CopperFox Metals Inc.

Schaft Creek Project

British Columbia, Canada

Schaft Creek
Bat Inventory 2007

Prepared by:

Rescan Tahltan Environmental Consultants
Vancouver, British Columbia

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EXECUTIVE SUMMARY

Executive Summary

Copper Fox Metals Inc. is proposing to develop a copper-gold-molybdenum-silver property within the Schaft Creek watershed 80 km south of Telegraph Creek in northwestern British Columbia. In preparation of an Environmental Assessment Application for the Schaft Creek Project, data were collected to characterise the baseline conditions of the area. Baseline inventory efforts focussed on determining the wildlife species that may occur within the proposed development area.

Prior to initiation of the baseline work presented herein, little inventory work had been completed for bats within the region of the Project area. Desk-based research suggested that a number of species potentially exist within the development area, including one blue-listed species; northern long-eared myotis (*Myotis septentrionalis*). To identify the extent of habitat use and potential for species at risk to occur within the area of the proposed development, an inventory was conducted in June and July of 2007. The methodologies used to determine bat species present in the region included recording bat echolocation calls with an Anabat II detector and mist-net capture.

Four locations near the proposed mine site were surveyed on five separate nights. One location was surveyed in both June and July. Survey sites were selected based on their suitability as bat foraging habitat. Specifically, survey sites included open, wet areas that would produce abundant insect prey and were adjacent to conifer vegetation that may provide bat roosts. Bats were detected at two of the four sites. From review of the sonograms generated, little brown myotis (*M. lucifugus*) was detected. Additional detections also indicated the presence of long-eared bats, including western long-eared myotis (*M. evotis*) or the blue-listed northern long-eared myotis (*M. septentrionalis*). Bats are suspected of exploiting the site during the growing season; however, there is little likelihood of hibernacula (*i.e.*, winter hibernating habitat) being supported in the study area.

ACKNOWLEDGEMENTS

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GLOSSARY

Glossary

AnaBat System:

A system designed to help users identify and survey bats by detecting and analyzing their echolocation calls. There are three main components to the system, a Bat Detector, a ZCAIM and software. A Bat Detector is used to produce audible output from the ultrasonic sounds (inaudible to the unaided human ear) that bats use to echolocate. The ZCAIM (Zero-Crossings Analysis Interface Module) is a piece of hardware that interfaces the audio-frequency signal from the Bat Detector to a PC. Recorded call parameters of bats are converted to AnaBat sequence files, which can be viewed as sonogram output and manipulated using Analook software.

AnaBat Sequence Files:

Data files produced by the AnaBat System that describe bat call parameters.

Bat Detector:

Any device used to render the ultrasonic calls of a bat audible to the unaided human ear.

Calcar:

A cartilaginous spur in some bats that projects from the ankle along the edge of the tail membrane. The presence or absence of a calcar is an important identification trait.

Call Parameters:

A set of measurable factors that describe a bat's call (*e.g.*, frequency, duration and repetition rate), and allow for the identification of different species of bats.

Duration:

The total time that a single call lasts, excluding any echoes.

Echolocation:

The use of acoustic signals by animals, often in the ultrasonic range, to locate objects or prey in their environment. The most sophisticated form of echolocation is used by bats.

Forearm Length:

Length of the bat forearm measured from wrist to elbow

Frequency:

The number of cycles of a sound wave, measured in kHz. The higher the number, the higher the sound is in pitch.

Habitat Suitability:

The ability of the habitat in its current condition to provide the life requisites of a species.

Hibernaculum:
The winter hibernating habitat or shelter of an animal (plural: hibernacula).

Life Requisites:
Specific activities of an animal that are critical for sustaining and perpetuating the species and that depend on particular habitat attributes or conditions. Life requites include feeding, security, thermal, breeding, migration, hibernation, *etc.*

Mass:
A measure of the amount of matter contained in or constituting a physical body.

Morphology:
The form and structure of an organism or one of its parts. Important morphometric measurements for bats include mass, forearm length and calcar length.

Population:
A collection of individuals of the same species that potentially interbreed.

Riparian Habitat:
Vegetation growing close to a watercourse, lake, swamp or spring that is generally critical for wildlife cover, fish food organisms, stream nutrients and large organic debris, and for streambank stability.

Roost:
Any site used by bats for rest, sleep, torpor, food digestion, shelter etc. A distinction can be made between day and night roosts. Day roosts tend to be used on a more permanent basis, whereas night roosts are sites used temporarily at night between foraging bouts. A maternal roost is used for birthing of young.

Search Phase Call:
A vocalization produced by bats to detect what is present in the vicinity of the bat, be it food or obstacles that the bat must navigate around. These calls are often species-specific and can thus be used to identify the type of bat making the call.

Sonogram:
A pictorial representation of a bat call in the form of a graph of sound frequency against time.

Structural Stage:
Describes the existing dominant vegetation appearance for a land area. Factors such as disturbance history, stand age and species composition all influence structural stage. Structural stages range from non-vegetated (1) to old growth forests (7).

Tragus:
A thin cartilaginous structure attached to the base of the ear in bats.

Ultrasonic:

Any sound above 20 kHz, which is generally inaudible to human hearing.

Voucher Specimen:

A representative specimen, such as a sonogram, that is collected in biological field surveys and research, and is preserved to permit independent verification of results and to allow for further study.

1. INTRODUCTION

1. Introduction

Copper Fox Metals Inc. (Copper Fox) is proposing to develop a copper-gold-molybdenum-silver property within the Schaft Creek watershed 80 km south of Telegraph Creek in northwestern British Columbia. In preparation of an Environmental Assessment Application for the Schaft Creek Project, data were collected to characterise the baseline conditions of the area. Baseline inventory efforts focused on determining the wildlife species that may occur within the proposed development area.

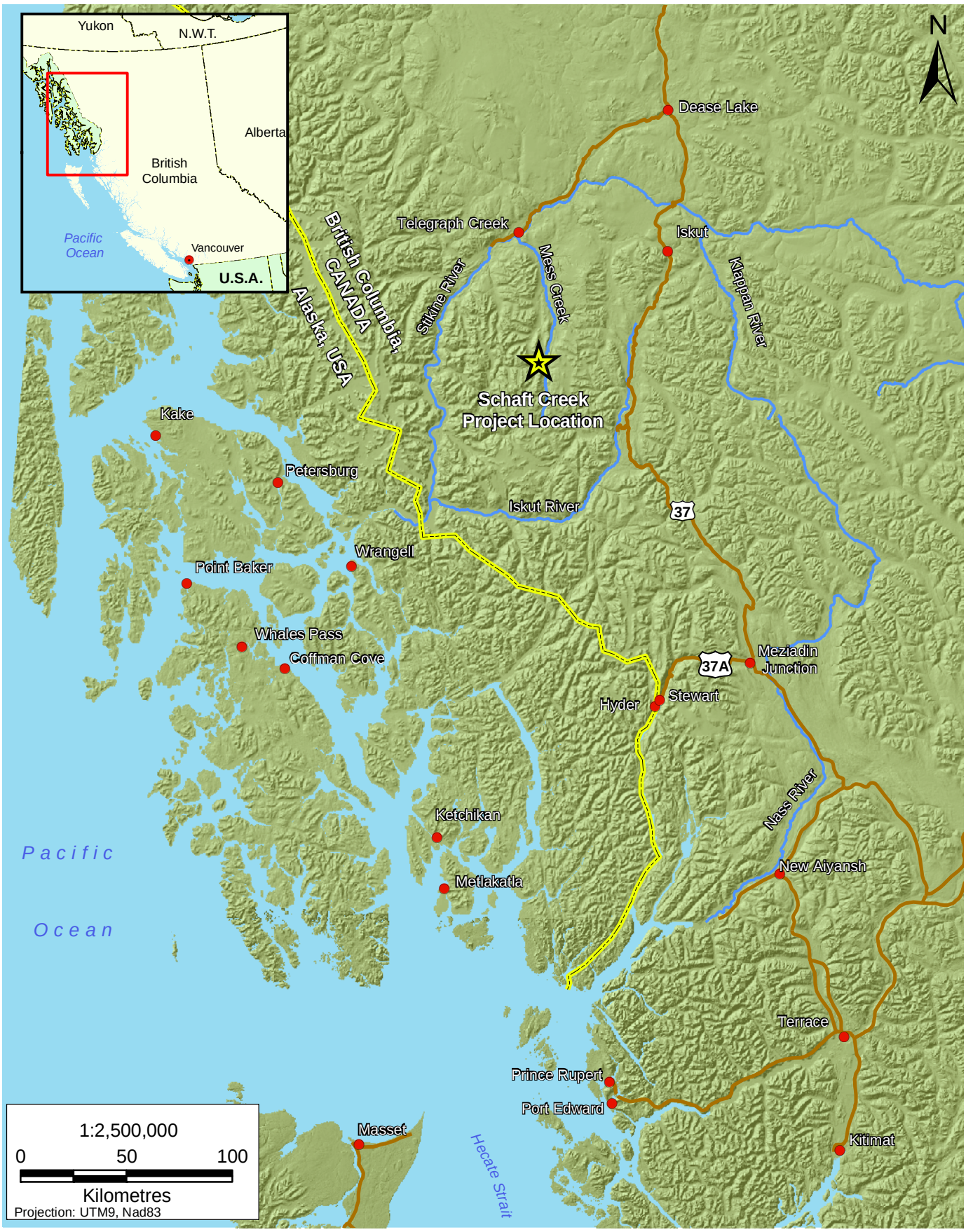
Little is known about bats within the area associated with the proposed development. Prior to implementing this study, it was not known whether the mid and higher elevation habitat present within the Schaft Creek property supports some species of bats. Recent work in the Northwest Territories (Lausen, 2006) suggests that bats may exploit areas previously not associated with suitable habitat, such as the cooler areas in the northern latitudes. There are a number of bat species at risk in British Columbia, many with unknown distributions. The distribution of one species at risk, the provincially blue-listed northern long-eared myotis (*M. septentrionalis*) is suggested to occur within the study area (Nagorson and Brigham, 1995) and may potentially occupy areas near the proposed development. The Keen's long-eared myotis (*M. keenii*) is often emphasised for inventory in northwestern B.C.; however, it has since been re-listed from red to unknown status. Although the distribution of the Keen's long-eared myotis is unknown in B.C., its association with coastal areas (Nagorson and Brigham, 1995) suggests it is unlikely to occur in the Schaft Creek watershed.

