



North American Tungsten Corporation Ltd.

MACTUNG PROJECT

2006 ENVIRONMENTAL BASELINE STUDIES WILDLIFE REPORT

1200163.004

May 2007

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EXECUTIVE SUMMARY

North American Tungsten Corporation Ltd. (NATCL) retained EBA Engineering Consultants Ltd. (EBA) in 2006 to continue to conduct updated environmental baseline studies at the MacTung Project Property, Yukon (YT).

North American Tungsten Corporation Ltd. is considering development of a world-class tungsten deposit located near MacMillan Pass, on the border between the Northwest Territories and the Yukon (Figure 1). The mine site is located in the Selwyn Mountains at an elevation of 1,725-1,800 m above sea level (a.s.l.). The mine site is connected to the southern Yukon during summer months by the North Canol Road, and is 650 km (400 air km) northeast of Whitehorse. The mine site is linked to the North Canol Road just east of MacMillan pass by a 10 km-long access road.

In October 2005, environmental baseline surveys were initiated to document ungulates utilizing the MacTung Project area, referred to herein as the wildlife study area (study area), an area of ~ 800 km². Based on species occurrences, species and habitat sensitivities, and species conservation status reported in EBA (2006) report, further baseline surveys were recommended to address additional species. To support future regulatory submissions leading to MacTung Project approvals and implementation, additional baseline surveys were recommended during the summer of 2006 that included wildlife, fisheries, hydrology and water quality.

Aerial and ground-based surveys were conducted in June, July, August and September 2006, following the methodology outlined from previous studies in the study area. Target species, such as moose, woodland caribou, Dall's sheep, breeding birds, raptors and waterfowl were adopted from previous studies and known literature.

In 2006, four aerial ungulate surveys (14 June, 7-8 July, 5 August and 19 September), additional Dall's sheep surveys, ground-based breeding bird surveys (13-17 June), aerial raptor surveys (concurrent with the aerial ungulate surveys) and aerial waterfowl surveys (7 August) were conducted within the wildlife study area (study area), an area of ~ 800 km². The total number of individuals observed both inside and outside of the wildlife study area of both targeted and incidental species was 1,495, including 33 moose, 571 caribou (314 of which were on Mackenzie Barrenlands outside of study area), 35 grizzlies, 337 breeding birds, 17 raptors, 172 waterfowl, 39 shorebirds, and a few other incidental observations including approximately 275 Sandhill Cranes in migration.

The structured surveys yielded a total of 825 observations (visuals) of targeted species within the wildlife study area. These observations comprised two mammal species (moose and woodland caribou) and 63 bird species. The most commonly observed bird species were Golden Eagle, Lesser Scaup, Surf Scoter, Green-winged Teal, Northern Pintail, Red-necked Phalarope, Short-billed Dowitcher, American Tree Sparrow, Common Redstart, Savannah Sparrow and Wilson's Warbler. Additional wildlife observed include grizzly bear, wolf, wolverine (sign), Dall's sheep (sign), beaver, hoary marmot, Common Raven, and ptarmigan.

In addition to the target species, the MacTung study area supports species of special conservation status, including woodland caribou, grizzly bear, wolverine, Peregrine Falcon *anatum*, and Short-eared Owl. All of these species have been documented within the study area either as part of the current program or past wildlife studies (AMAX 1983; AMAX NDb; AMAX 1982; Gill 1978).



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1.0 INTRODUCTION

North American Tungsten Corporation Ltd. (NATCL) retained EBA Engineering Consultants Ltd. (EBA) to conduct updated environmental baseline studies at the MacTung Project Property, Yukon (YT) (Figure 1).

North American Tungsten Corporation Ltd. is considering development of a world-class tungsten deposit located near MacMillan Pass, on the border between the Northwest Territories and the Yukon (Figure 1). The mine site is located in the Selwyn Mountains at an elevation of 1,725-1,800 metres above sea level (a.s.l.). The mine site is connected to the southern Yukon during summer months by the North Canol Road, and is 650 km (400 air km) northeast of Whitehorse. The mine site is linked to the North Canol Road just east of MacMillan pass by a 10 km-long access road.

In October 2005, environmental baseline surveys were initiated to document ungulates utilizing the MacTung Project area, referred to herein as the wildlife study area (study area), an area of ~ 800 km². Based on species occurrences, species and habitat sensitivities, and species conservation status reported in EBA (2006) report, further baseline surveys were recommended to address additional species. To support future regulatory submissions leading to MacTung Project approvals and implementation, additional baseline surveys were recommended during the summer of 2006 that included wildlife, fisheries, hydrology and water quality.

This report summarizes wildlife work conducted during the spring, summer and fall of 2006, other environmental components are discussed under separate reports. The objective of this wildlife work was to document and characterize wildlife within the project area and to establish baseline conditions for the potential development. In addition, these surveys will assist in forming the basis for future monitoring programs associated with project implementation and operation. Additional results from the 2005 wildlife surveys are reported in EBA (2006), while other environmental discipline work from the summer of 2006 are reported in separate documents.

2.0 METHODS

In 2006 aerial and ground-based surveys were completed in June, July, August and September, which targeted six species or species groups including: woodland caribou (northern mountain ecotype), moose, Dall's sheep, breeding birds, raptors, and waterfowl. Even though aerial survey methodology has changed over the years, in order to facilitate comparison of results, aerial- and ground-based ungulate surveys were conducted using the same methods detailed by Gill (1978) and Kershaw and Kershaw (1983). Breeding bird, raptor and waterfowl surveys were conducted using contemporary survey protocols. The Wildlife program field surveys were conducted by an EBA Senior Arctic Ecologist, Mr. Steven Moore, B.E.S., B.A., and Environmental Scientist Ms. Karla Langlois B.Sc., P. Bio., with technical assistance of Mr. Jeff Matheson, M.Sc., R.P.Bio. Ms Krista Amey

participated in report preparation and Mr. Richard Hoos, M.Sc., R.P.Bio. provided peer review.

2.1 UNGULATES

Four systematic ungulate surveys were flown in June, July, August and September (Figure 2). The size of the study area surveyed was 40 km by 20 km, encompassing approximately 800 km². The survey area was divided into eleven east – west transects, each 40 km long and spaced 2 km apart. As expected in mountainous terrain, the effective survey width varied throughout the surveys with topographic relief."

A Bell 206B helicopter was used for all surveys. Three personnel flew on each survey; the pilot, a navigator/left observer and a right observer. The pilot concentrated on maintaining altitude, ground speed and staying on transect. The left observer recorded animals on the left side of and beneath the helicopter, out of sight of observer in the right-rear backseat. Flight altitude and ground speed averaged 90 m above ground level (a.g.l.) and 150 kph, respectively.

Information recorded for each ungulate observation included transect number, GPS waypoint (hand-held with a remote antenna for increased accuracy), an estimate of group size, dominant activity, group composition, habitat type and any additional incidental wildlife observations.

Independent Dall's sheep aerial and ground-based surveys were also completed in June, July, August and September. Surveys efforts focused on flying parallel to mountain ranges previously occupied by sheep (Gill 1978), as well as areas considered potential sheep habitat.

2.2 BREEDING BIRDS

Breeding bird surveys were conducted in June, when most species of songbirds are on territory and singing (Ralph and Scott 1981; Verner 1985; Bibby *et al.* 1993). Birds were surveyed using point counts (Ralph *et al.* 1993). Point count sites were located within 33 habitat types.

Point count sites were accessed on foot. Surveys commenced at 0400 hrs and continued until 1000 hrs when singing is considered to be the most intense (Ralph *et al.* 1993). Surveys were curtailed when observation conditions became unsatisfactory due to weather (*e.g.* wind, constant rain). Particular care was given to not disturb the birds when approaching point count sites. Observers recorded the date, location, weather conditions, basic habitat conditions, and start time before starting a point count. Observers waited a minimum of 2 to 5 minutes before beginning each point count to allow birds to resume their normal behaviour. At each point count site, all birds heard and seen were recorded within 0 – 50 m, 50 – 100 m, and greater than 100 m from station centre, at temporal intervals of 0 – 5 minutes and 5 – 10 minutes.

Birds observed beyond 100 m or flying over the site were noted separately as incidental observations. The species, sex (where possible), and behaviour (flushed, territorial display, etc.) was recorded for each bird observation. Territorial and breeding behaviour were recorded such as territorial calls, displays, distraction behaviour, and disputes. Other information recorded was nest site, anxious parents, incubation, nest building, fledged young, mating, adults carrying food to a nest, or the begging calls of nestlings. Breeding birds were also recorded between point counts and during other aspects of the fieldwork.

2.3 RAPTORS

Raptor surveys focused on cliff-nesting birds such as Peregrine Falcons, Gyrfalcons, Golden Eagles and Rough-legged Hawks. The survey route used for the study area was based on known locations of previously-occupied territories and supplemented with investigations of additional potentially promising sites. The survey was conducted from a Bell 206B helicopter and involved a slow fly-by of known, suspected, or potential nest sites or nesting areas.

The survey crew consisted of the pilot, a front-seat navigator/observer, and a rear-seat observer/recorder. The helicopter flew along mountain ranges at a range between 25 to 50 m scanning for nests and looking for potential nesting areas. Prominent cliff faces were inspected for birds, active nests, whitewash (Guano), and orange lichen.

2.4 WATERFOWL

The “Look-See” method was the chosen technique for conducting waterfowl surveys in 2006. This is an appropriate methodology for counting birds, such as waterfowl, breeding at low densities in remote areas (Bidy *et al.* 1992). This technique involves selecting lakes prior to conducting fieldwork and setting up observation stations at the predetermined water bodies. Observation stations are the standard approach for the “Look-See” method for surveying breeding (mated pairs) and non-breeding waterfowl during mid-summer. This technique is useful for surveying birds in all lifecycle stages, and is the preferred method for counting breeding pairs and broods for all but the most elusive waterfowl species. For a few remote lakes with no access, a helicopter was used to inventory birds. Surveys were designed to determine waterfowl species present and territories where possible. Small lakes were surveyed on foot (ground surveys).

For lakes surveyed from the ground, two personnel hiked to a suitable vantage point to slowly and completely scan each entire lake using a spotting scope. Each scan lasted for a minimum of 15 minutes to provide ample time to spot birds that may have been diving or hiding.

For each site the following data were recorded: date, UTM coordinates, weather parameters, species (all bird and incidental mammal species were recorded), numbers of birds seen, behavioural notes, adjacent terrestrial ecosystem unit(s), and any predators of waterfowl. Breeding territories were confirmed based on one of the following two criteria: a pair of adults on the lake during one visit, or one adult with a brood.

2.5 MISCELLANEOUS MAMMALS AND BIRDS

All incidental wildlife and wildlife sign were documented during aerial and ground-based surveys, including observations of tracks, scats, dens, nests, digs and trails. Miscellaneous species, or evidence of their presence, were documented and described. The locations of grizzly bear digs and scat observations were also documented, and the age of sign was estimated based on a number of factors including surrounding soil and plant disturbance and re-growth, soil texture, and scat morphology. If the carnivore species could not be identified, digs were classed as “carnivore”.

3.0 RESULTS

Four types of surveys were conducted during the 2006 season: aerial ungulate surveys (June July, August and September), ground-based breeding bird surveys (June), aerial raptor surveys (June) and aerial waterfowl surveys (August). Target species or species groups, selected from previous studies in the study area, include moose, woodland caribou and Dall’s sheep (all part of the ungulate aerial surveys), breeding birds, raptors and waterfowl, the results of which are discussed in detail below. Additional wildlife species observed during the 2006 wildlife surveys are reported in Section 3.3.

3.1 UNGULATES

The 2006 aerial ungulate surveys were conducted on 14 June, 7-8 July, 5 August and 19 September. These surveys yielded a total of 125 observations, including 110 actual sightings (totalling 270 individuals) and 15 accounts of sign. These observations comprised three ungulate species, moose, woodland caribou and Dall’s sheep. The following sections detail these observations as well as provide general habitat preferences, behaviour and conservation status of these species.

3.1.1 Moose

Moose (*Alces alces*) are considered Secure throughout their range in Canada, including the NWT (Working Group on General Status of NWT Species 2006; Canadian Endangered Species Conservation Council 2006).

