Copper Fox Metals Inc.

Schaft Creek Project: Moose Literature Review

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SCHAFT CREEK PROJECT:
Moose Literature Review

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MOOSE LITERATURE REVIEW

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1. Introduction

1.1 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 (Figure 1.1-1). 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. The deposit is situated within the upper source regions of Schaft Creek, which drains northerly into Mess Creek and onwards into the Stikine River. The Stikine River is an international river that crosses the US/Canadian border near Wrangell, Alaska. The Schaft Creek deposit is a polymetallic (copper-gold-silver-molybdenum) deposit located in the Liard District of north-western British Columbia (Latitude 57°22 42 ; Longitude 130°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).

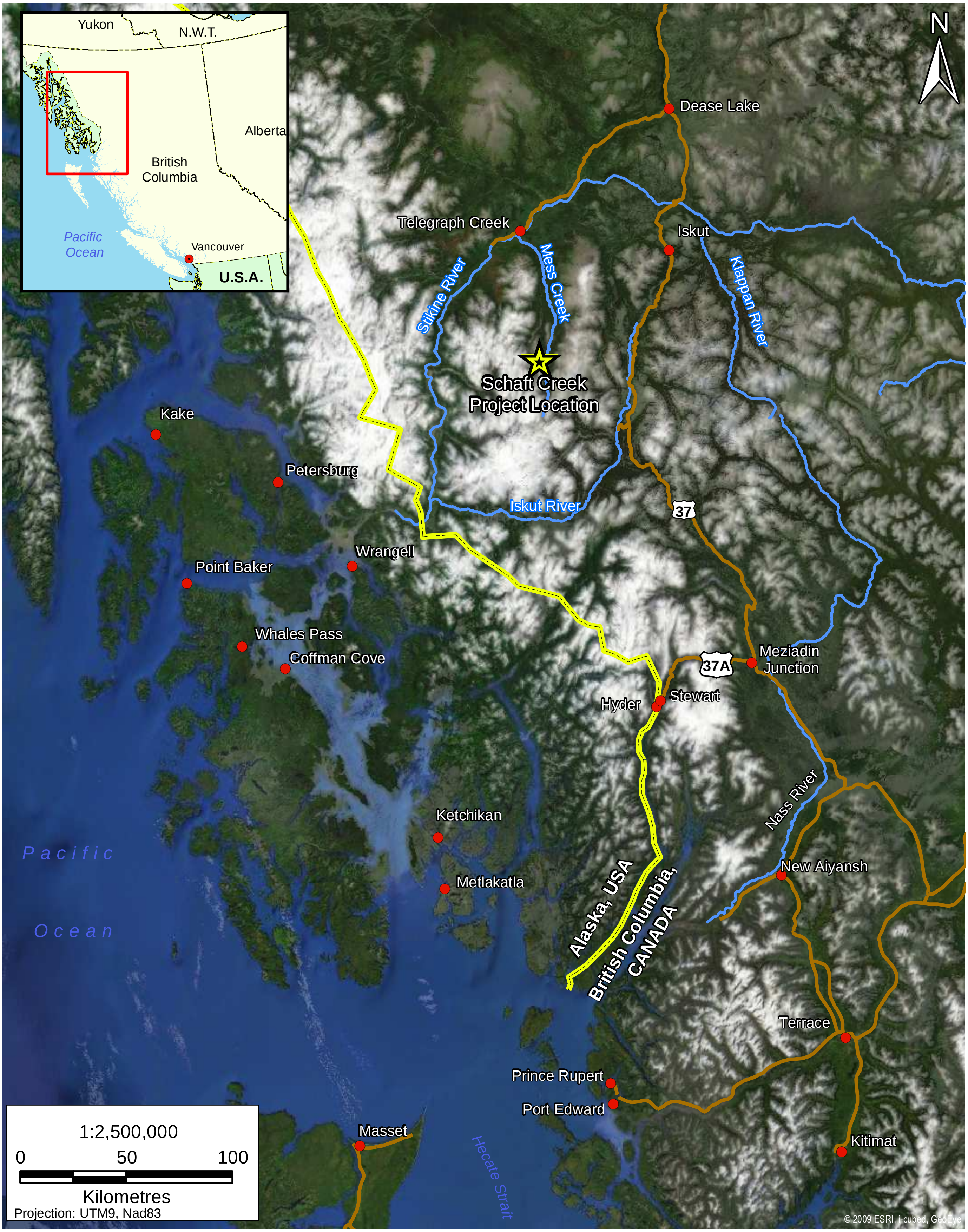
The Schaft Creek Project (the Project) is located within the traditional territory of the Tahltan Nation. Copper Fox has been in discussions with the Tahltan Central Council (TCC) and the Tahltan Heritage Resources Environmental Assessment Team (THREAT) since initiating exploration activities in 2005. Copper Fox will continue to work together with the Tahltan Nation as work on the Schaft Creek Project continues.