Given the uncertainty associated with bat use of the region, and difficulties in differentiating to the species level of taxonomic organization using efficient survey techniques, an initial inventory was undertaken to determine the presence or absence of bats within areas supporting the most suitable bat habitat. The principle objective was to determine if and to what extent bats may exist within the area of the mine site and secondly to determine if species at risk (*i.e.*, northern long-eared myotis) may exist in the area.

1.1 Schaft Creek Project Summary

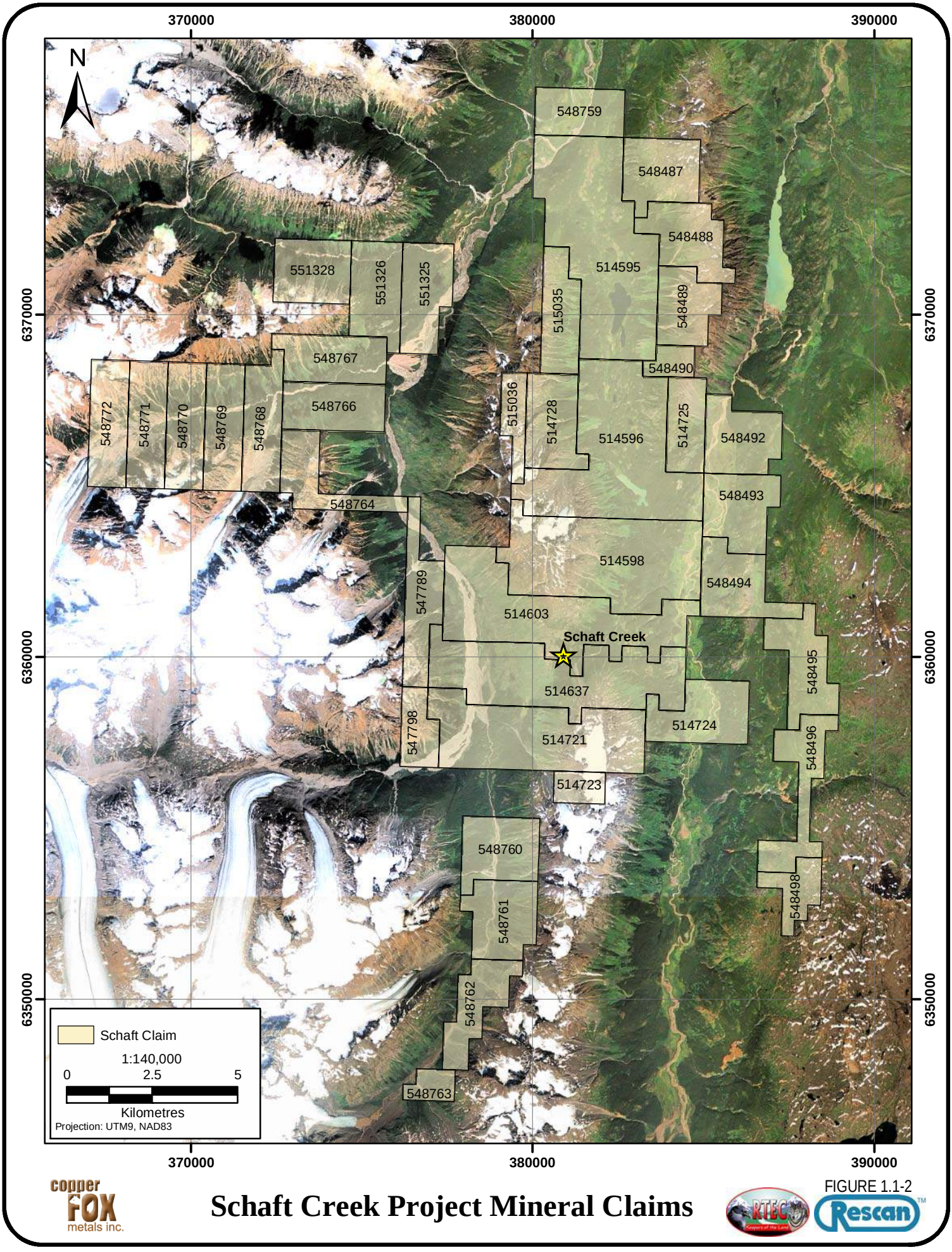
Copper Fox Metals Inc. (Copper Fox) is a Canadian mineral exploration and development company focused on developing the Schaft Creek deposit located in north-western British Columbia, approximately 60 km south of the village of Telegraph Creek Creek (Figure 1.1-1). The Schaft Creek deposit is a polymetallic (copper-gold-silver-molybdenum) deposit located in the Liard District of northwestern British Columbia (Latitude 57^{o} 22' 4.2''; Longitude 130^{o}, 58' 48.9"). The property is comprised of 40 mineral claims covering an area totalling approximately 20,932 ha within the Cassiar Iskut-Stikine Land and Resource Management Plan (Figure 1.1-2).

The Schaft Creek Project is located within the traditional territory of the Tahltan Nation. Copper Fox has been in discussions with the Tahltan Central Council (TCC) and the Tahltan Heritage Resources Environmental Assessment Team (THREAT) since initiating exploration activities in 2005. Copper Fox has engaged in numerous agreements with the TCC including a



Location Map for Schaft Creek Project

FIGURE 1.1-1



Schaft Creek Project Mineral Claims

FIGURE 1.1-2

Communications Agreement, Traditional Knowledge Agreement, Letter of Understanding with the Tahltan Nation Development Corporation (TNDC) and a THREAT Agreement. Copper Fox will continue to work together with the Tahltan Nation as work on the Schaft Creek Project continues.

The Schaft Creek deposit was discovered in 1957 and has since been investigated by prospecting, geological mapping, geophysical surveys as well as diamond and percussion drilling. Over 65,000 meters of drilling has been completed on the property as of end of 2007. Additional drilling is planned for 2008 to support future economic assessments of the property and an environmental assessment application.

The Schaft Creek Project entered the British Columbia environmental assessment process in August 2006. Although a formal federal decision has not yet been made, the Project will likely require federal approval as per the Canadian Environmental Assessment Act. Copper Fox has targeted the end of 2008 for submission of their Schaft Creek Environmental Assessment Application.