Two different subspecies of moose are known to occur in this region; the larger Alaska – Yukon subspecies (*A. a. gigas*) and a smaller eastern Yukon – NWT subspecies (*A. a. andersonii*). The larger subspecies occur in the Yukon and territorial border of the study area and is likely the subspecies that were observed in 2006 in the study area. Moose are generally non-migratory, and occupy shrubby and forested habitats of Yukon and Northwest Territories (NWT) throughout the year. In the Yukon, moose numbers are estimated to be between 65,000 and 70,000 (Yukon Government 2006); while in the NWT, the number of moose is estimated to be between 30,000 and 40,000 (RWED 2004).

Aerial surveys were completed June 14, July 7, August 5 and September 19, 2006 (approximately five hours per aerial survey). In 2006, a total of 33 moose were observed. Of these 33 observations, 25 moose were recorded on transects within the study area (two moose were observed during the June aerial survey, six in July, four in August, and 13 in September). A total of 8 incidental moose observations were recorded in 2006, both inside and outside of the study area, four of which were in a group, consisting of a male, two females and a yearling. Most moose were observed in wooded upland, wooded lowland riparian, shrub-upland and shrub-lowland riparian (Photographs 1 and 2). The locations of these observations are depicted in Figure 3. No twinning was observed during the surveys.

In addition to actual sightings, moose sign (tracks and antler shed) were also documented.

Mineral licks are considered additional important moose habitat. Gill (1978) classified mineral licks as critical moose habitat. A known mineral lick located along a tributary of the Hess River in the Yukon (within the study area) was surveyed by Gill in 1978. During this survey, moose were considered the most common ungulate user (Gill 1978). Moose utilized this mineral lick throughout the year, particularly during winter months since the spring remained open. In 1976, a total of 44 recently shed moose antlers were documented in the immediate vicinity of this mineral lick (Gill 1978). This mineral lick was observed monthly during the 2006 field season and visited during August and September (Photograph 3). In August, heavy use by moose was documented as evidenced by 12 antler sheds in the grass. There were also moose sheds in the surrounding uplands and the uplands birch was heavily browsed by moose. The location of this mineral lick is depicted in Figure 3.

3.1.2 Woodland Caribou (Northern Mountain Ecotype)

Woodland caribou *Rangifer tarandus caribou* (northern mountain ecotype) is a species of Special Concern under SARA (Schedule I) (COSEWIC 2006) and is considered Secure in the NWT (Working Group on General Status of NWT Species 2006). The *Redstone* woodland caribou herd occupies the study area. Approximately 7,500 caribou are estimated to compose the *Redstone* herd.

During the October 2005 preliminary survey, no woodland caribou were observed; however, fresh tracks and trails were observed within the study area. Based on snow and past weather conditions, it was estimated that caribou had been within the study area at least 48 hours prior to the aerial survey. Tracks were observed at elevations ranging between approximately 1,300 m – 1,650 m, and all trails were heading east towards the Keele River watershed, which drains into the NWT and eventually into the Mackenzie River.

In 2006, aerial surveys were conducted on June 14, July 7, August 5 and September 19. In 2006, a total of 571 caribou were observed throughout the study area including incidental observations. Of these 571 observations, 204 caribou were recorded on transects within the study area (45 caribou were observed during the June caribou survey, 45 in July, 57 in August, and 57 in September).

A total of 367 incidental caribou observations were recorded during all four surveys in 2006 both within the study area and in the adjacent Mackenzie Mountain Barrenlands. The June survey yielded a total of 15 incidental observations, the July survey, six incidentals, the August survey, 281 incidentals (predominantly within the Mackenzie Mountain Barrenlands) and the September survey, 65 (predominantly within the Mackenzie Mountain Barrenlands).

Kershaw and Kershaw (1983) conducted ungulate surveys over a three day period in June, August, September and February in 1981 and 1982. A total of 325 caribou were recorded in June (average of 103 caribou per day), and 305 caribou were recorded in August (average of 101.6 caribou observed each day) over three consecutive days. During the 1981 fall rut (September survey event), Kershaw and Kershaw (1983) recorded a total of 33 caribou within their survey area over three days (average of 11 caribou observed each day). No caribou were observed during their surveys in February.

Woodland caribou are known to have a high fidelity to sites within their range, and the *Redstone* herd in particular is known to summer along the Yukon/NWT border (including the study area), and move down to lower elevations along the Keele, Little Keele, Mountain, Carcajou, Moose Horn, and Redstone river valleys (east of the study area) during the winter (Olsen *et al.* 2001). Collin (1983) indicated seasonal migrations respond to topographic funnelling along the Keele and Twitya rivers, since caribou predominantly utilize these drainages to pass through the mountains within the study area and into the surrounding higher elevations. Caribou commonly occur within the MacMillan Pass area from early June to the end of September, although some caribou remain until the end of November (AMAX 1983; Gill 1978).

These seasonal migrations are prompted by plant phenology, rutting and calving requirements, weather conditions (including winds and snow coverage), and biting insects (AMAX 1983). Similarly, vertical movements to high windswept mountain peaks in response to insect harassment and heat stress have also been documented (Gill 1978; Kershaw and Kershaw 1983). Caribou observations recorded during the 2006 field program also supports this understanding of vertical movements during summer and fall.

Northern mountain caribou have a high fidelity to calving areas, which includes plateaus and upland habitats. The majority of caribou in the *Redstone* herd are expected to calve from the last week of May to the first week of June (Collin 1983 and references herein). Known calving areas for the *Redstone* herd includes the Mackenzie Mountain Barrenlands (approximately 25 km northeast of the MacTung project (Figure 4)), between the Tsichu and Intga rivers, as well as between the Keele and Natla headwaters (more specific locations of the later potential calving areas were not reported; however, they are expected to be located outside the study area to the northeast and southeast, respectively) (Collin 1983). In addition, Gill (1978) suggested a potential calving site approximately 5 km south of Camp 222, outside the study area (although this potential calving site has not been confirmed). Collin (1983) identified the Mackenzie Mountain Barrenlands in the NWT as the principle calving and post-calving area for the *Redstone* herd.

No caribou calving areas were recorded within the study area during the 2006 aerial surveys. Only a single calf was observed within the study area during the June 2006 survey and only six calves were recorded in July, indicating the study area may not be a critical post calving area.

In contrast, Kershaw and Kershaw (1983) conducted caribou surveys on June 1 and 2, (during peak calving season) mainly within the NWT portion of the study area including the Mackenzie Mountain Barrenlands. They reported observing a large number of caribou (groups of cows and calves) on the Mackenzie Mountain Barrenlands; however, four solitary cows with calves were also recorded near the Continental Divide. Therefore, Kershaw and Kershaw (1983) assumed some cows also calve in that area.

The June 2006 survey was conducted immediately following the caribou calving season; and consequently, caribou were assumed to be on or traveling to their post-calving ranges. Post-calving areas commonly include moist alpine tundra and open meadows in the mountains (Gray and Panegyuk 1989). During the June 2006 survey, small groups of caribou (average group size was 2.5) were located predominantly in low valley systems throughout the study area. Although air temperatures during the aerial survey exceeded 20 degrees Celsius (°C), snow patches were still present in the valleys. Forty-eight percent of caribou observations during the June survey were recorded on snow patches in response to the heat.

By the July 2006 survey, small groups of caribou (average group size was 4.0) moved higher in elevation (average elevation of observations were approximately 1,650m), and dispersed throughout the study area.

Similarly, small groups of caribou (average group size was 1.6) were randomly distributed throughout the study area during the August 2006 survey (Photograph 4). In addition, caribou appeared to move slightly higher in elevation from the July survey (average elevation of caribou observations was approximately 1,700 m (ranged between 1,400 m to 2,100 m). Kershaw and Kershaw (1983) reported the majority of caribou observations were located on snow patches and near windswept ridges during their August surveys. In August 1981, solitary individuals, typically bulls, were commonly observed at or below 1,500 m; whereas, mixed groups of caribou, females, calves and juveniles were observed at high elevations in alpine tundra habitats (Kershaw and Kershaw 1983).

By September 2006, small groups of caribou (average group size was 3.5) were observed at lower elevations commonly along or near large valley systems (Photograph 5). Kershaw and Kershaw (1983) reported caribou migrating out of the area by September 19, and consequently, reported small numbers of caribou within their study area.

A reconnaissance flight was conducted on August 4, 2006 over the Mackenzie Mountain Barrenlands and a ground-based observation station was set up. Preliminary results from the reconnaissance flight and observation station reported 266 caribou on the Barrenlands, including 49 calves. In addition, a second reconnaissance flight was conducted over the Barrenlands on September 20, 2006. A total of 48 caribou (including 4 calves) were

documented during the September survey. Reconnaissance flights were not conducted over the Mackenzie Mountain Barrenlands during the June and July survey events to avoid stress induction to cows and calves.

3.1.3 Dall's Sheep

Dall's sheep (*Ovis dalli*) have not been assessed by COSEWIC (2006), but are considered Secure in the Northwest Territories (Working Group on General Status of NWT Species 2006).

Dall's sheep occur in the Mackenzie Mountains and the MacTung study area, although the MacTung study area has been identified as poor winter range (AMAX NDb). Approximately 18,000 Dall's sheep live in the Yukon (Yukon Government 2006), and within the Mackenzie Mountains, populations are estimated to range from 14,000 to 26,000 sheep (Nagy 1999; Veitch 1999).

In 2006, aerial surveys were completed on June 14, July 7, August 5 and September 19. There were no observations of Dall's sheep during these surveys. There was confirmation of Dall's sheep using the area as evidenced by eight observations of sign (pellet groups and tracks) during the June survey (Figure 5). Photograph 6 shows fresh sheep pellets.

Independent Dall's sheep aerial- and ground-based surveys were also conducted in June, July, August and September. Sheep were not observed during any of these surveys. The ground-based surveys were conducted near the mine site. The June ground-based survey yielded one set of fresh sheep tracks in a melting snow bank and two pellet groups. Trails belonging to a ewe plus a young-of-the-year were tracked (Photograph 7). The pair of sheep had evidently walked down the mining road downhill toward the valley, suggesting movement to another mountain (summer range). Even though a single pair of tracks was observed, they may have been travelling in a group because ewes with young typically travel with others.

Dall's sheep have resided on the mountain range next to the MacTung site in the past and still reside in that region but below historic densities (K. Neufeld pers. comm. 2007). Movement patterns (mountain to mountain) are dependent on the prevailing seasonal environmental conditions. Wind action, snow depth and hardness appear to be limiting factors in determining suitable habitat (Heimer 1987). Winter weather is considered the major factor influencing sheep numbers and severe winters may cause population declines (AMAX 1983). The MacTung area experiences very deep snow, which restricts the amount of forage available to Dall's sheep on their winter range and forces them to travel further for food. Amount of snow cover and depth is what influences the winter range of Dall's sheep. They are not efficient at pawing away the snow like other ungulates and so they rely on wind-exposed, wind-swept ridges.

The densities are lower in the MacTung area than in other parts of the region and the reduced availability of winter forage (due to the presence of deep snow) appears to be the driving factor. Other factors, such as predators (wolves) and hunting are much less

important and have less influence on controlling these population densities than prevailing environmental conditions (K. Neufeld pers. comm. 2007).

Mineral licks are considered additional important Dall's sheep habitat. Gill (1978) reported 13% of all sheep sightings occurring at the mineral lick located within the study area, along a tributary of the Hess River in the Yukon (Figure 5). These sightings occurred during early summer and were mostly ewes and lambs. In August 2006, old sheep tracks were documented at the mineral lick.

3.2 BIRDS

3.2.1 Breeding Bird Survey

Forty-six breeding bird stations within the 2006 Wildlife Study Area were surveyed from June 13-17, 2006. Surveys began at 4:15 and continued until 10:00 am.

Thirty-nine species (28 passerine, 7 shorebird, 3 waterfowl and 1 upland nesting), totalling 337 birds, were detected during the surveys. Sixty-eight additional observations were made, which occurred outside of the 100-m survey radius, outside of the survey time or were flyovers. Table 1 provides a list of the species observed during the breeding bird survey, this includes all observations from stations located inside and outside of the local study area. These observations included actual sightings or bird calls. American Tree Sparrow, Wilson's Warbler, Common Redstart, Savannah Sparrow, Red-necked Phalarope, Golden-crowned Sparrow, White-crowned Sparrow, American Robin, Ruby-crowned Kinglet and Yellow-rumped Warbler were the most common species.

