed Access Road
 - Proposed Mine Site Infrastructure
 - 2008 Wildlife Regional Study Area (RSA)
 - Existing Roads
 - NWT - Yukon Border
- Species Observed**
- Beaver (Visual)
 - Beaver (Sign)
 - Grey Wolf (Visual)
 - Dall's Sheep (Visual)
 - Grizzly Bear (Visual)
 - Grizzly Bear (Sign)

ISSUED FOR USE

NOTES
 Base data source:
 Access road alignment provided by Wardrop



PROJECTION: UTM Zone 9
 DATUM: NAD83
 FILE NO.: W23101021_014_Grizzly_Other_Figure10.mxd

EBA Engineering Consultants Ltd.

MACTUNG 2008 WILDLIFE BASELINE STUDIES			
Grizzly Bear and Other Wildlife Observations			
PROJECT NO. W23101021.014	DWN MEZ	CKD AS	REV 0
OFFICE EBA-VANC	DATE December 8, 2008	Figure 10	



PHOTOGRAPHS





Photo 1
Mountain caribou on an alpine plateau within study area. Photo taken July 15, 2008.



Photo 2
Bull caribou located downslope from the project site. Photo taken July 15, 2008.



Photo 3
Moose in typical habitat within the access road study area. Photo taken September 6, 2008.



Photo 4
Sow grizzly bear with 3 cubs observed in the project valley. Photo taken on September 5, 2008.



Photo 5


Beaver and lodge on a side channel of the Hess River Tributary near fisheries site PS1. Photo taken on August 7, 2008.



APPENDIX A

APPENDIX A YUKON GOVERNMENT (ENVIRONMENT) WILDLIFE RESEARCH PERMIT #0041





WILDLIFE RESEARCH PERMIT
SUBJECT TO THE PROVISIONS OF THE WILDLIFE ACT AND REGULATIONS:
PERMIS DE RECHERCHE SUR LA FAUNE
SOUS RÉSERVE DES DISPOSITIONS DE LA LOI SUR LA FAUNE ET DE SES RÉGLEMENTS D'APPLICATION

0041

Last name • Nom de famille: **EBA Engineering Consultants Ltd. [Chris Jastrebski et al.]**

First name and initials • Prénom usuel et autres prénommes

Mailing address • Adresse postale: **Calcite Business Center - Unit 6 151 Industrial Rd.**

Town, city • Vale, village: **WHITEHORSE, Y.T. Y1A 2V3**

Postal code • Code postal

001		
Voucher number / N° de distributeur/distributrice		
08	07	14
Year • Année	Month • Mois	Day • Jour
668-2071 L.243		
Phone/message number • N° de téléphone		

Is hereby authorized to engage in wildlife research respecting / est par les présentes autorisé(e) à effectuer des recherches sur la faune répondant aux particularités suivantes:

riparian bird species, raptors and ungulates

in **the Mactung Project Wildlife Study Area, MacMillan Pass, Y.T.**

from → **2008/07/14** → to →

à partir du → **2008/07/14** → jusqu'au →

Year Année Month Mois Day Jour (Expiry date) (Date d'expiration) Year Année Month Mois Day Jour

CONDITIONS OF PERMIT / CONDITIONS ASSOCIÉES AU PERMIS

Research is to be conducted as per application for Wildlife Research Permit dated July 11, 2008 EBA File W23101050.004

EBA shall upon completion of the research, furnish to a Conservation Officer a report that fully discloses the results of the research and the conclusions derived from it.

[Signature]

SIGNATURE OF PERMITTEE / SIGNATURE DU DÉTIENNAIRE

[Signature]

ISSUING OFFICER / SIGNATURE DE LA PERSONNE CHARGÉE LA DÉLIVRANCE

Personal information contained on this form is collected under the Wildlife Act and associated Regulations and will be used by the Department of Environment for research, statistical and enforcement purposes. For further information, contact the Department of Environment at (867)667-5652 or 1-800-661-0408 within the Yukon.

Les renseignements personnels contenus dans le présent formulaire sont recueillis en vertu de la Loi sur la faune et des règlements d'application, et ils seront utilisés par le ministère de l'Environnement à des fins de recherche, de compilation de statistiques et d'exécution de la Loi. Pour obtenir de plus amples renseignements, communiquez avec le ministère de l'Environnement, au (867) 667-5652 ou au 1-800-661-0408 (à l'intérieur du Yukon).

YG2495/NC3 02/2003

Distribution: 1—Permittee • Titulaire du permis 2—Whitehorse Office • Bureau de Whitehorse 3—Leave in book • À conserver dans le carnet