Copper Fox has recently released a scoping level engineering and economic report for Schaft Creek. The mine and associated infrastructure are presented in Figure 1.1-3. The current mine plan has ore milled from an open pit at a rate of 65,000 tonnes/day. The Schaft deposit will be mined with large truck/shovel operations and typical drill and blast techniques. An explosives manufacturing facility will be constructed on-site to support blasting activities. The mine plan includes 719 million tonnes of minable ore over a 31 year mine life. The Project is estimated to generate up to 1,200 jobs during the construction phase of the project and approximately 500 permanent jobs during the life of the mine.

Ore will be crushed, milled and filtered on-site to produce copper and molybdenum concentrates. The mill will include a typical comminution circuit (Semi-Autogenous Mill, Ball Mill and Pebble Crusher) followed by a flotation circuit and a copper circuit with thickener, filtration and concentrate loadout and shipping. The mill includes a designated molybdenum circuit with thickener, filtration circuit, drying and bagging. The filter plant will be located at the plant site. A tailings thickener and water reclaim system will be used to recycle process water. The circuit will have a design capacity of 70,652 tonnes per day and a nominal capacity of 65,000 tonnes per day (23,400,000 tonnes per year). The copper and molybdenum concentrates will be shipped via truck from the mill to the port of Stewart, BC.

Copper Fox will construct an access road from Highway 37 to the Schaft Creek property. Access to the property from Highway 37 will require approximately 105 km of new road. The first 65 km of the access road to the Schaft Creek property corresponds to the Galore Creek access road. NovaGold and Teck Cominco have currently put a hold on future construction efforts along their access road and the overall Galore Creek Project. Copper Fox will seek approval from the provincial government and NovaGold/Teck Cominco to construct the first 65 km of the Galore Creek access road should the status of the project not change.