TABLE 1. ALL BIRD SPECIES OBSERVED DURING THE BREEDING BIRD SURVEY, 13-17 JUNE 2007

Species	Number of Observations	Species	Number of Observations
Green-winged Teal	1	Fox Sparrow	1
Harlequin Duck	1	Golden-crowned Sparrow	17
Long-tailed Duck	1	Gray Jay	1
Least Sandpiper	3	Gray-cheeked Thrush	8
Lesser Yellowlegs	4	Hermit Thrush	4
Red-necked Phalarope	19	Horned Lark	5
Sandpiper species	1	Le Conte's Sparrow	2
Semipalmated Plover	2	Lincoln's Sparrow	1
Upland Sandpiper	2	Northern Waterthrush	1
Wilson's Snipe	1	Orange-crowned Warbler	4
Willow Ptarmigan	9	Palm Warbler	1
American Pipit	2	Ruby-crowned Kinglet	13
American Robin	14	Savannah Sparrow	29
American Tree Sparrow	55	Swainson's Thrush	7

TABLE 1. ALL BIRD SPECIES OBSERVED DURING THE BREEDING BIRD SURVEY, 13-17 JUNE 2007

Species	Number of Observations	Species	Number of Observations
Blackpoll Warbler	3	Townsend's Solitaire	1
Boreal Chickadee	1	White-crowned Sparrow	17
Cape May Warbler	1	Wilson's Warbler	51
Chipping Sparrow	1	Yellow Warbler	1
Common Redstart	32	Yellow-rumped Warbler	11
Dark-eyed Junco	8		

All of the species in Table 1 have not been assessed by COSEWIC (COSEWIC 2006). Of the species in Table 1, the Working Group on General Status of NWT Species (2006) consider the Long-tailed Duck, Least Sandpiper, Red-necked Phalarope, Lesser Yellowlegs, American Pipit, American Tree Sparrow, Blackpoll Warbler and Boreal Chickadee to be Sensitive and the Harlequin Duck to be May Be At Risk.

An Ecological Land Classification (ELC) was conducted for the MacTung Local Study Area (LSA), the details of which can be found in the Vegetation and Ecosystem Land Classification baseline study report (EBA 2007). Twenty-four plant and mixed plant communities were identified (14 and 10 respectively). Of the 46 breeding bird plots surveyed in 2006, 33 are within ELC-defined community types (Figure 6). Thirteen of the 34 plant or mixed plant communities contained at least one breeding bird plot, eight in the plant communities described in Table 2 and the remaining five were in mixed plant communities (approximate 50:50 ratio of two of the plant communities identified in Table 2).

TABLE 2. SUMMARY OF PLANT COMMUNITIES OF THE MACTUNG LOCAL STUDY AREA

Plant Community	Notes
Epilithic Lichen	Mainly bare rock/ lichen with sparse dwarf shrub
Fescue-Sedge	Dry alpine meadow
Fescue-Salix	Moist alpine meadow
Heath-Lichen	Dry, well drained heath/ dwarf shrub community
Sedge-Mertensia	Wet sedge meadow high in forbs and species richness
Sedge-Potentilla	Wetland in Dale Valley
Willow-Sedge	Dense willow riparian corridors
Willow-Mertensia	Open willow riparian corridors/ high elevation wet gentle slopes
Salix (med/tall)-Slope	Steep well drained slopes including avalanches chutes.
Betula-Lichen	Dry, well drained, convex micro-topography
Betula-Moss	Moist, cool aspect, concave micro-topography
Fir-Lichen	Dry, well drained, convex micro-topography
Fir-Moss	Moist, cool aspect, concave micro-topography
Marsh/ Fen	Unclassified wetland

Of the 13 plant and mixed plant communities where point counts were conducted, Fir-Lichen: Fir-Moss complex and Salix-Mertensia plant communities had the highest numbers of birds observed, while Betula-Lichen: Fir-Moss and Festuca-Carex: Betula-Lichen complexes had the lowest numbers observed (Figure 7).

Fir-Lichen: Fir-Moss complex and Betula-Lichen had the highest number of species observed, while Betula-Lichen : Fir-Moss and Betula-Lichen : Betula-Moss complexes had the lowest numbers of species observed (Figure 8). Species richness (ratio of the number of species to the number of birds detected) was highest in the Festuca-Carex : Betula-Lichen complex and lowest in the Betula-Lichen : Betula-Moss complex (Figure 9). Richness considered with species density per point count site (Figure 9) indicates that plant communities such as Festuca-Carex : Betula-Lichen had relatively high numbers of birds represented by the highest number of species, while communities such as Betula-Lichen : Betula-Moss featured low numbers of relatively few species.

The average numbers of birds detected per breeding bird plot per plant community were highest in the Betula-Lichen : Betula-Moss, Carex-Mertensia and Salix (med/tall)-Slope complexes (Figure 10).

The species detected most often in different plant communities (habitat generalists) were the American Robin, American Tree Sparrow, Common Redstart, Golden-crowned Sparrow, White-crowned Sparrow and Wilson's Warbler, while some species appeared to be specific to a single plant or mixed plant community. Species such as the Cape May, Palm and Blackpoll warblers, Townsend's Solitaire, White-winged Crossbill and Boreal Chickadee were only detected in Fir-Lichen: Fir-Moss mixed plant community.

3.2.2 Raptors

Aerial raptor surveys were conducted in conjunction with the ungulate surveys. Seventeen raptor observations comprised of four species were recorded. These species were Peregrine Falcon (*Falco peregrinus anatum*), Bald Eagle (*Haliaeetus leucocephalus*), Golden Eagle (*Aquila chrysaetos*) and Rough-legged Hawk (*Buteo lagopus*). Golden Eagles were the most commonly observed raptor species (Figure 11).

Nationally the Peregrine Falcon is listed as Threatened by SARA (Schedule I) (SARA 2006), but in the NWT the Peregrine Falcon (*anatum*) is considered Sensitive (Working Group on General Status of NWT Species 2006). In addition, Peregrine Falcon's (*anatum*) are Specially Protected in the Yukon.

Thirteen Golden Eagles were observed, nine within the study area. Of these nine seven were adults and two were juveniles. A single observation each of an immature Bald Eagle and a Rough-legged Hawk were made.

Incidentally two adult male Northern Harriers were observed during the Breeding Bird Surveys in June.

No raptor nests were observed during the 2006 surveys.

3.2.3 Waterfowl

An aerial waterfowl survey of a number of streams, wetlands and ponds was conducted on August 7, 2006, during which waterfowl and shorebirds were recorded. A typical waterfowl survey site is shown in Photograph 8. Fourteen waterfowl and eight shorebird species were observed within the WSA during this survey, comprising 172 and 39 individuals, respectively. A lake east of the water quality station on the Lower Tsichu River, Emerald Lake (local name) and a small lake downstream of Emerald Lake had the highest numbers of waterfowl, 48 (39 scaup, 5 Northern Pintail, 3 Green-winged Teal and 1 Red-necked Grebe), 26 (all Surf Scoters) and 29 (25 Surf Scoter, 2 Lesser Scaup and 2 Ring-necked Duck), respectively.

The most common waterfowl species were Lesser Scaup, Surf Scoter, Green-winged Teal and Northern Pintail; the most common shorebird species were Red-necked Phalarope and Short-billed Dowitcher. Table 3 provides a list of the species observed during the aerial waterfowl survey and Figure 12 depicts the locations of the observations.

TABLE 3. BIRD SPECIES OBSERVED WITHIN THE WILDLIFE STUDY AREA DURING THE AERIAL WATERFOWL SURVEY, 7 AUGUST 2006

Waterfowl Species	Number of Observations	Shorebird Species	Number of Observations
Blue-winged Teal	1	Herring Gull*	1
Cinnamon Teal	1	Baird's Sandpiper	1
Green-winged Teal	23	Red-necked Phalarope	23
Harlequin Duck	7	Semipalmated Plover	1
Horned Grebe*	1	Short-billed Dowitcher	9
Lesser Scaup	61	Unknown Shorebird	1
Northern Pintail	18	Wandering Tattler	1
Northern Shoveler	1	Yellowlegs Species	2
Pacific Loon*	3		
Red-necked Grebe*	1		
Ring-necked Duck	2		
Ruddy Duck	2		
Surf Scoter	51		

* For the purpose of this report, loons and grebes are grouped with waterfowl

**For the purpose of this report, gulls are grouped with shorebirds

All of the species in Table 3, with the exception of the Red-necked Grebe have not been assessed by COSEWIC. The Red-necked Grebe has been determined to be Not At Risk by COSEWIC (COSEWIC 2006). Of the species in Table 3, the Working Group on General Status of NWT Species (2006) consider the Lesser Scaup, Northern Pintail, Surf Scoter, Red-necked Phalarope and Lesser Yellowlegs to be Sensitive and the Harlequin Duck to be May Be At Risk.

3.3 MISCELLANEOUS WILDLIFE OBSERVATIONS

Eleven miscellaneous species (non-target species) were recorded during the 2006 surveys (Figure 13). These observations included actual sightings of individuals or sign (tracks and dwellings). The 11 species include the Sandhill Crane (*Grus canadensis*), Common Raven (*Corvus corax*), two species of ptarmigan, Rock (*Lagopus muta*) and Willow (*L. lagopus*), and seven mammals including ground squirrel (*Spermophilus parryii*) hoary marmot (*Marmota caligata*), beaver (*Castor canadensis*), grizzly bear (*Ursus arctos*), wolf (*Canis lupus*), red fox (*Vulpes vulpes*) and wolverine (*Gulo gulo*).

3.3.1 Sandhill Cranes

A flock of approximately 275 Sandhill Cranes was observed flying south on September 19, 2006.

The Sandhill Crane has not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and are considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.2 Common Raven

One Common Raven was documented on August 4, 2006. Common Ravens occur in a broad range of habitats and occupy the study area for much of the year. Previous observations of Common Ravens within the study area have been reported (AMAX 1982) and three were recorded during the preliminary wildlife survey in October 2005.

The Common Raven has not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and is considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.3 Ptarmigan

Twenty-nine(29) ptarmigan (Rock and Willow) were observed during the September 2006 aerial survey. Five were documented during the preliminary wildlife survey in October 2005. Previous studies have reported numerous Rock and Willow Ptarmigan in river valley systems throughout the year feeding on buds and small twigs (AMAX 1983). These species of ptarmigan have not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and are considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.4 Ground Squirrel

Two ground squirrels were observed on June 13, 2006. A ground squirrel den was located on the same date. Ground squirrels have not been reported in previous studies. Ground squirrels prefer tundra and clearings in forests with good drainage (Banfield 1974).

The ground squirrel has not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and is considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.5 Hoary Marmot

A hoary marmot was observed on June 14, 2006, approximately 200m north of one of the Breeding Bird Survey plots on the edge of vegetation and scree. Hoary marmots are typically located at high elevations near the timber line on talus slopes and alpine meadows (Chapman and Feldhamer 1982).

The hoary marmot has not yet been assessed by COSEWIC (COSEWIC 2006) and its status in the Northwest Territories has not yet been determined, but could be May-be-at-Risk (Working Group on General Status of NWT Species 2006).

3.3.6 Beaver

A beaver was observed on 7 August and several beaver dams and lodges were observed during the July and August surveys. During the preliminary wildlife survey in October 2005, many beaver lodges, dams, and food caches were documented throughout the river systems of the study area.

The beaver has not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and is considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.7 Grizzly Bear

The 2006 surveys yielded a total of 35 grizzly bear observations, totalling 15 individuals, 14 of which were observed within the study area. There were no bears observed in June, four in July (including a female and cub pair), five in August (a female with three cubs (Photograph 9) and an independent male) and five independent individuals (at least four of which were adults) in September. The observation that occurred outside of the study area was of a single bear on top of a gut pile in September. The sexes and/or ages of the remaining individuals could not be determined. In 2006, grizzly bears were observed primarily in high elevation valleys and high alpine habitat.