The Schaft Creek Project entered the British Columbia EA process in August 2006. Although a formal federal decision has not yet been made, the Project would likely require federal approval as per the *Canadian Environmental Assessment Act*. Copper Fox has targeted the third quarter 2010 for submission of their Schaft Creek EA Application.

1.2 STUDY AREA

The Project wildlife study area covers approximately 3,131 km^2 (Figure 1.2-1). A portion (556 km^2) of the study area is overlapped to the northeast by Mount Edziza Provincial Park. The study 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 categorizes the study area into Boreal Altai Fescue Alpine (BAFA), multiple subzones of the Engelmann Spruce-Subalpine Fir (ESSF), Spruce Willow Birch (SWB), Boreal White and Black Spruce (BWBS), and Interior Cedar Hemlock (ICH). The study area is within the coastal climate zone of BC and is characterized by cool summers and cold humid winters, with an estimated annual precipitation of 640 mm. Temperatures are strongly influenced by the Coast Mountains and may range from above 20°C in the summer to well below -30°C in winter. There is pronounced transition in the ecology of the study area from east to west. The eastern study area is characterized by expansive high elevation plateaus while the west is more representative of rugged coastal mountainous terrain, with Mess Creek forming the effective border between these two geomorphologies (Plate 1.2-1). Terrain elevation within the study area ranges from 500 m to greater than 2,000 m above sea level.

gis no. SCH-15-039 Job No.1039-001-01 November 16, 2009



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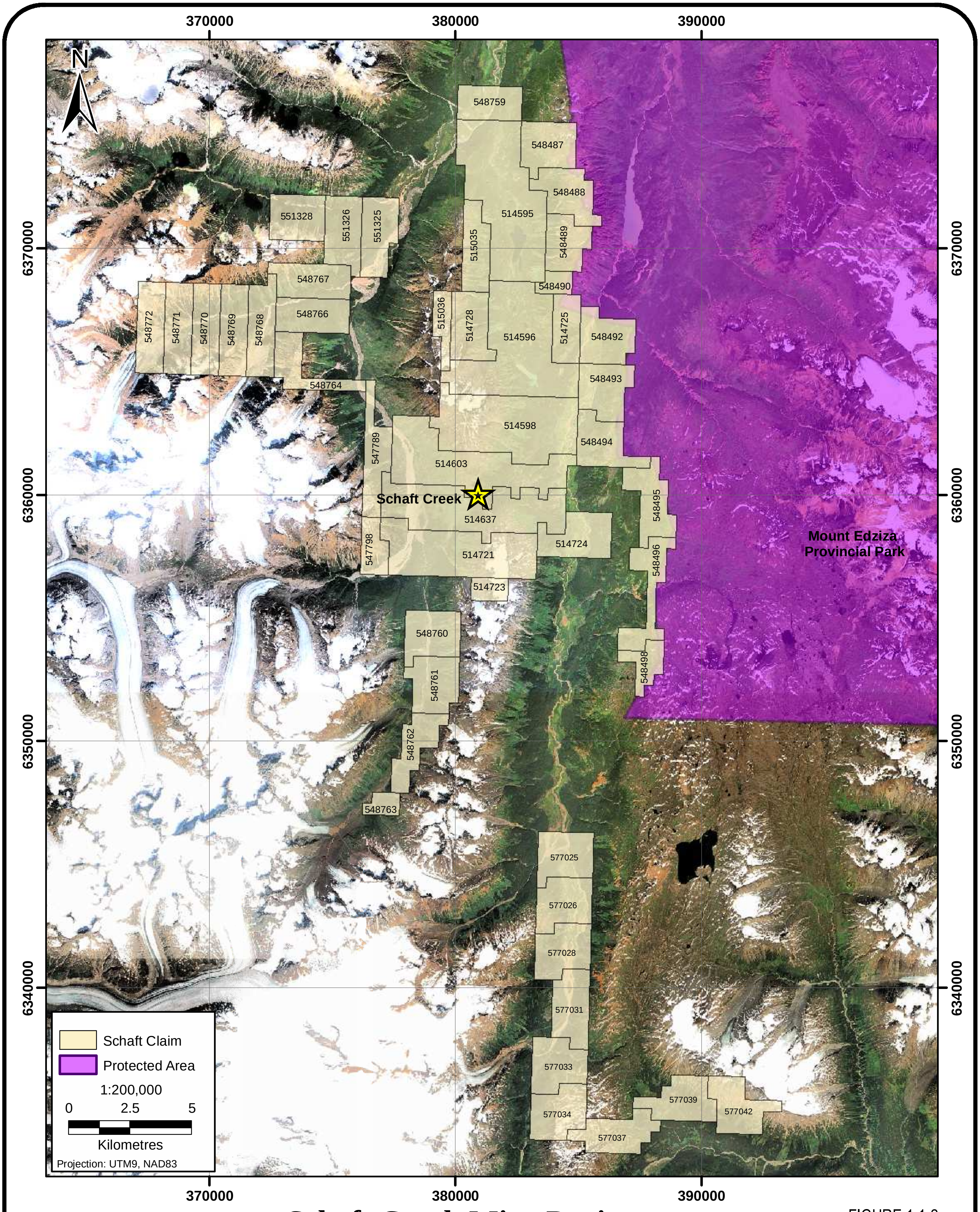
Location Map for Schaft Creek Mine Project