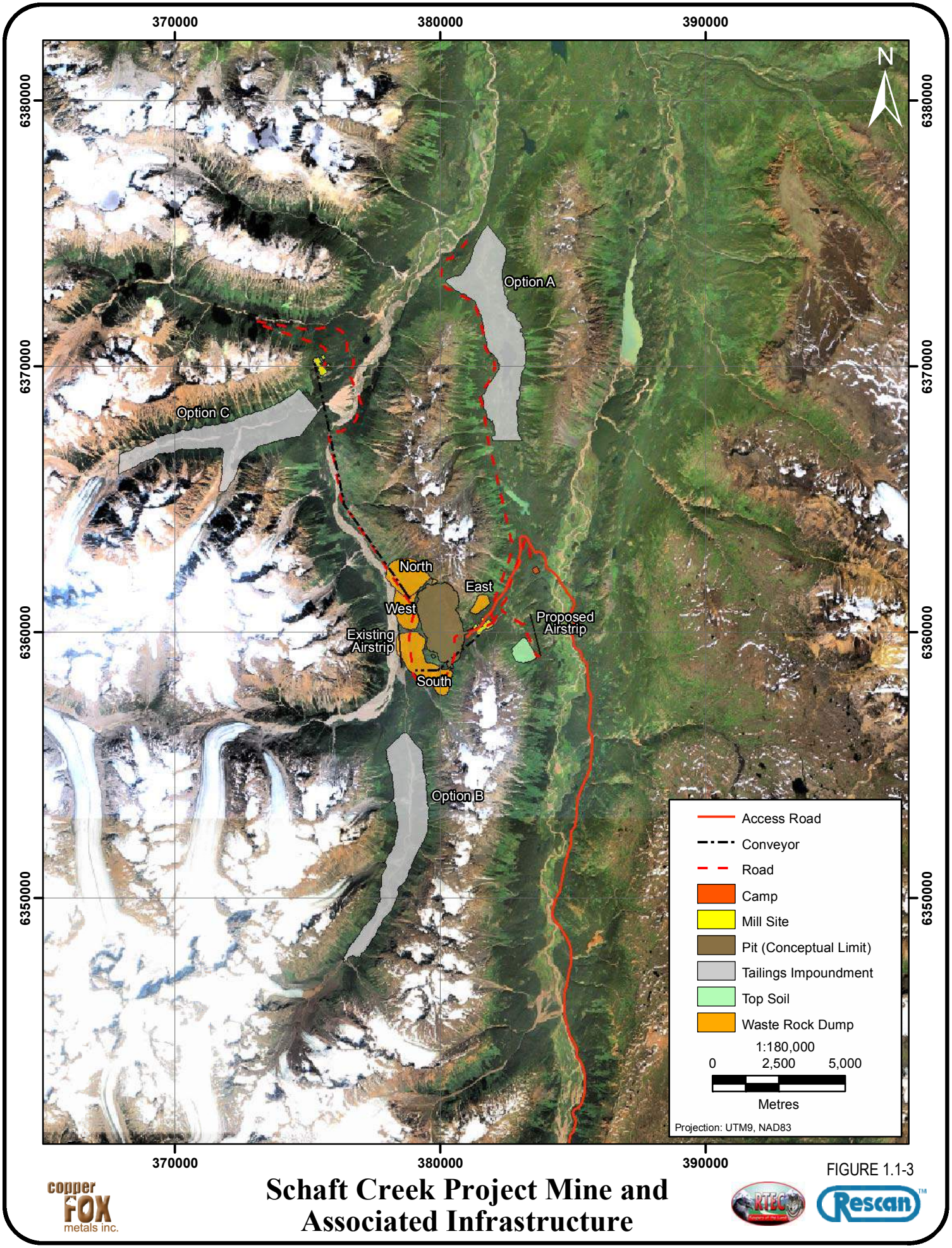


FIGURE 1.1-3

Schaft Creek Project Mine and Associated Infrastructure

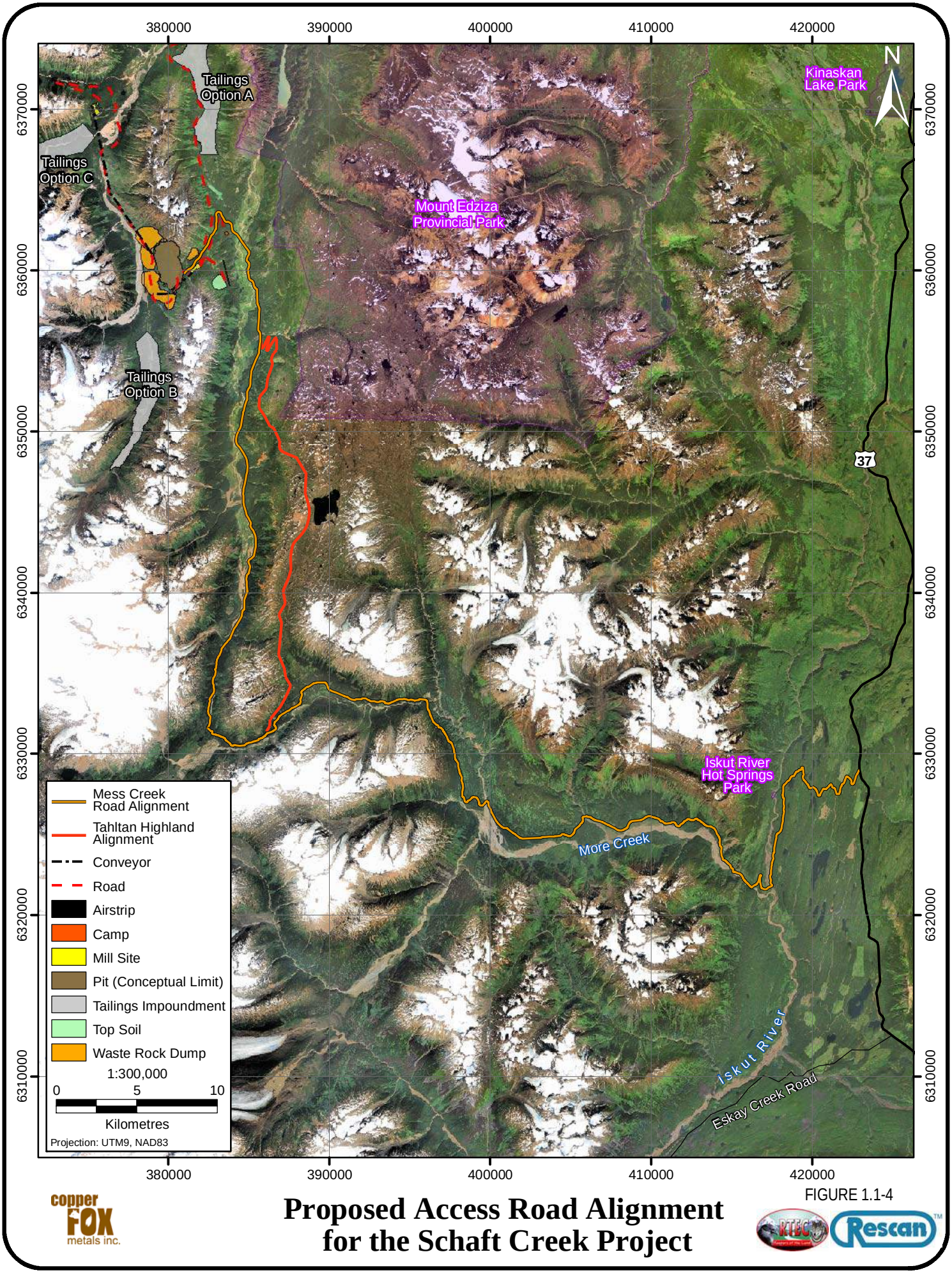


FIGURE 1.1-4

Proposed Access Road Alignment for the Schaft Creek Project

The route of the final 40 km of access road has not been finalized. Copper Fox has completed initial investigations of a route along Mess Creek. An alternative route is also being considered that utilizes the plateau to the east of Mess Creek. Copper Fox is currently investigating the feasibility, as it relates to geohazards, of the two alignments. Both alignments include a 30 m bridge on Mess Creek. Mess Creek is considered navigable as per Transportation Canada criteria. Figure 1.1-4 presents the access road alignment that follows the Galore Creek road (65 km from Highway 37) and the Mess Creek alignment (40 km) to the Schaft Creek property.

Over the life of the mine, the Schaft Creek Project will generate over 700 million tonnes of tailings. There are three tailings facilities being considered (Figure 1.1-3). The three options will undergo an alternatives assessment that will include engineering, construction and operating costs, geotechnical, geohazards, environmental and social considerations.

The Project will generate over a billion tonnes of waste rock. Waste rock dumps are proposed around the perimeter of the pit (Figure 1.1-3). This includes the flat area between the proposed pit and Schaft Creek.

A detailed water management plan has yet to be developed for the Project. A water management plan will be included in the next level of economic assessment (pre-feasibility) and the next project description update. A waste water discharge is expected from the tailings facility, waste rock dumps and domestic waste water treatment plant. The management plan will detail the plans to minimize natural drainage into the tailings facility, the pit and the waste rock dumps. Pit water will be pumped to the tailings facility.

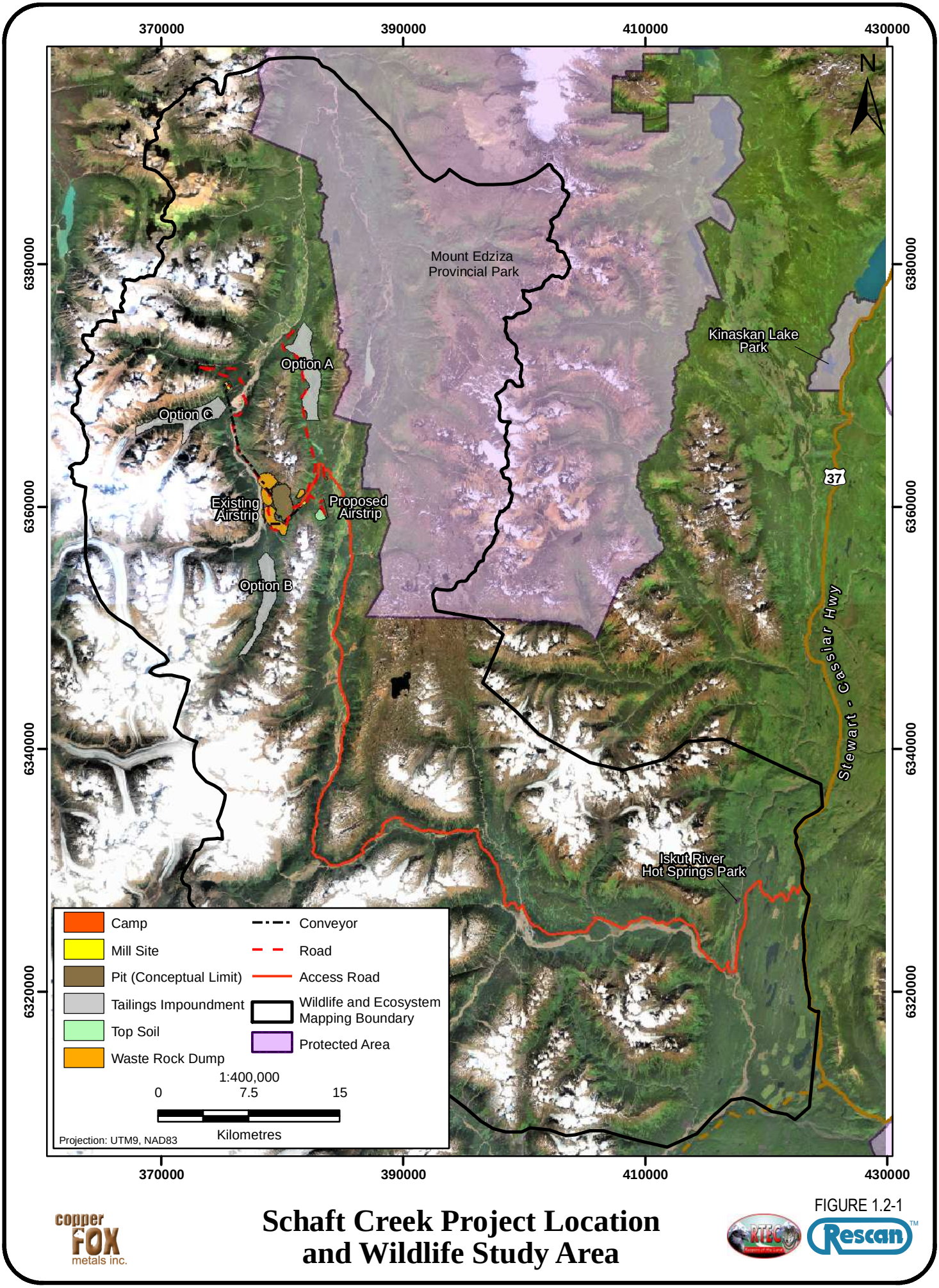
A new airfield will be constructed to the east of the pit (Figure 1.1-3). The Project will be a fly-in, fly-out operation. The new landing strip will be capable of handling a Boeing 737. Other facilities include a terminal building, fuelling, maintenance and control facilities.

A permanent camp will be constructed to support a staff of approximately 500 employees. Other facilities include truck shop, warehouse, administration, maintenance laboratory, explosives storage, water treatment facilities and potable water storage.

Copper Fox has targeted the end of 2008 for submission of their Environmental Assessment Application and full Feasibility Report. Screening of the EA Application plus the 180 day review period will result in project approval as early as July 2009. Copper Fox will likely seek concurrent permitting for strategic permits to facilitate the timely construction of key project components. Construction is estimated to take two and half years. Thus, production could begin by early 2012.

1.2 Study Area

Schaft Creek is located in the mountainous terrain of north-western British Columbia (Latitude: 130º 58’ 48.9’, Longitude: 57º 22’ 4.2’) approximately 1,000 km northwest of Vancouver (Figure 1.2-1; Plate 1.2-1). The area is located 80 kilometers southwest of Telegraph Creek and approximately 76 kilometers west of the Stewart-Cassiar paved highway (Highway 37). The mineral claims of interest are situated near the headwaters of Schaft Creek – a tributary of Mess Creek which flows into the Stikine River downstream of the community of Telegraph Creek.



Schaft Creek Project Location and Wildlife Study Area

FIGURE 1.2-1

Plate 1.2-1. Schaft Creek, 2006

Schaft Creek is located in the coastal climate zone of British Columbia and is characterized by cool summers and cold humid winters. Elevations on the property range from 500 m to greater than 2,000 m above sea level. Average annual precipitation is estimated to be 640 mm, which is approximately 84% greater than that recorded at Telegraph Creek (*i.e.*, the nearest community).