Fresh grizzly bear sign was documented, which included 12 dens (11 within the study area), five of which were considered fresh (Photograph 10), numerous ground squirrel digs and four sets of tracks. The locations of these observations are depicted in Figure 13. All dens were situated within the 1,400- and 1,800-m elevation range and were with the majority occurring in the western half of the study area. The majority of grizzly bear dens identified during the 2006 surveys exhibited the typical southerly aspect, but there was a high degree of variance, with four dens exhibiting northerly aspects, two faced east and one west. Gill (1978) reported not having seen any bear dens and attributed this to time of year, but had reported the existence of denning habitat within the study area.

The grizzly bear is considered a species of Special Concern in Canada and the Yukon (COSEWIC 2006; Government of Yukon 2007) and is designated as Sensitive in the NWT (Working Group on General Status of NWT Species 2006). Grizzly bears occupy much of the Yukon and NWT, including the Mackenzie Mountains and the MacTung study area. In the Yukon, grizzly bear populations are estimated at 6,000 – 7,000 bears (Yukon Government 2006); while the NWT population has been estimated at 4,800 grizzly bears (Working Group on General Status of NWT Species 2006) (including both mountain and barren-ground grizzlies), and the Mackenzie Mountains are considered to support the highest concentrations of grizzly bears in the NWT. Within the study area, grizzly bears are considered common (Gill 1978).

3.3.8 Wolf

A single wolf was observed on 13 June 2006 during the Breeding Bird Surveys. Fresh wolf tracks were observed in June and July (Photograph 11). In October 2005, a pack of five wolves was observed near the Canol Road, immediately south of the study area.

The wolf has been assessed by COSEWIC and is considered to be Not at Risk (COSEWIC 2006; Government of Yukon 2007) nationally and in the Yukon; Secure in the NWT (Working Group on General Status of NWT Species 2006); however there are no estimates of population numbers in the NWT (ENR 2007).

3.3.9 Red Fox

A single red fox (black colour morph) was observed on the access road to the MacTung mine on September 19, 2006. AMAX (NDb) reported common observations of fox tracks in the valleys every month during their winter surveys.

The red fox has not yet been assessed by COSEWIC (COSEWIC 2006; Government of Yukon 2007) and are considered Secure in the NWT (Working Group on General Status of NWT Species 2006).

3.3.10 Wolverine

Wolverine tracks were documented along the Tsichu River on June 14, 2006. AMAX (NDb) reported observations of wolverine tracks during every survey conducted at the MacTung site between October 1975 and March 1976. Damage caused by wolverines was documented at the MacTung camp. An individual had been observed near Camp 222 during the previous winter (1974/75). In September 1974, a wolverine was also observed at MacTung (AMAX 1983). A female wolverine with a young of the year was observed along the Tsichu River July in 1983 (S. Moore pers. obs. 1983). Gill (1978) reports predation of Dall's sheep by a wolverine in April 1978, approximately 2.1 km northwest of Mt. Allan.

The wolverine is a species with special conservation status. The wolverine has been identified as a species of Special Concern nationally and in the Yukon (COSEWIC 2006; Government of Yukon 2007) and it is considered at be Sensitive by the Government of the

Northwest Territories (Working Group on General Status of NWT Species 2006). The population estimate reported in 2003 for the total western population of the wolverine in Canada is between 15,000 and 19,000 individuals. In the Yukon, populations are considered healthy and stable in all regions. In the Northwest Territories, densities vary with location and are estimated to be highest in the southwest (SARA 2006); however population numbers for the NWT are unknown (ENR 2007).

4.0 CONCLUSION

Aerial and ground-based surveys were conducted in June, July, August and September 2006, following the methodology outlined from previous studies in the study area. Target species, such as moose, woodland caribou, Dall's sheep, breeding birds, raptors and waterfowl were adopted from previous studies and known literature.

In 2006, four aerial ungulate surveys (14 June, 7-8 July, 5 August and 19 September), additional Dall's sheep surveys, ground-based breeding bird surveys (13-17 June), aerial raptor surveys (concurrent with the aerial ungulate surveys) and aerial waterfowl surveys (7 August) were conducted within the wildlife study area (study area), an area of ~ 800 km². The total number of individuals observed both inside and outside of the wildlife study area of both targeted and incidental species was 1,495, including 33 moose, 571 caribou (314 of which were on Mackenzie Barrenlands outside of study area), 35 grizzlies, 337 breeding birds, 17 raptors, 172 waterfowl, 39 shorebirds, and a few other incidental observations including approximately 275 Sandhill Cranes in migration.

The structured surveys yielded a total of 825 observations (visuals) of targeted species within the wildlife study area. These observations comprised two mammal species (moose and woodland caribou) and 63 bird species. The most commonly observed bird species were Golden Eagle, Lesser Scaup, Surf Scoter, Green-winged Teal, Northern Pintail, Red-necked Phalarope, Short-billed Dowitcher, American Tree Sparrow, Common Redstart, Savannah Sparrow and Wilson's Warbler. Additional wildlife observed include grizzly bear, wolf, wolverine (sign), Dall's sheep (sign), beaver, hoary marmot, Common Raven, and ptarmigan.

In addition to the target species, the MacTung study area supports species of special conservation status, including woodland caribou, grizzly bear, wolverine, Peregrine Falcon *anatum*, and Short-eared Owl. All of these species have been documented within the study area either as part of the current program or past wildlife studies (AMAX 1983; AMAX NDb; AMAX 1982; Gill 1978).

5.0 CLOSURE

EBA is pleased to present NATCL with this 2006 Wildlife Report for the MacTung Project. The survey objective was to document wildlife and habitat characteristics within the study area for future regulatory submissions leading to MacTung Project approvals and implementation. We are confident that the data and associated information obtained will assist in supporting this objective.

Respectfully submitted,
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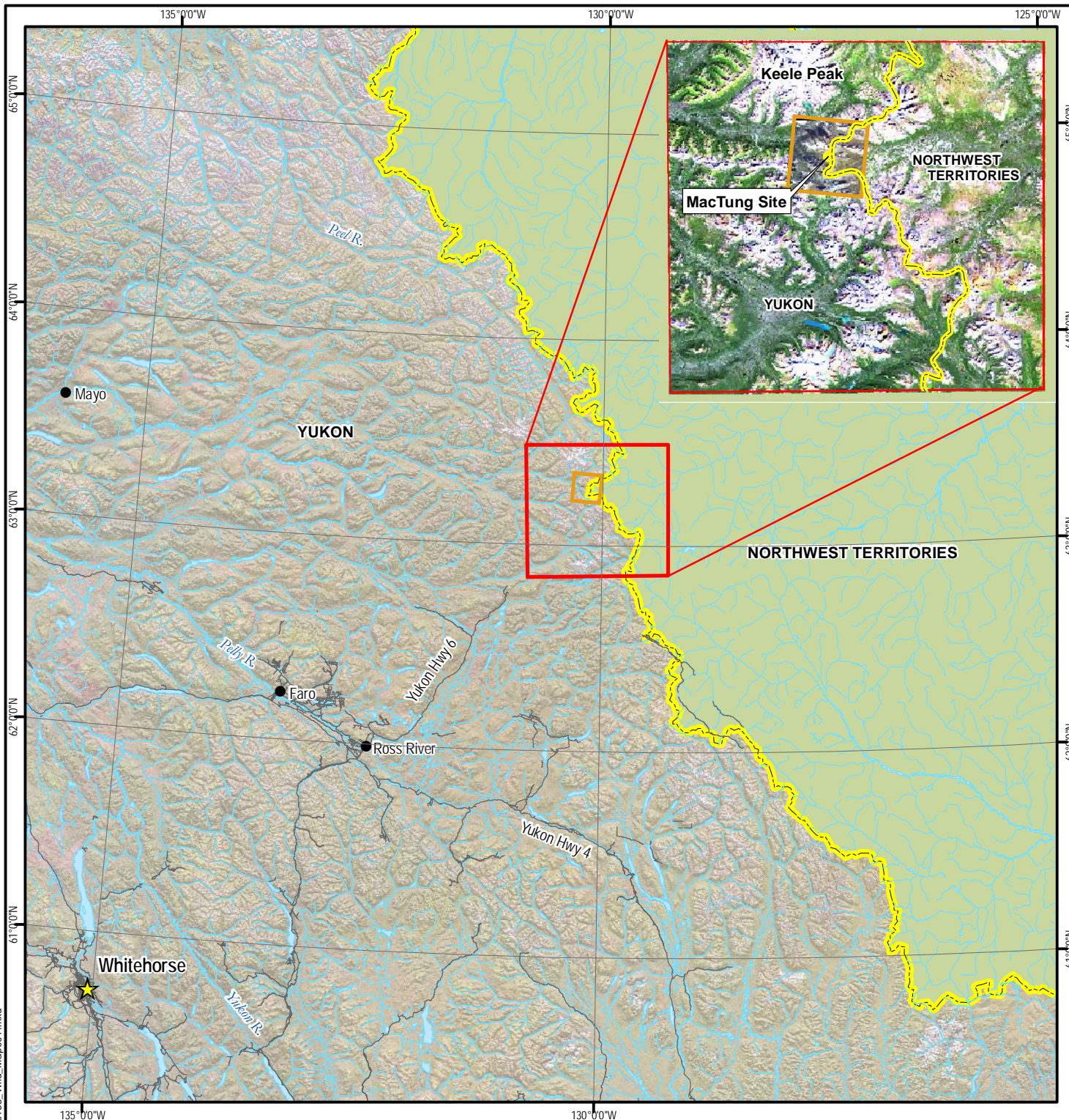
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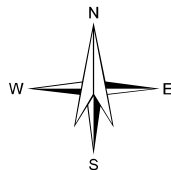
FIGURES





LEGEND

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



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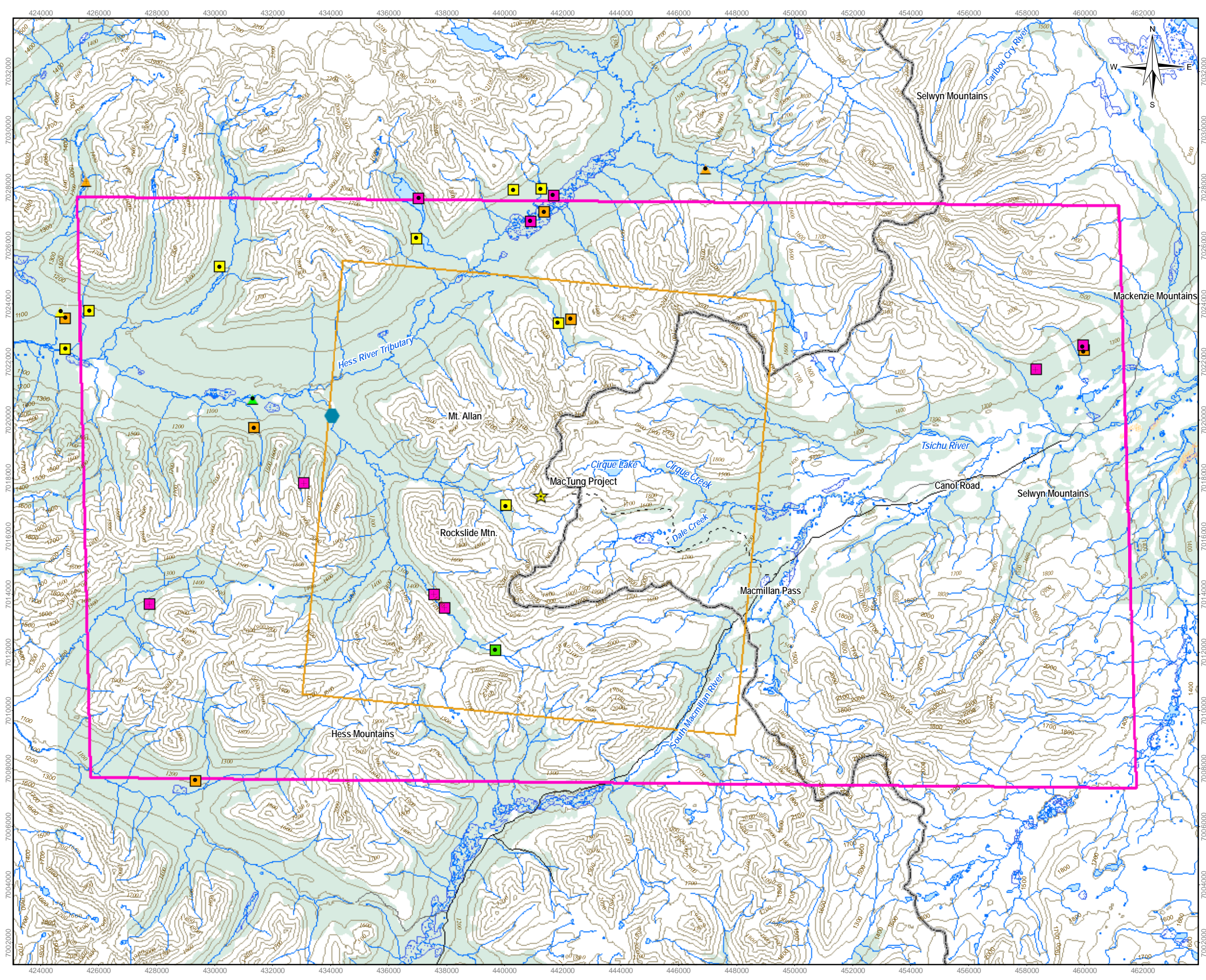
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PROJECT NO. 1200163.004	DWN KMW	CKD TA	REV 1
OFFICE EBA-VANC	DATE May 15, 2007		

EBA Engineering
Consultants Ltd.