FIGURE 1.1-1

RTEC

Rescan™



Schaft Creek Mine Project
Mineral Claims

FIGURE 1.1-2

gis no. SCH-23-021 Job No. 1039-001-07-01 May 5, 2010

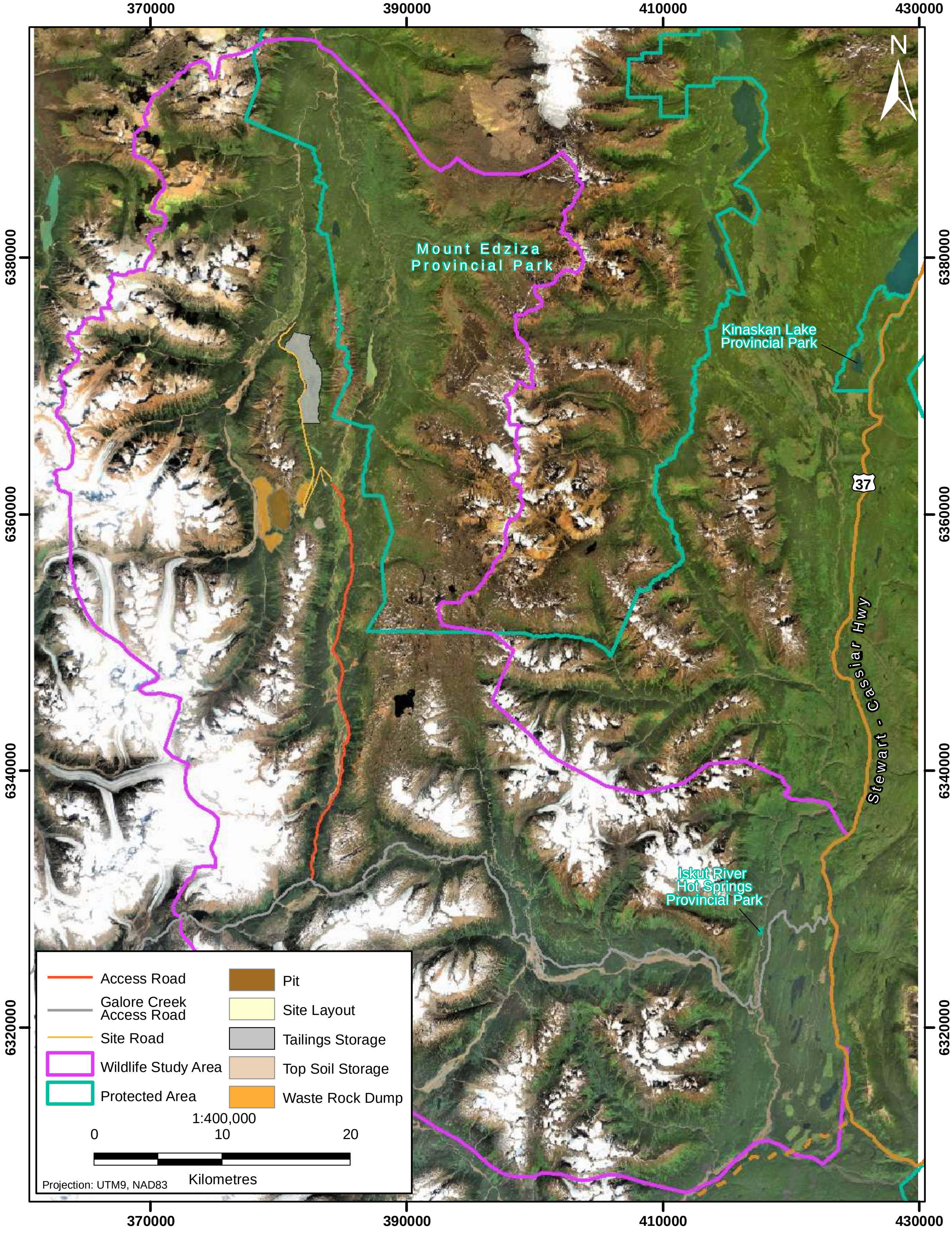


FIGURE 1.2-1

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Schaft Creek Wildlife Study Area

RTEC Rescan™

a. Eastern Study Area (Mount Edziza Provincial Park)

b. Western Study Area (Above Schaft Creek)

Plate 1.2-1. Geomorphologies of the Wildlife Study Area.

1.3 OBJECTIVES

Traditionally, Aboriginal peoples used moose (*Alces alces*) extensively, harvesting them for meat, using their hide for clothing and shelter and creating tools from their bone and antlers (BC Ministry of Environment Lands and Parks 2000). Moose are an important economic and social resource in the region surrounding the Schaft Creek and Mess Creek watersheds. This species is important to both traditional harvesters of the Tahltan Nation and recreational harvest by resident and non-resident hunters (BC ILMB 2000).

This literature review was conducted in response to a request by THREAT for more information on moose within the Project study area. The main objectives of this literature review are to:

- Identify the state of current information on the moose population within and near the Project study area;
- Discuss the effectiveness of a moose collaring program to acquire spatial and temporal information on moose habitat use and selection, and movement patterns.

2. Background

2. Background

2.1 HABITAT USE

Moose are widely distributed across the Province of BC and Canada. Northern BC supports 70% of the province's moose population, which is estimated at 170,000 (BC Ministry of Environment Lands and Parks 2000). Moose are a generalist species and are capable of existing in a variety of different habitats. They are herbivorous "browser species" and, although their diet depends upon seasonal availability and nutritional value, their main diet items include: red osier dogwood (*Cornus stolonifera*), cottonwood (*Populus balsamifera*), aspen (*Populus tremula*), Saskatoon (*Amelanchier alnifolia*), willow (*Salix* spp.), pondweed (*Potemogeton* spp.) and a number sedges and grasses (*Carex* spp., *Gramineae* spp.).