Temperatures in the region surrounding Schaft Creek are strongly influenced by the Coastal Mountains and can range from above 20 ºC in the summer to well below -20 ºC in winter.

While the area is predominately pristine, past exploration has occurred within the upper basin of the Schaft Creek drainage and is noticeable. All mineral claims are contained within the Cassiar Iskut-Stikine Land and Resource Management area, which encompass a total of 5.2 million hectares. The area is part of the Telegraph Creek Community Watershed identified in the Cassiar Iskut-Stikine Land and Resource Management Plan (LRMP) (BC MSRM, 2000). Much of the study area falls within the trapline of an active fur harvester who currently resides on Mess Lake. As well, a local outfitter regularly takes clients to harvest moose, Stone's sheep, mountain goat, and grizzly bear within the study area.

The study area for the Project encompasses both Schaft Creek and Mess Creek drainage basins to their headwaters and beyond the height of land to More Creek (Figure 1.2-1). This area lies within the Northern Boreal Mountain ecoprovince, including both the Yukon-Stikine Highlands ecoregion (Tahltan Highlands ecosection) and the Northern Mountains and Plateaus ecoregion (Southern Boreal Plateau ecosection) (Luttermerding *et al.*, 1990). The biogeoclimatic ecosystem classification (BEC) system further categorizes the study area into AT (alpine tundra), BAFA (boreal altai fescue alpine), multiple subzones of the ESSF (Engelmann spruce-subalpine fir),

SWB (spruce willow birch), BWBS (boreal white and black spruce) and ICH (interior cedar hemlock). The transition between the ecology of the site is quite pronounced. The Mess Creek basin forms an effective border between coastal and interior regions, with the geomorphology to the west representative of rugged coastal mountains and the east supporting expansive high elevation plateaus.

To gain information on the presence of bat species in the Project area, the bat inventory was restricted to the area of the development that included the pit and mine associated infrastructure (Figure 1.2-2) particularly areas that could be accessed safely at night. These focal areas associated with future mine development were the lowest elevation zones in the study area, and it is in these areas that conditions for bat occupancy, *e.g.*, open, wet areas that would produce abundant insect prey and adjacency to conifer vegetation that may provide bat roosts, are optimized. It was anticipated that the results of inventory effort directed at these habitats could be extended to similar local habitats as may be associated with other components of the development. The ecology of the inventory area included forests and wetlands within the ESSFwv (Engelmann Spruce Subalpine Fir wet very cold) biogeoclimatic zone, which supports diverse vegetation. Much of the landscape near the development has intermediate forest (structural stage 4) with a substantial area of deciduous shrub (*e.g.*, willow, cottonwood) vegetation resulting from a past wildfire. Habitat interspersion of mixed coniferous and deciduous forest and wet, open sites is important for bat use during the summer.

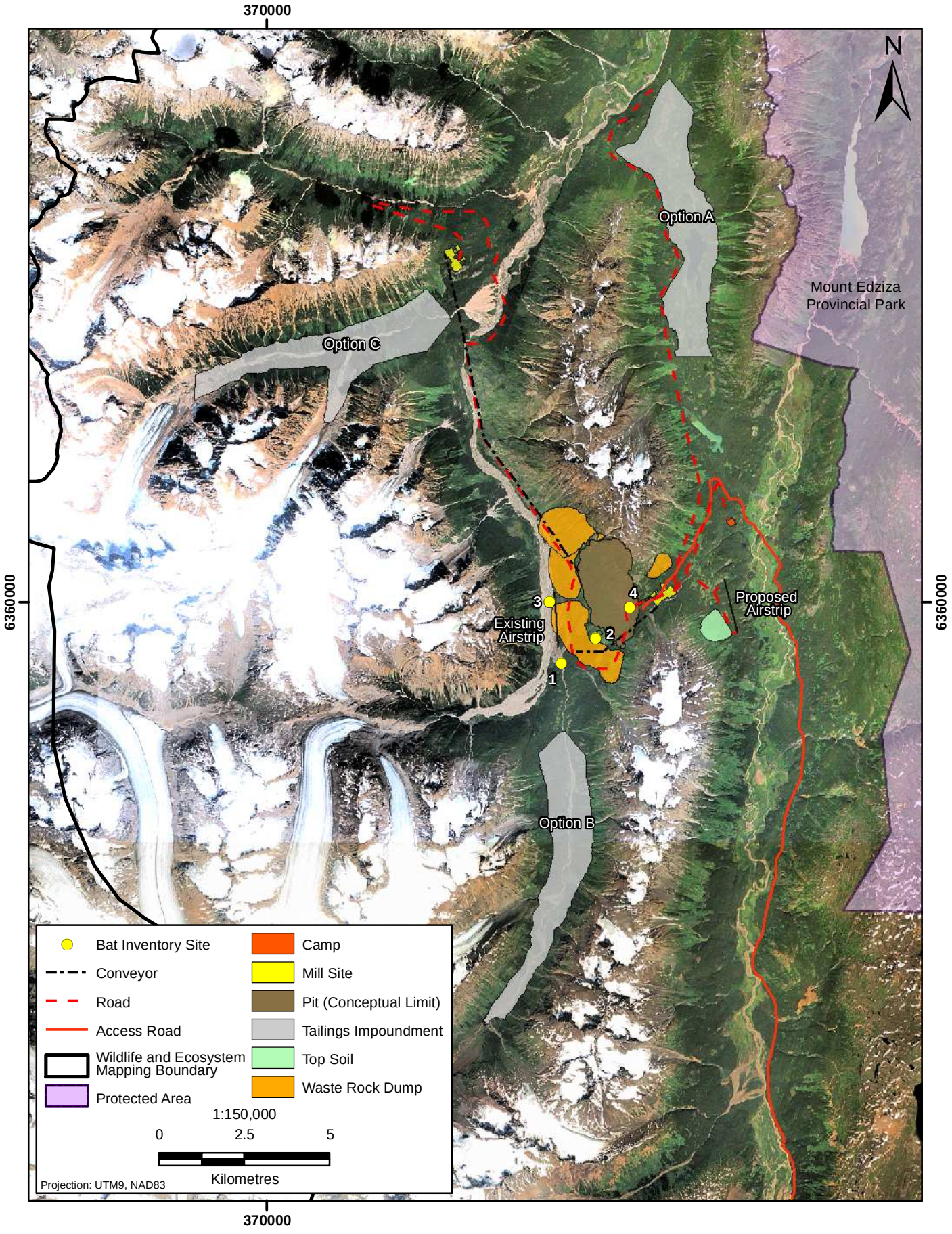


FIGURE 1.2-2

Bat Inventory Sites within the Schaft Creek Wildlife Study Area

2. METHODS

2. Methods

Bats were inventoried using a combination of broad band bat detectors and mist-net capture (in accordance with Provincial Permit SM07-31206). The Anabat II electronic bat detector is effective for identifying the range of echolocation calls produced by all bats potentially present in British Columbia. However, *Myotis* spp. tend to have similar echolocation calls and, as such, mist-net capture and identification in hand is a more effective method for identifying these species. Using available literature, a list of potentially occurring bat species in the study area was generated (Table 2-1). This table provided the basis for species identification through sonogram analysis; however, other species may potentially occur in the region, considering that inventories have historically been limited.

Table 2-1
Bat Species Which May Potentially Exist in the Study Area
(From Nagroson and Brigham, 1995)

Species	Code	Provincial Ranking[1]	Federal Ranking[2]	Likelihood of Occurrence
Little brown myotis (*Myotis lucifugus*)	M-MYLU	Yellow	Not listed	High
Northern long-eared myotis (*Myotis septentrionalis*)	M-MYSE	Blue	Not listed	Possible
Western Long-eared myotis (*Myotis evotis*)	M-MYEV	Yellow	Not listed	Likely (identified in Galore)
Keen's long-eared myotis (*Myotis keenii*)	M-MYKE	Unknown	Data Deficient	Unlikely, generally associated with coastal areas
Long-legged myotis (*Myotis volans*)	M-MYVO	Yellow	Not Listed	Possible
Silver haired bat (*Lasionycteris octivagans*)	M-LANO	Yellow	Not Listed	Possible

[1] B.C. Conservation Data Centre. 2007. BC Species and Ecosystems Explorer. B.C. Ministry of Environment, Victoria, BC. Available: http://srmapps.gov.bc.ca/apps/eswp/ (accessed July 31, 2007).
[2] Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Available: http://www.cosewic.gc.ca/eng/sct1/index_e.cfm (accessed July 31, 2007).