Figure 1

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LEGEND

- MacTung Project
- Local Study Area
- Wildlife Study Area
- NWT - Yukon Border
- Known Mineral Lick
- Contour (100m interval)
- Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- 2006 Moose Observations**
- Aerial Ungulate Survey, 14 June
- Aerial Ungulate Survey, 7-8 July
- Aerial Ungulate Survey, 5 August
- Aerial Ungulate Survey, 19 September
- Incidental Observation, 14 June
- Incidental Observation, 7-8 July
- Incidental Observation, 5 August
- Incidental Observation, 19 September
- Observation Type**
- Sign
- Visual

NOTES

Base data source:
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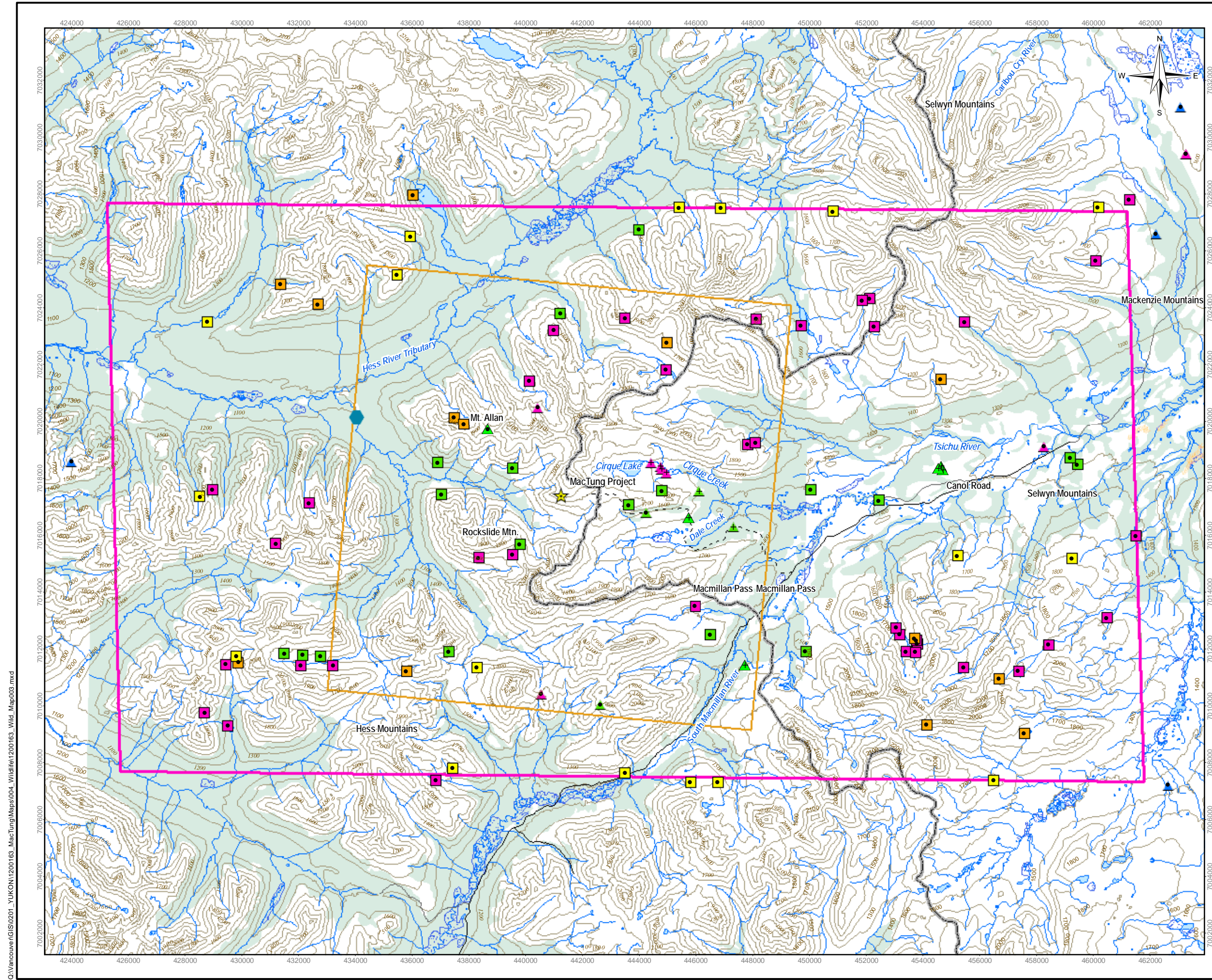
**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

Moose Observations within the Study Area

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Kilometres			
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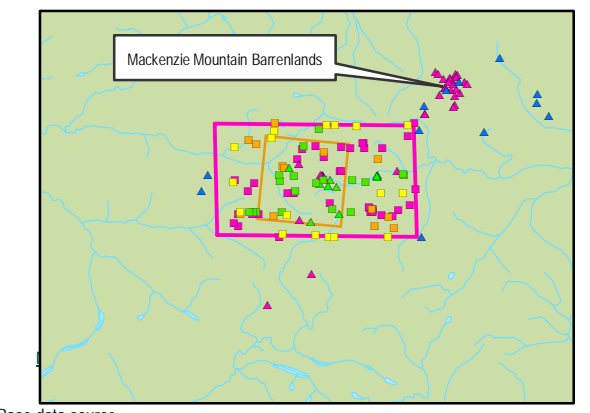


Figure 3



LEGEND

- MacTung Project
 - Local Study Area
 - Wildlife Study Area
 - NWT - Yukon Border
 - Known Mineral Lick
 - Contour (100m interval)
 - Esker
 - Limited-use Road
 - Road
 - Trail
 - Watercourse
 - Waterbody
 - Wetland
- 2006 Caribou Observations**
- Aerial Ungulate Survey, 14 June
 - Aerial Ungulate Survey, 7-8 July
 - Aerial Ungulate Survey, 5 August
 - Aerial Ungulate Survey, 19 September
 - Incidental Observation, 14 June
 - Incidental Observation, 5 August
 - Incidental Observation, 19 September
- Observation Type**
- Sign
 - Visual



Base data source:
NTS 1:50,000

**MACTUNG PROJECT
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**Woodland Caribou (Northern Mountain)
Observations within the Study Area**

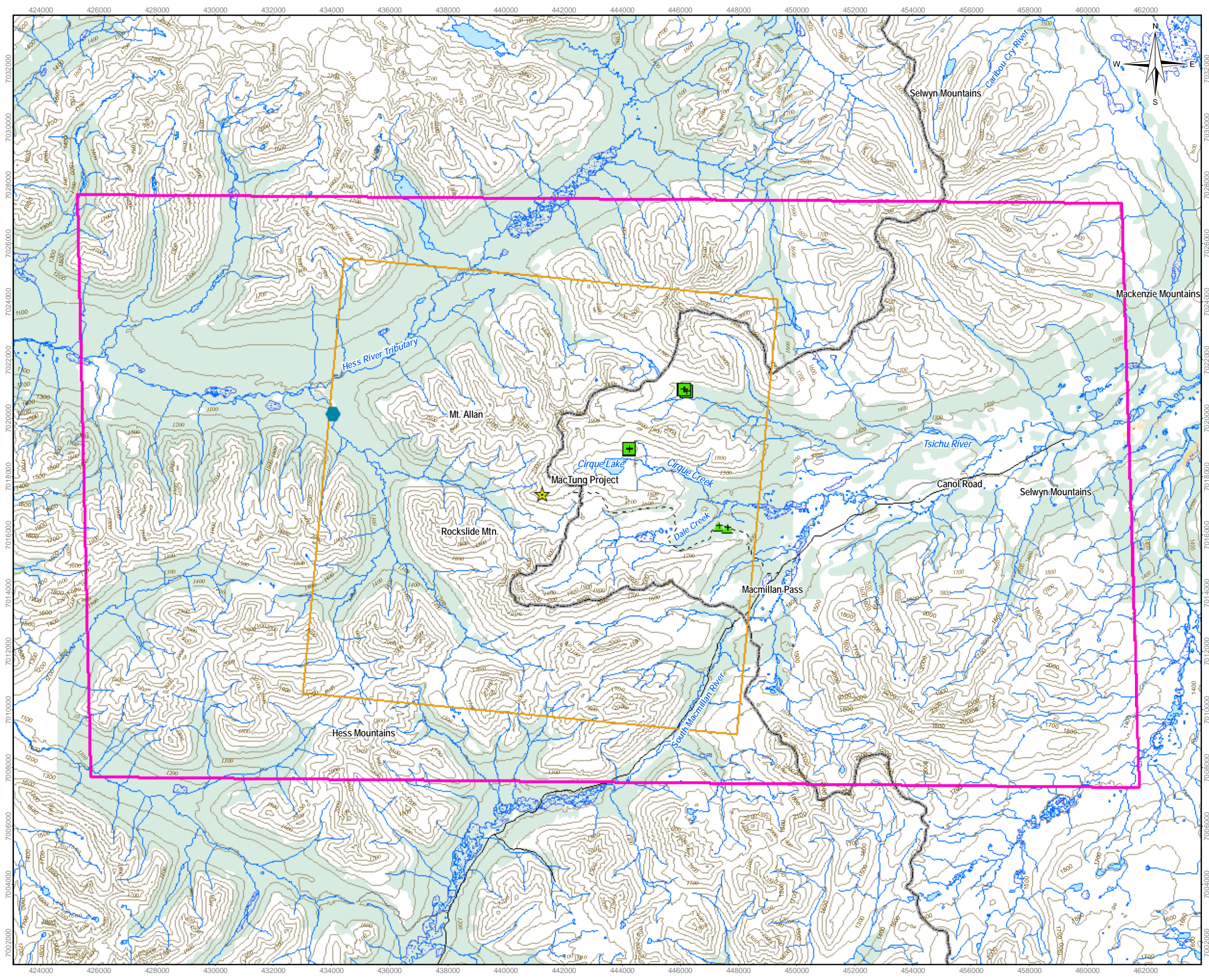
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Kilometres	

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OFFICE EBA-VANC	DATE May 15, 2007		



Figure 4

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LEGEND

- Mactung Project
- Local Study Area
- Wildlife Study Area
- NWT - Yukon Border
- Known Mineral Lick
- Contour (100m interval)
- Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- 2006 Dall's Sheep Observations**
- Aerial Ungulate Survey, 14 June
- Incidental Observation, 14 June
- Observation Type**
- Sign

NOTES

Base data source:
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**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

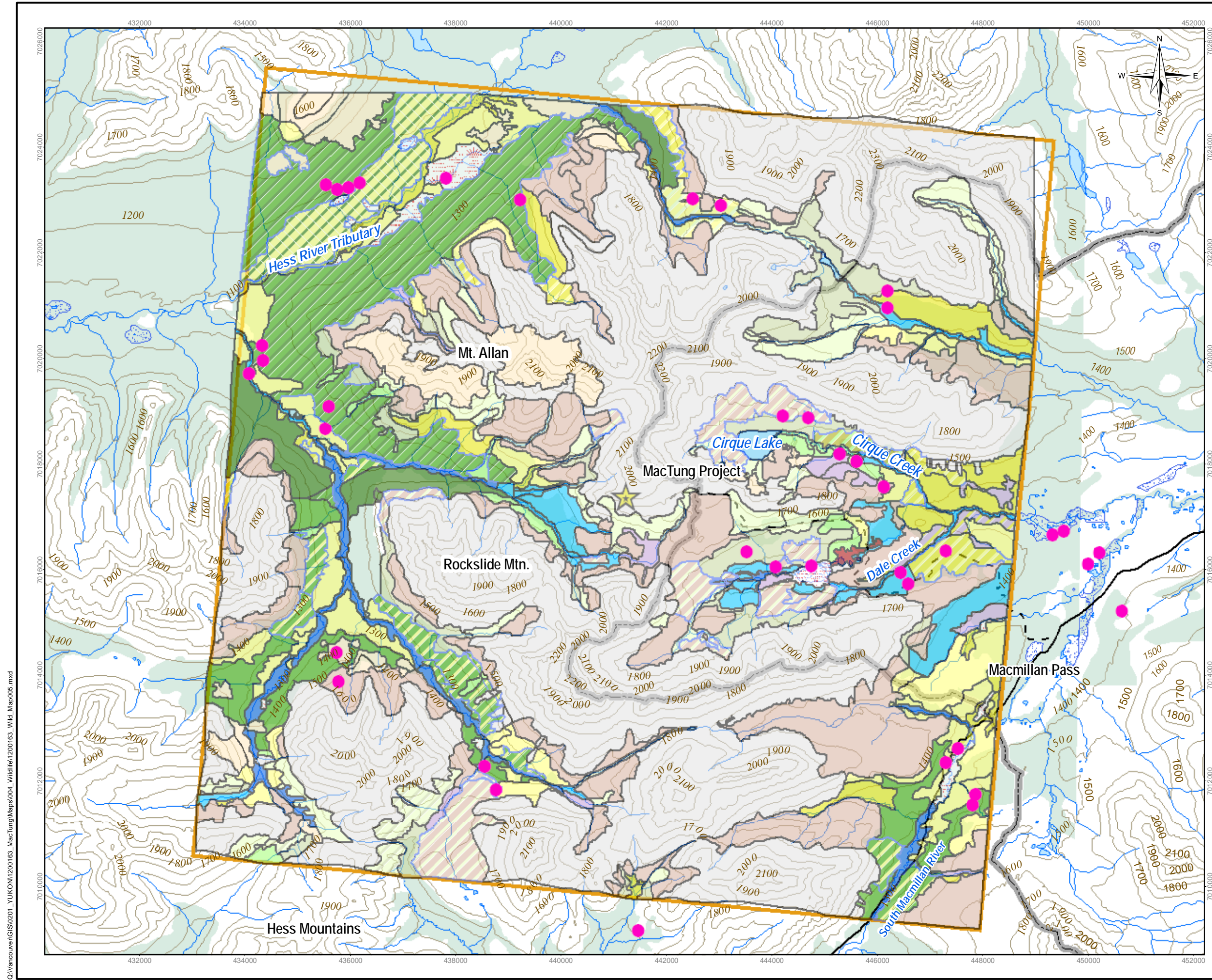
**Dall's Sheep Observations within
the Study Area**

PROJECTION UTM Zone 9	DATUM NAD83
Scale: 1:130,000	
Kilometres	



FILE NO. 1200163_Wild_Map004.mxd			
PROJECT NO. 1200163.004	DWN KMW	CKD KA	REV 2
OFFICE EBA-VANC	DATE May 15, 2007		

Figure 5



LEGEND

- ★ MacTung Project
- Local Study Area
- NWT - Yukon Border
- Contour (100m interval)
- Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- 2006 Breeding Bird Plot Locations

Site Series

Map Unit Polygons

- Birch-Moss:Fir-Moss
- Fir-Lichen
- Fir-Lichen:Fir-Moss
- Fir-Moss
- Birch-Lichen
- Birch-Lichen:Fir-Lichen
- Birch-Lichen:Fir-Moss
- Birch-Lichen: Birch-Moss
- Birch-Moss
- Heath-Lichen
- Heath-Lichen:Fescue-Sedge
- Sedge-Mertensia
- Sedge-Mertensia: Birch-Moss
- Sedge-Potentilla
- Epilithic Lichen
- Fescue-Sedge
- Fescue-Sedge: Birch-Lichen
- Fescue-Sedge:Fescue-Willow
- Fescue-Willow
- Fescue-Willow: Willow-Slope
- No Data
- Willow-Sedge
- Willow-Mertensia
- Marsh/Fen
- Water
- Willow-Slope

NOTES

Base data source:
NTS 1:50,000

**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

**Breeding Bird Plot Locations
within the Study Area**

PROJECTION UTM Zone 9	DATUM NAD83
Scale: 1:70,000	
1 0.5 0 1 2 Kilometres	
FILE NO. 1200163_Wild_Map005.mxd	
PROJECT NO. 1200163.004	DWN KMW
OFFICE EBA-VANC	CKD KA
DATE May 15, 2007	REV 2

EBA Engineering Consultants Ltd.

Figure 6

C:\Vancouver\GIS\2007\1200163_MacTung\Map005.mxd

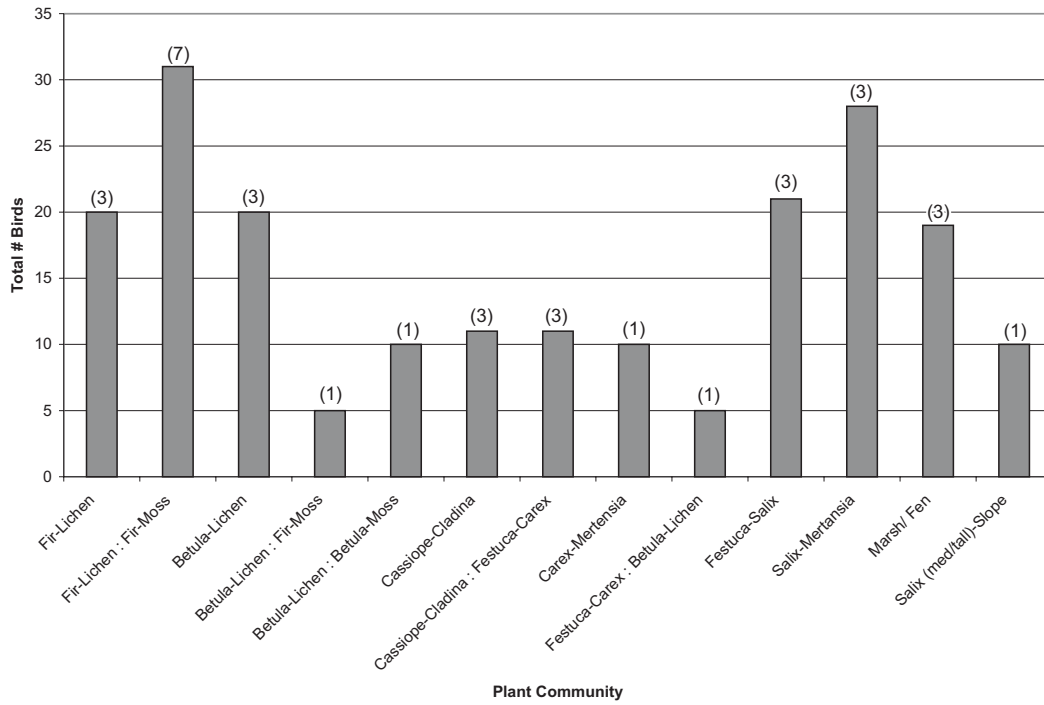


Figure 7. Total number of birds observed in each of the 13 plant communities surveyed. Number in parentheses above each bar indicates the number of plots surveyed in that habitat type.

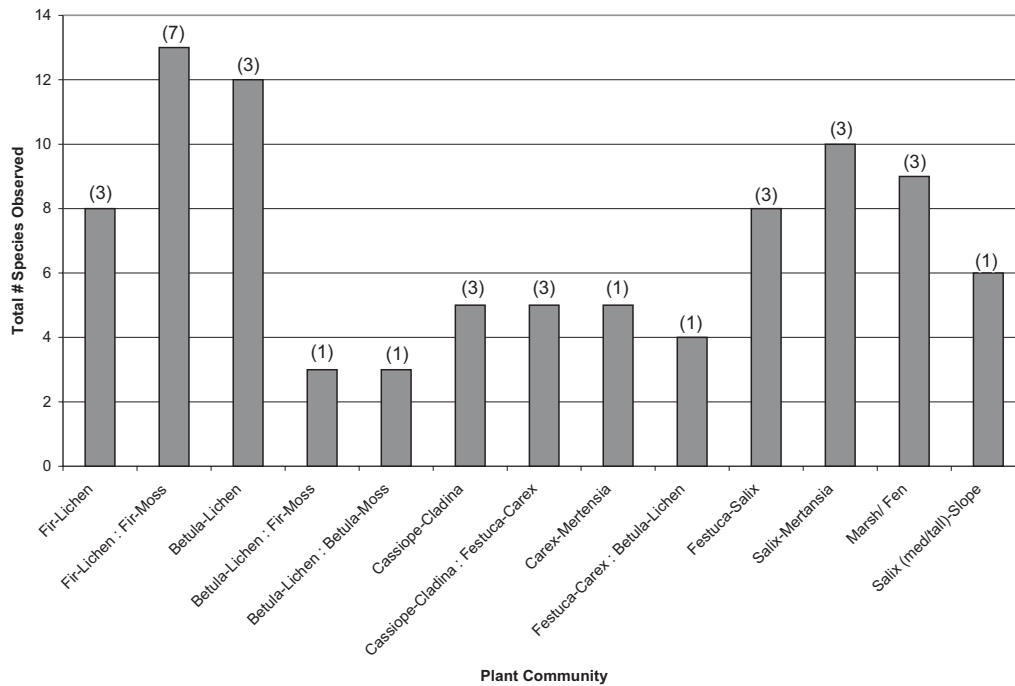


Figure 8. Total number of species observed in each of the 13 plant communities surveyed. Number in parentheses above each bar indicates the number of plots surveyed in that habitat type.

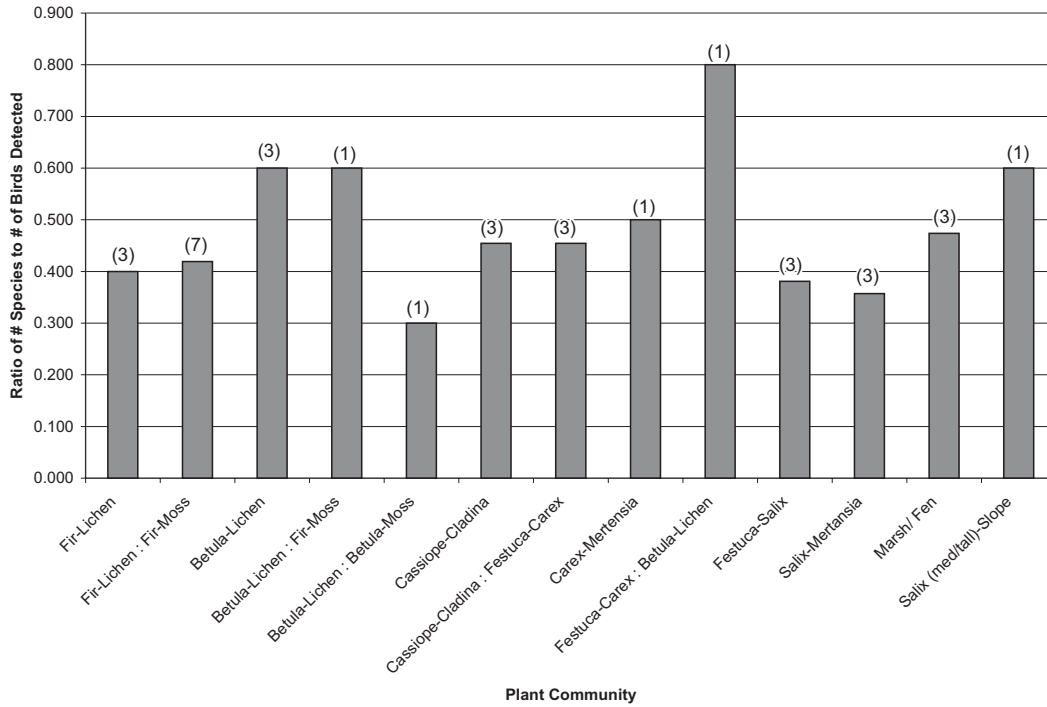


Figure 9. Species richness observed in each of the 13 plant communities surveyed. Number in parentheses above each bar indicates the number of plots surveyed in that habitat type.