A combination of mist-net capture and electronic bat detection was conducted during five evenings in June and July of 2007. Inventory methods adhered to resource inventory and standards committee (RISC) standards (RIC, 1998) and included the use of three, 2.6 m x 9.0 m, 38 mm mesh mist-nets in conjunction with an Anabat II detector with a ZCAIM (zero-crossings analysis interface module). Sonograms of these files were compared to published accounts and to voucher sonograms in order to differentiate between species. If species level differentiation was not possible, sonograms were differentiated by genus.

Data recorded was consistent with RISC standards, including duration of net and detector operation, weather conditions, sex, age class and morphometrics of individuals captured. Inventory locations were geo-referenced and a description of the habitat was taken to facilitate the interpretation of ecosystems present within the study area.

3. RESULTS

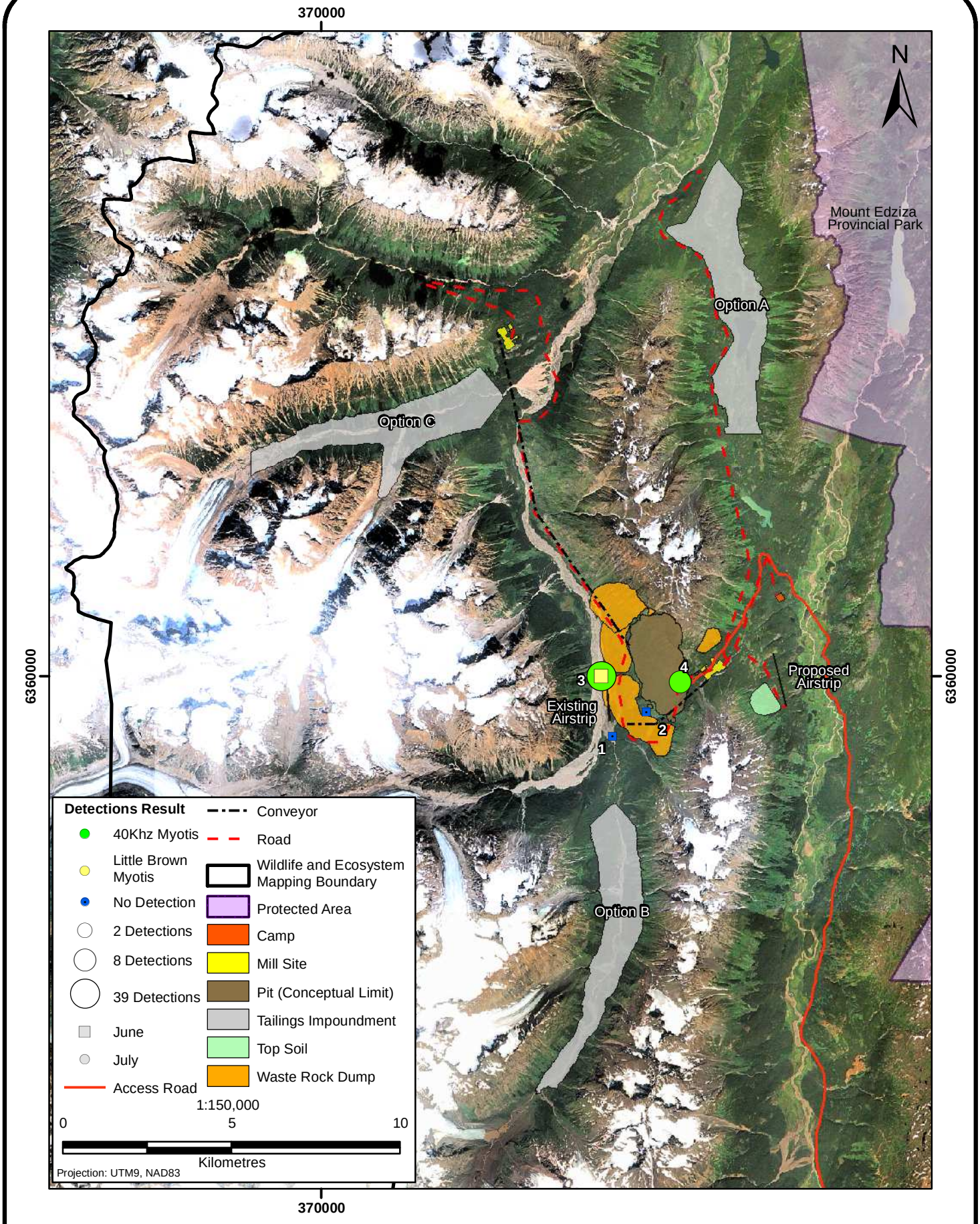
3. Results

Five night surveys were conducted at four locations within the proposed mine site. Surveys were conducted on June 20-22 and on July 24 and 25, 2007. Inventory sites were selected for their potential suitability as bat foraging areas and included wetlands or open areas that would support an abundance of flying insects. All sites were located next to mature or intermediate conifer forest that may provide snags suitable for day roosts (or night roosts during cooler weather). Examples of inventory locations are shown in Plate 3-1 and Plate 3-2. Elevations ranged from 870 m to 1170 m, and all sites were within the Engelmann Spruce Subalpine Fir wet very cold (ESSFwv) biogeoclimatic subzone, the predominant ecological type present at the proposed mine site. Bats were detected at two of the four locations surveyed (Figure 3-1; Table 3-1). Full details on capture effort is provided in Appendix 1. One location (Site 3, Appendix 1) was surveyed twice, once on June 22, 2007 and again on July 24, 2007. As this site contained some of the most suitable habitat within the study area for bat occupancy and was very conducive to supporting detection, the resurvey was performed as a control to investigate whether seasonal influences (*e.g.*, a later onset of the growing season at higher latitudes) affected bat presence within the study area. Bats were detected during both events; however, much more activity was detected during the July effort (39 detections) versus the two detections made in June. Insect prey was abundant during both survey periods, suggesting an adequate food supply occurred during both surveys.

Plate 3-1. Habitat at Site 3 where bats were detected in June and July, 2007.

Plate 3-2. Habitat at Site 4 where bats were Detected in July, 2007.

Sonograms were developed from Anabat II sequence files at both locations surveyed in July. Search phase calls of bat species detected were analyzed using parameters of frequency (either highs or lows, measured in kHz) and duration (ms) to identify species or groups. Literature provides descriptions of call phase, as well as voucher sonograms for some species (*e.g*., Fenton and Bell, 1981; O'Farrell *et al.*, 1999; Madison *et al.*, 2003; McCaffrey *et al.*, 2003). A number of *Myotis* sp. are classified as '40kHz Myotis', having a search phase call that descend to a low frequency of 40kHz in 1 to 2 ms. Species exhibiting this call phase, among others, includes the little brown myotis and long-eared myotis sp., which were anticipated in the study area (Table 2-1). Examples of sonograms collected from sites 3 and 4 are shown in Figure 3-2 and Figure 3-3, respectively. These two sonograms match voucher sonograms classified as '40Khz Myotis'. Of the parameters investigated, detections typically had high frequencies of less than 90kHz, low frequencies of about 40kHz and durations of less than 2ms. Bat species whose call frequencies fall within the range of those detected are *M. lucifugus* (>60-40kHz), *M. evotis* (>100-40kHz) or *M. septentrionalis* (80-40kHz). Although two detections were made at site 3 in June, a sequence file (sonogram) could not be developed.