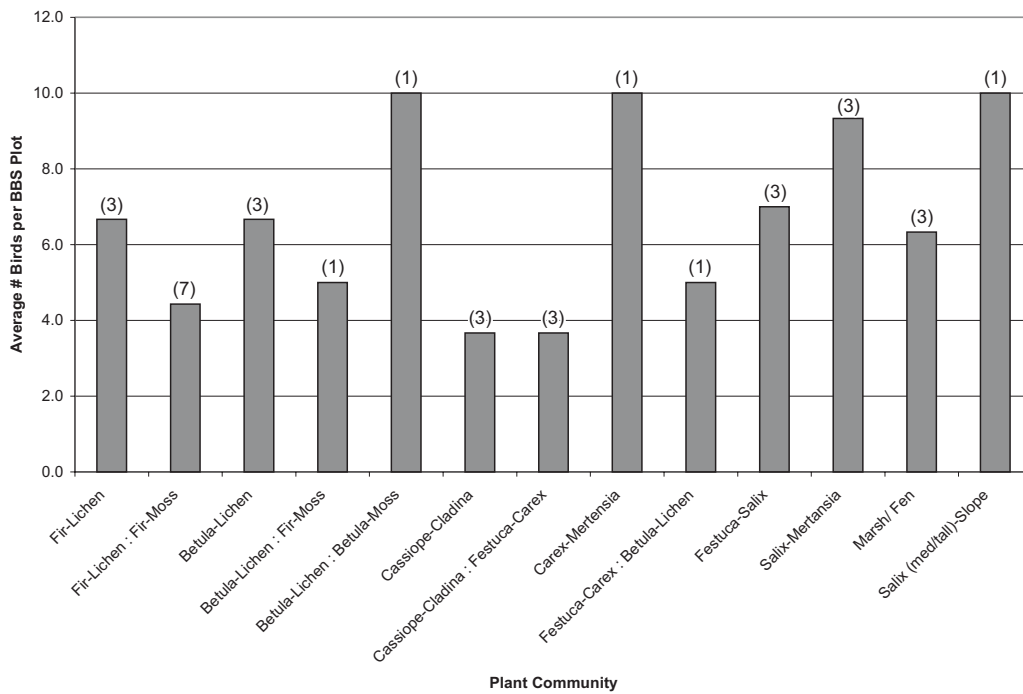
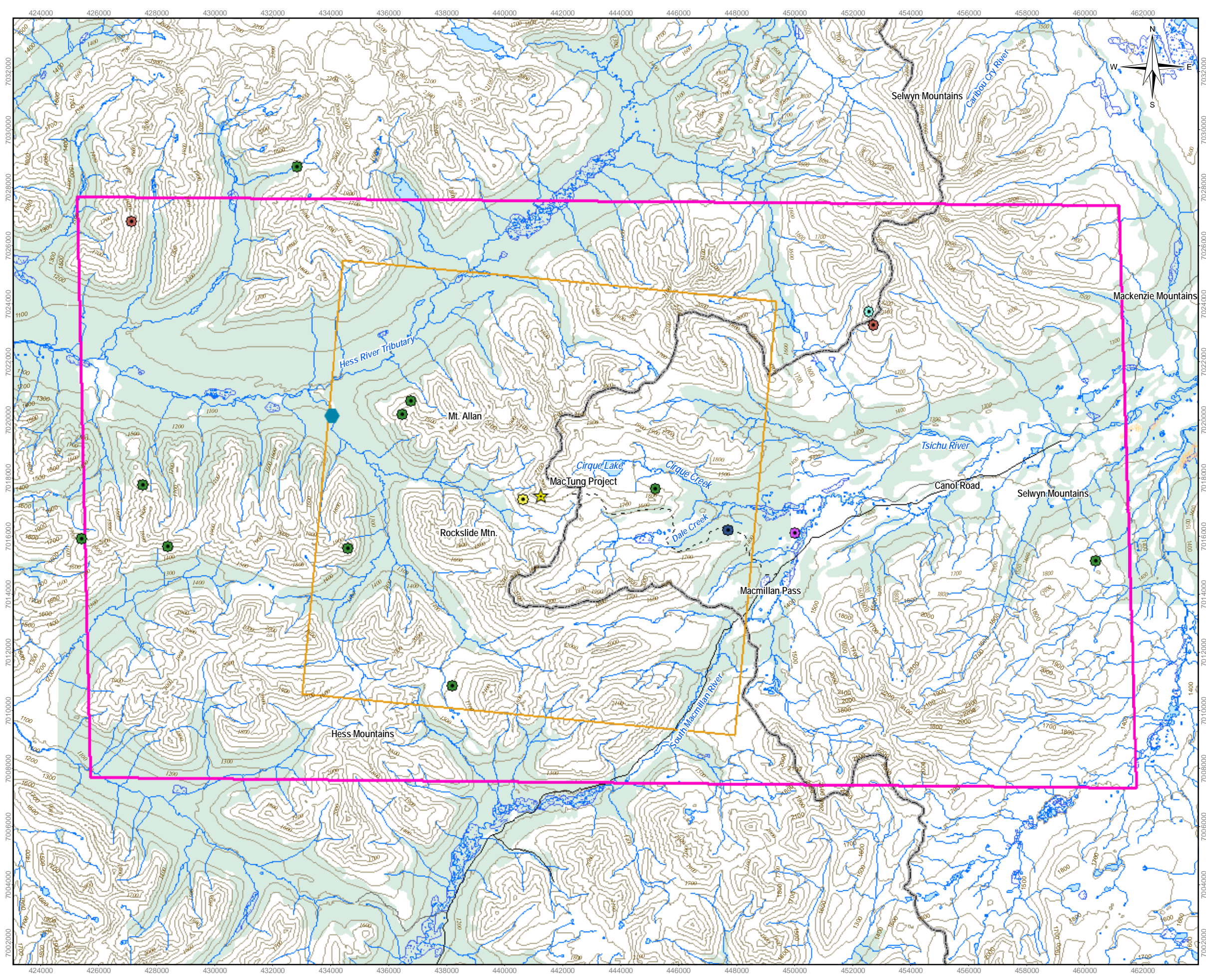


Figure 10. Average number of birds observed per point count in the 13 plant communities surveyed. Number in parentheses above each bar indicates the number of plots surveyed in that habitat type.

C:\Yankee\GIS\0201_YUKON\1200163_Mactung\Maps\004_Wildlife\1200163_Wild_Map006.mxd



LEGEND

- Mactung Project
- Local Study Area
- Wildlife Study Area
- NWT - Yukon Border
- Known Mineral Lick
- Contour (100m interval)
- Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- 2006 Raptor Species**
- Bald Eagle
- Common Raven
- Golden Eagle
- Northern Harrier
- Peregrine Falcon
- Rough-legged Hawk
- Observation Type**
- Visual

NOTES

Base data source:
NTS 1:50,000

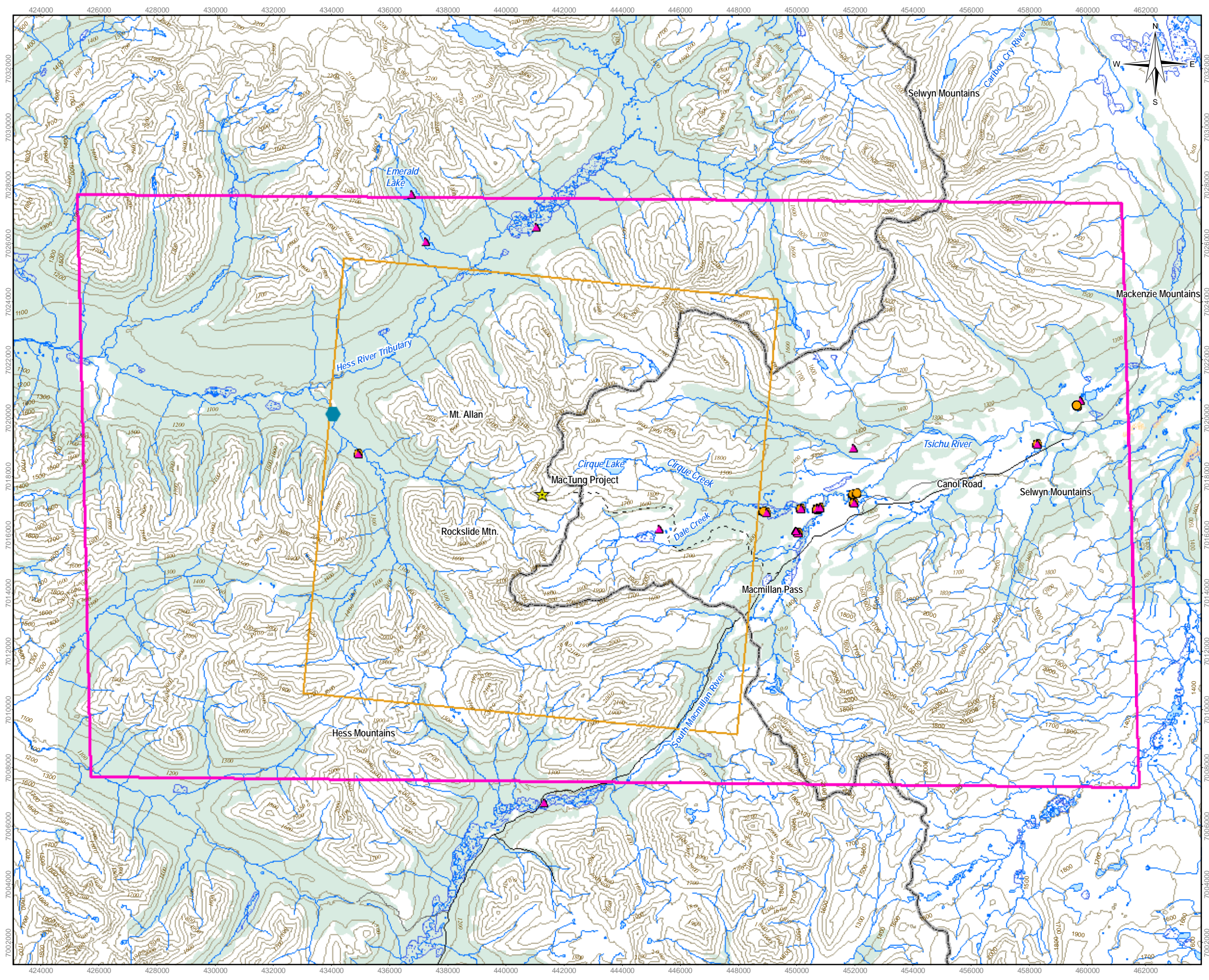
**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

**Raptors Observations
within the Study Area**

PROJECTION UTM Zone 9	DATUM NAD83		
Scale: 1:130,000			
Kilometres			
FILE NO. 1200163_Wild_Map006.mxd			
PROJECT NO. 1200163.004	DWN KMW	CKD KA	REV 3
OFFICE EBA-VANC	DATE May 15, 2007		

EBA Engineering Consultants Ltd.