Bat Survey Locations and Echolocation Detection Results, 2007

FIGURE 3-1

Table 3-1
Summary of Bat Inventory Effort

Site	Date	Apparatus	Detections/ Captures	Sonograms[2]	Temperature Start to Finish (°C)	Likely species[1]
1	June 20, 2007	Anabat II and 3 mist nets	0/0	0	10 to 5	n/a
2	June 21, 2007	Anabat II and 3 mist nets	0/0	0	8 to 3	n/a
3	June 22, 2007	Anabat II and 3 mist nets	2 detections	0	10 to 5	Likely MYLU
3	July 24, 2007	Anabat II and 3 mist nets	39 detections	52	10 to 4	40Khz Myotis (Likely MYLU but possibly MYSE/MYEV)
4	July 25, 2007	Anabat II and 3 mist nets	8 detections	7	11 to 7	40Khz Myotis (Likely MYLU but possibly MYSE/MYEV)

1 MYLU, little brown myotis; MYSE, northern long-eared myotis; MYEV, western Long-eared myotis
2 Anabat II sequence files generated

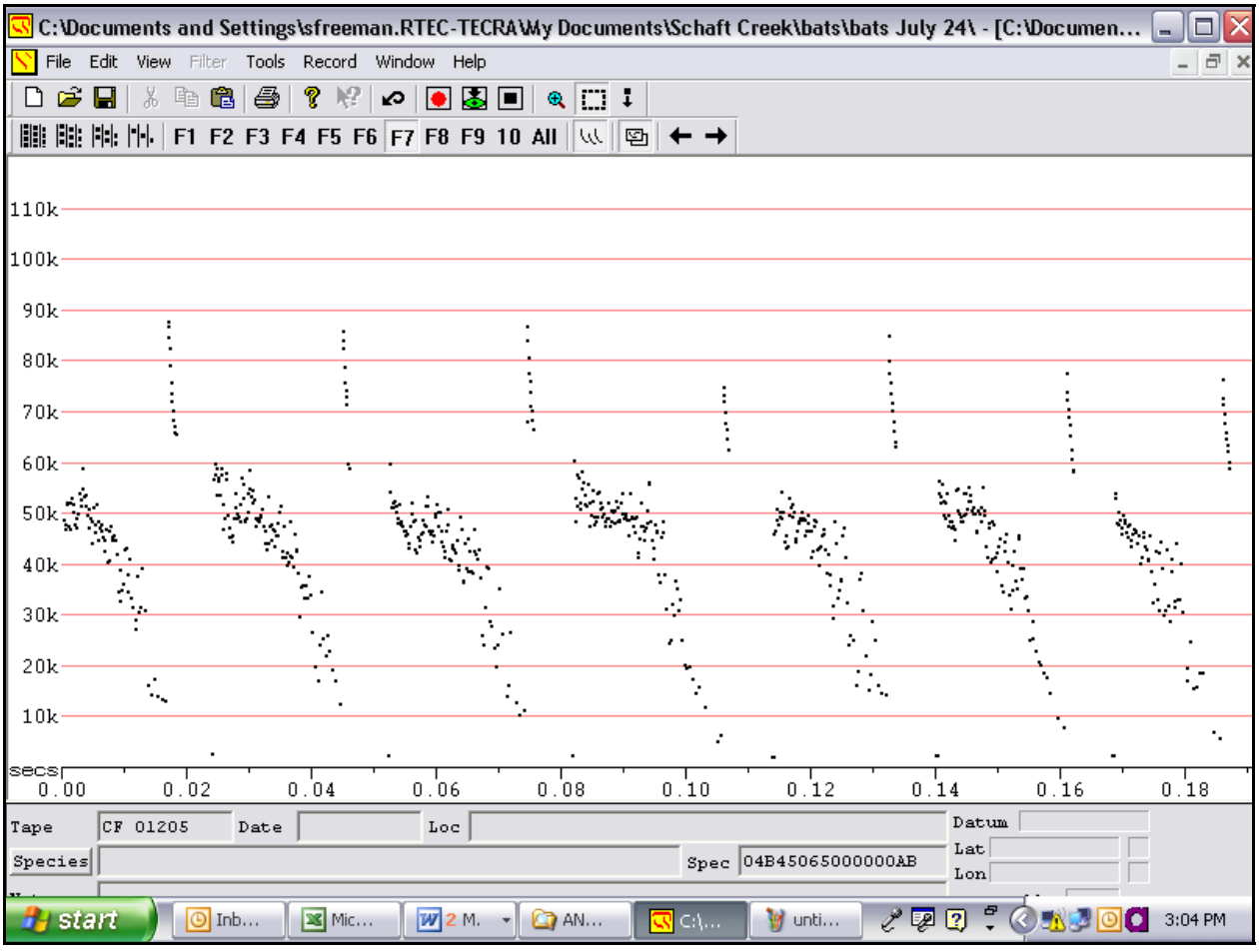


Figure 3-2 Anabat II Generated Sonogram from Bat Detection at Site 3, July 24, 2007

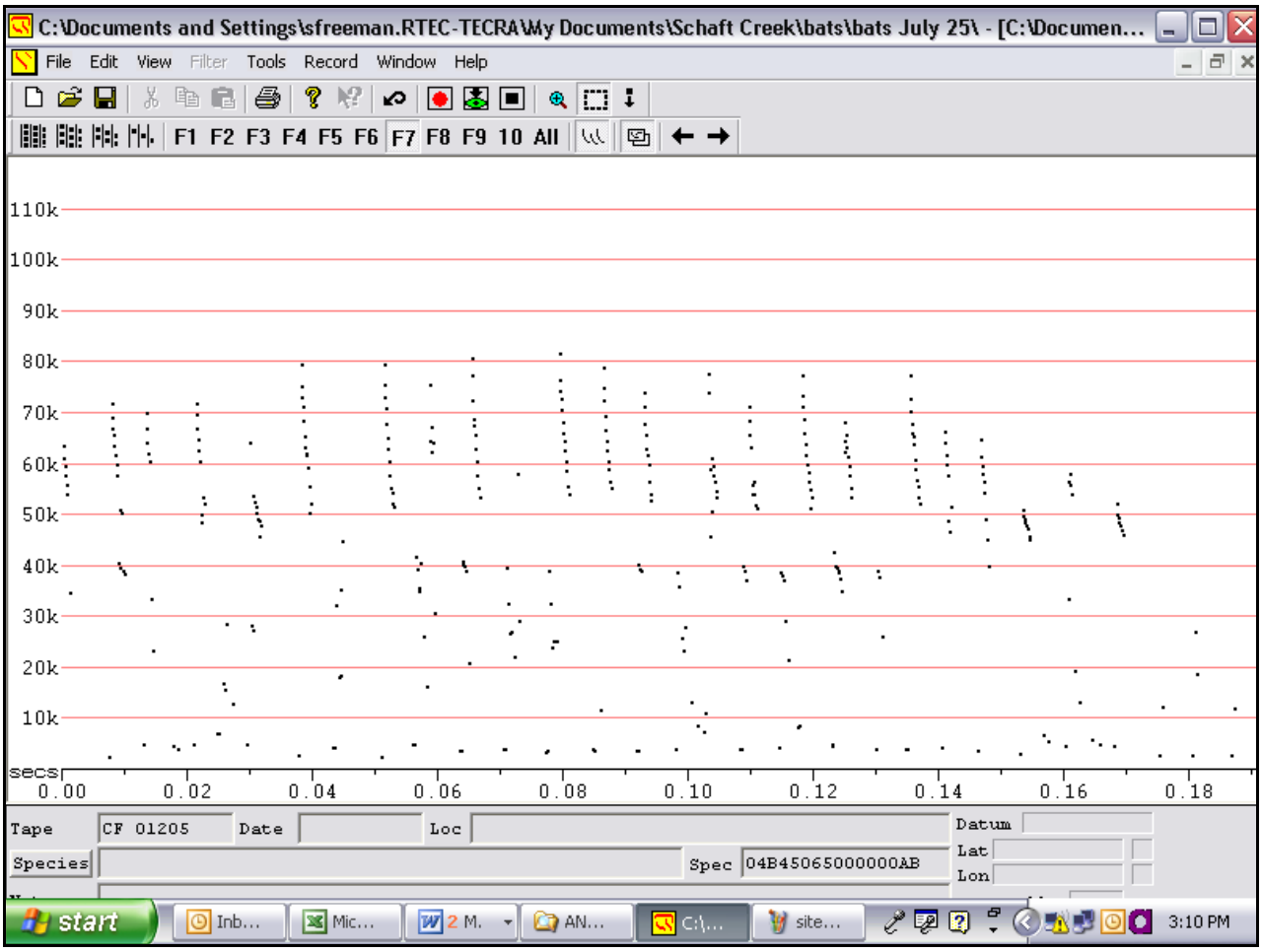


Figure 3-3 Anabat Generated Sonogram from Bat Detection at Site 4, July 25, 2007.