Figure 11



LEGEND

- ★ MacTung Project
- Local Study Area
- Wildlife Study Area
- NWT - Yukon Border
- Known Mineral Lick
- Contour (100m interval)
- ▨ Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- ▲ 2006 Waterfowl Observations, 7 August
- 2006 Shorebird Observations, 7 August

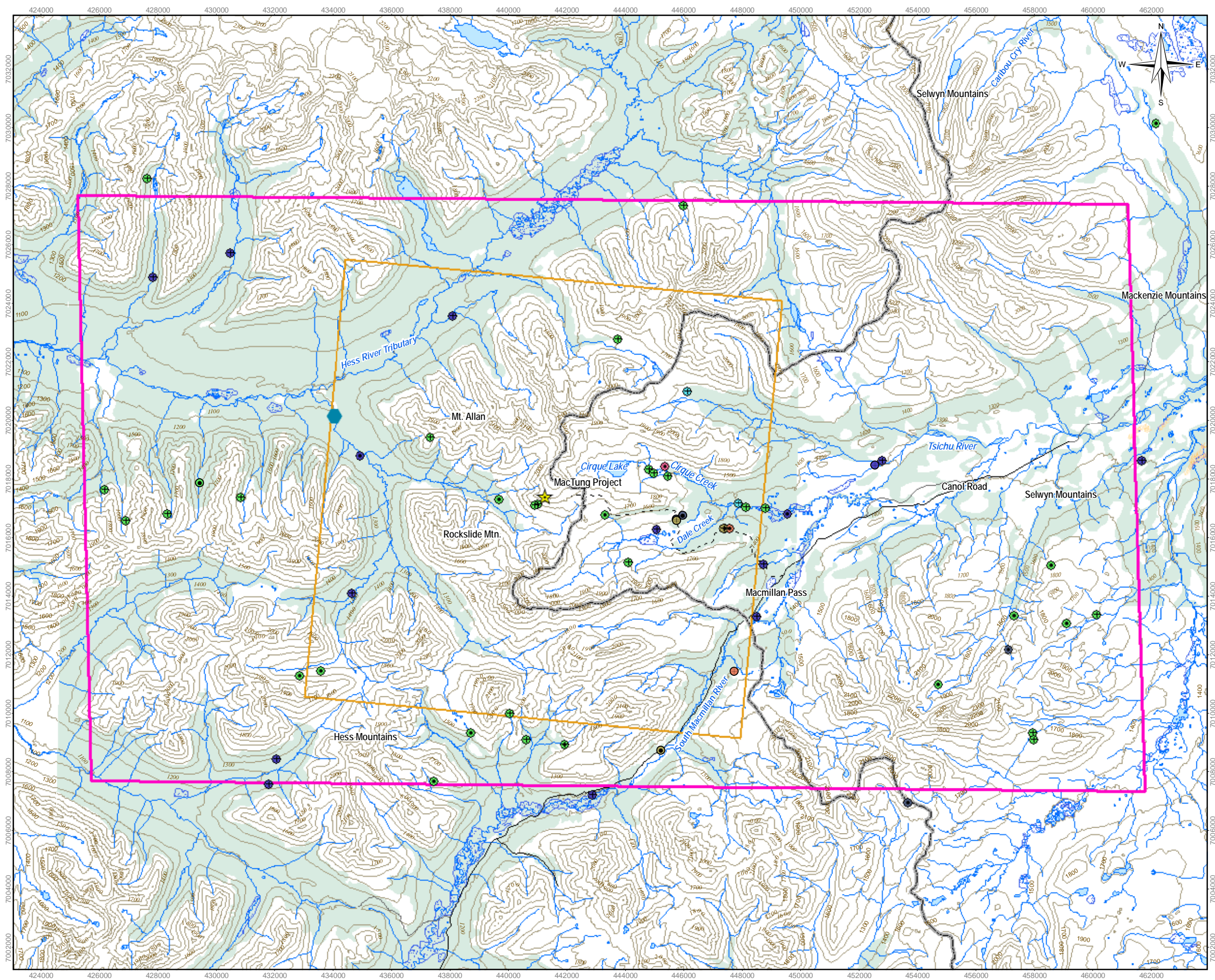
NOTES
Base data source:
NTS 1:50,000

**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

**Waterfowl and Shorebird Observations
within the Study Area**

PROJECTION UTM Zone 9	DATUM NAD83
Scale: 1:130,000	
EBA Engineering Consultants Ltd.	
FILE NO. 1200163_Wild_Map007.mxd	
PROJECT NO. 1200163.004	DWN KMW
OFFICE EBA-VANC	CKD KA
DATE May 15, 2007	REV 2

Figure 12



LEGEND

- MacTung Project
- Local Study Area
- Wildlife Study Area
- NWT - Yukon Border
- Known Mineral Lick
- Contour (100m interval)
- Esker
- Limited-use Road
- Road
- Trail
- Watercourse
- Waterbody
- Wetland
- 2006 Species**
- Beaver
- Grizzly Bear
- Ground Squirrel
- Hoary Marmot
- Ptarmigan
- Wolf
- Wolverine
- Observation Type**
- Sign
- Visual

NOTES

Base data source:
NTS 1:50,000

**MACTUNG PROJECT
2006 ENVIRONMENTAL BASELINE STUDIES
WILDLIFE REPORT**

**Miscellaneous Wildlife
within the Study Area**

PROJECTION UTM Zone 9	DATUM NAD83		
Scale: 1:130,000			
Kilometres			
FILE NO. 1200163_Wild_Map009.mxd			
PROJECT NO. 1200163.004	DWN KMW	CKD KA	REV 3
OFFICE EBA-VANC	DATE May 15, 2007		



Figure 13



PHOTOGRAPHS





Photo 1

Bull moose observed during fall aerial survey standing in wooded lowland riparian habitat. Photograph taken in September 2006.



Photo 2

Riparian zones are important moose habitat in this region. Photograph taken in August 2006.



Photo 3

Mineral licks are important ungulate habitat. The mineral lick pictured here, in the MacTung study area, is heavily used by moose, caribou and Dall's sheep as evidenced by moose antler shed and numerous ungulate tracks. Photograph taken in August 2006.

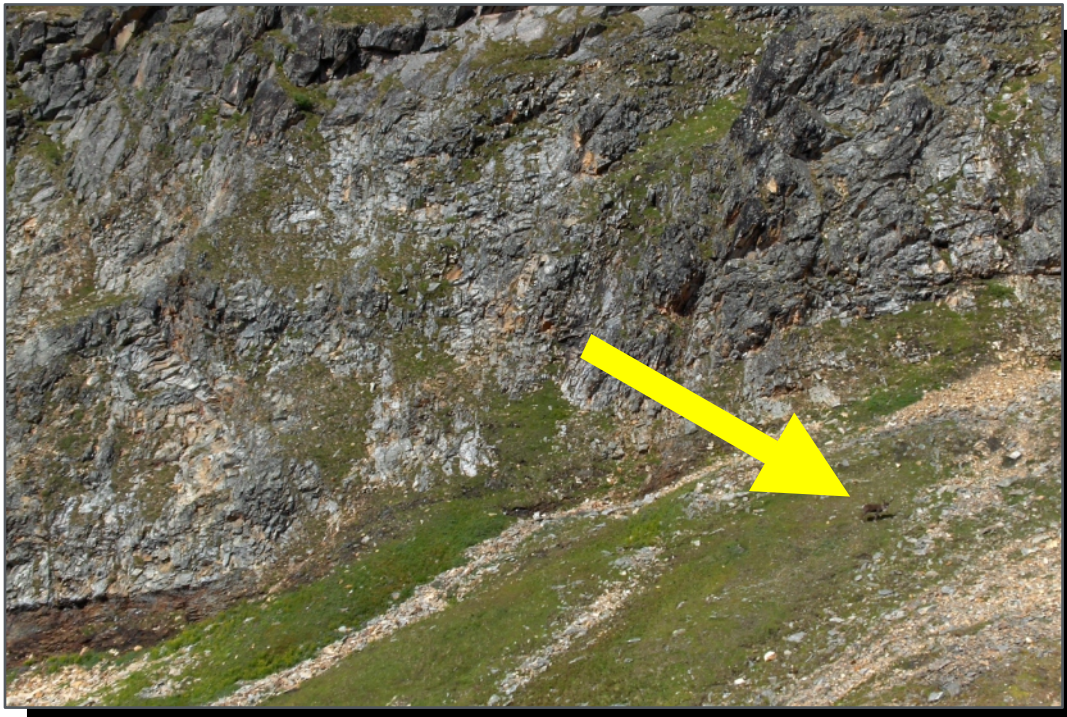


Photo 4

Adult male woodland caribou observed in high alpine habitat during an early August aerial survey. Photograph taken in August 2006.



Photo 5

Caribou trails, such as these, are commonly seen on scree slopes throughout the study area. Photograph taken in September 2006.



Photo 6

Sheep pellet groups were observed at a couple of locations in alpine habitat. The sheep pellet group pictured here was observed close to Cirque Lake. Photograph taken in June 2006.



Photo 7

Woodland caribou and Dall's sheep (ewe and lamb) tracks were observed along a portion of the MacTung mining road.
Photograph taken in June 2006.



Photo 8

Ponds such as these are heavily used by breeding waterfowl. On this particular pond, multiple broods of Harlequin Ducks were observed. All of these ponds are typically inhabited by beavers; this photo depicts a dam and a lodge.
Photograph taken in August 2006.

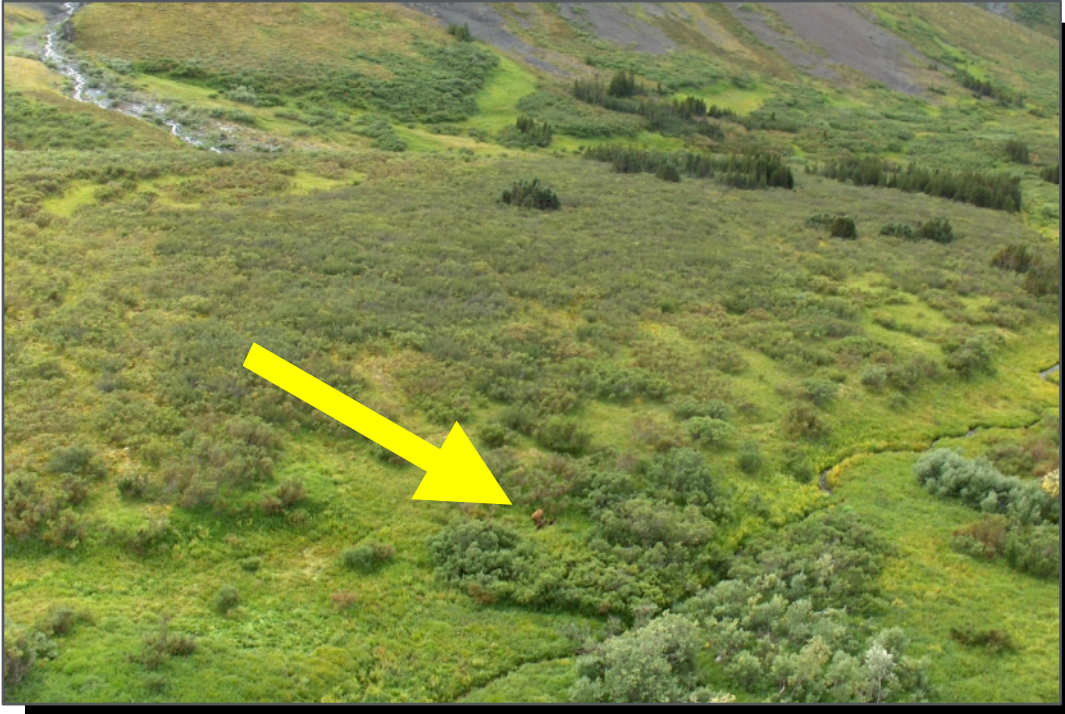


Photo 9

Grizzly bears are commonly observed during aerial surveys. Pictured here is a sow with three cubs. Photograph taken in August 2006.



Photo 10

This is a freshly dug grizzly bear den observed along one of the tributaries to the Tsichu River. This den was located at 1400-m elevation and had a southwest aspect, typical of bear dens in this region. Photograph taken in August 2006.



Photo 11

Fresh wolf tracks along the Tsichu River (Adult male human hand print is to provide an indication of size of wolf paw).
Photograph taken in July 2006.