4. DISCUSSION

4. Discussion

The study area associated with the Schaft Creek Project supports bats, and there is the possibility that the blue-listed northern long-eared myotis (*M. septentrionalis*) may occur within suitable habitat (Section 1.2-1) associated with the proposed development. However, identifying the calls of the long-eared myotis to species is difficult due to similarities between calls and the limited availability of voucher sonograms with which to compare the detections obtained. Additionally, differentiating between *M. septentrionalis* and *M. evotis* based on morphometrics of captured bats can be difficult, and it is suggested that genetic analysis is the only way to confidently identify species (M. Brigham, U. of Regina, *pers comm.*). Considering the relatively low density of bats observed and shortfalls in current taxonomic knowledge of the species potentially present, attempting further inventory to characterise the local bat community is of little utility, and likely to require a substantially greater effort with no guarantee of more conclusive results. Suitable management techniques are likely to be adequately integrated into future development to insure no significant residual effects to the local bat population occur.

Less activity was detected in June compared to the July survey effort, which suggests that the bats are using the location on a limited basis during the growing season. An increase in use of the area by bats during the later part of the growing season may also reflect bat reproduction, as young bats typically born in June and early July become capable of flight approximately 3 weeks afterwards. However, since *Myotis* spp. do not typically have more than one offspring per year, the reproductive cycle alone does not fully explain the increase in observed activity later in the season. The pronounced increase in activity may suggest migration through the area, as nighttime temperatures experienced during both June and July were similar and likely did not influence bat activity. However, it is unlikely that bats are hibernating to any extent within the local study area, as suitable natural structures (hibernacula) that provide the warm (above freezing) and humid (>70%) conditions necessary to sustain bats are lacking, although geothermal activity beyond the local study area may support this type of habitat. In the event that bats were using the development area for hibernating, it is anticipated that a larger concentration of activity would have been detected during the June effort after emergence from hibernacula. The little brown myotis, a species detected during the inventory, is known to emerge in May. Detection of bats would be expected in the earlier rather than the later surveys if they were overwintering in the area.

The presence of bats during the growing season suggests that important habitat features, including day and maternal roosts, may exist near the development. These types of roosts have been identified as critical for the reproduction and survival of bats and many species depend on cavities either in trees or beneath bark for roosts (Laki and Baker, 2007). These trees typically include large conifer or deciduous trees that can support cavities or thick bark suitable for providing insulation from the elements. Kalcounis and Hecker (1996) identified little brown myotis in Saskatchewan as selecting cavities in trembling aspen (*Populus tremuloides*) because of their availability and decay characteristics. Sasse and Pekins (1996) identified northern long-eared myotis as roosting in both live and dead deciduous and conifer species with average diameters of 41 cm. Tree stands in the study area are likely to support stems with features

suitable for bat roosting. These stands are typically associated with the most productive (*e.g.*, rich nutrient regime and moist soils on warm sites) ecosystems supporting mature and old growth coniferous and deciduous forests.

REFERENCES

References

BC Ministry of Sustainable Resource Management (MSRM). 2000. *Cassier Iskut-Stikine Land and Resource Management Plan*. British Columbia. Available at http://srmwww.gov.bc.ca/ske/lrmp/cassiar/approved_lrmp-plan/toc.htm.

Copper Fox Metals Inc. 2006. *Schaft Creek Copper-Gold-Molybdenum-Silver Deposit Project Description*. Prepared by CopperFox Metals Inc. for British Columbia Environmental Assessment Office. Calgary, Alberta.

Fenton, M.B. and G.P. Bell. 1981. Recognition of species of insectivorous bats by their echolocation calls. *J. Mammal*., 62(2): 233-243.

Kalcounis, M.C., and K.R. Hecker. 1996. Intraspecific variation in roost-site selection by little brown bats (*Myotis lucifugus*). In M.R. Barclay and R.M. Brigham (editors). *Bats and forest symposium held in Victoria, B.C., Canada 19-21 October, 1995*, by the Res. Br., BC Min. For., Victoria BC, Work. Pap. 23/1996.

Lauson, C. 2006. Bat survey of Nahanni National Park and surrounding areas NWT. Report for Parks Canada, Ft. Simpson, NWT.

Laki, M.J. and M.D. Baker. 2007. Day roosts of female fringed myotis (*Myotis thysanodes*) in xeric forests of the Pacific Northwest. *J. Mamm*., 88(4): 967-973

Luttermerding, H.A., D.A. Demarchi, E.C. Lea, D.V. Meidinger, and T. Vold. 1990. *Describing ecosystems in the field*, second edition. Ministry of Environment (MoE) Manual 11, B.C. Ministry of Environment, Victoria, B.C. R. M. Barkley and R.M. Bringham (editors).

Luttermerding, H.A., D.A. Demarchi, E.C. Lea, D.V. Meidinger and T.Vold. Victoria, BC. 1990. *Describing ecosystems in the field, second edition. MoE manual 11*.

Madison, E., K. Oelrich, T. Rodhouse, and L. Garrett. 2003. Report for subagreement No. 20 to cooperative agreement CA9000-95-018. *Mammal inventories, City of Rocks National Reserve*. University of Idaho and National Park Service Columbia Cascades Support Office. Moscow, Idaho.

McCaffrey, M., T. Rodhouse, and L. Garrett. 2003. Report for subagreement No. 20 to cooperative agreement CA9000-95-018. *2003 vertebrate inventory Lake Roosevelt National Recreation Area*. University of Idaho and National Park Service Columbia Cascades Support Office. Moscow, Idaho.

Nagorsen, D. W. and R.M. Brigham. 1995. *Bats of British Columbia*. Royal BC Museum Handbook. UBC Press, Vancouver, BC.

O'Farrell, M.J., B.W. Miller, and W.L. Gannon. 1999. Qualatative identification of free-flying bats using the Anabat detector. *J. of Mammal*., 80(1): 11-23.

Resource Inventory Committee (RIC). 1998. *Inventory methods for bats*. Standards for components of British Columbia's biodiversity, no. 20. BC MoELP, Victoria, BC.

Sasse, D.B., and P.J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (*Myotis septentrionalis*) in the White Mountain National Forest. In M.R. Barclay and R.M. Brigham (editors). *Bats and forest symposium held in Victoria, B.C., Canada 19-21 October, 1995*, by the Res. Br., BC Min. For., Victoria BC, Work. Pap. 23/1996.

APPENDIX 1
SUMMARY OF BAT DETECTION AND MIST-NET INVENTORY, 2007

Appendix 1
Summary of Bat Detection and Mist-Net Inventory, 2007

Bat Detection and Mist-Net Inventory

Site	Date	Zone	UTM Northing	UTM Easting	Elevation (m)	Detector Start	Detector Finish	Detector Effort (hrs)	Detections	Detections/hr	Mist Net-1 hang time (hrs)	Mist Net-2 hang time (hrs)	Mist Net-3 hang time (hrs)	Captures
1	June 20 2007	09V	6358225	378643	870	22:30	1:15	2:45	0	0.0	2:45	2:45	2:45	0
2	June 21 2007	09V	6358955	379644	935	21:40	1:15	3:35	0	0.0	3:35	3:35	3:35	0
3	June 22 2007	09V	6360005	378305	883	22:00	1:30	3:30	2	0.6	3:30	3:30	3:30	0
3	July 24 2007	09V	6360005	378305	883	21:20	0:20	3:00	39	13.0	3:00	3:00	3:00	0
4	July 25 2007	09V	6359841	380647	1178	21:00	0:10	3:10	8	2.5	3:10	3:10	3:10	0

Weather Conditions

Site	Elevation (m)	Temp start (°C)	Temp finish (°C)	Precipitation	Wind Speed (kn)	Cloud Cover (%)	Lunar Phase	Time of Sunset
1	870	10.0	5.0	light	5 - 10	55 to 10%	1/2	22:44
2	935	8.0	3.0	none	0 - 10	15 to 0%	1/2	22:44
3	883	10.0	5.0	none	10 - 20	5 to 90%	1/2	22:45
3	883	10.0	4.0	none	15 - 5	15 to 0%	7/8	22:17
4	1178	11.0	7.0	none	0 - 5	20 to 80%	9/10	22:15