While moose can adapt to a variety of habitats, they prefer riparian habitats, such as waterways and moist meadows with abundant forage of willow, red osier dogwood and birch (Doerr 1983; Sinclair and Burns 2000; Rea and Gillingham 2001; Poole and Stuart-Smith 2005). Willow is the most important and preferred browse species because it is available year round. Moose in the Skeena region showed a preference for some willow species over others (Roberts 1986). Of the fifteen different willow species within the Bulkley Valley and Skeena regions, scoulers (*Salix scoulerianna*) and bebbs (*Salix bebbiana*) upland willow species were the preferred and most widely consumed. However, moose also browsed on other varieties of willow including barclays, Drummonds and sacific. During winter, pussywillows accounted for the largest portion of moose winter browse.

Winter is the critical season for moose, and forest cover adjacent to foraging areas is an important component of moose winter habitat. In northwestern BC, moose move from higher elevation SWB (Spruce Willow Birch) BECs to lower BWBS (Boreal White and Black Spruce) areas as snow conditions dictate. Other winter habitats include riparian areas, floodplains, shrub lands, wetlands and their edges, burns, cutovers and other open areas (Demarchi 1986; Sopuck et al. 1997).

2.2 BEHAVIOUR

Important periods for moose include calving and rut. The rut begins in mid to late September and usually lasts for three weeks. During this period, bulls compete aggressively for access to females. Bulls also tend to be less cautious during the rut than at other times of the year (Geist 1999). The gestation period of a cow moose is eight months, with the birthing period beginning in late May and June (BC Ministry of Environment Lands and Parks 2000). Cows are reported to select birthing sites with a higher quantity and quality of forage, such as south-facing slopes at high elevation (Bowyer et al. 1999). Cows may also seek out locations with better visibility, such as islands and gravel bars on river floodplains.

Some moose may migrate between distinct summer and winter ranges in response to snow conditions, while others may be non-migratory (Demarchi 2003). Capturing that individual variability is important to designing effective land-use plans (Gillingham and Parker 2008a). Poole (2010) provides a concise overview of migration:

> *Migration can be defined as the regular, usually seasonal, movement of all or part of an animal population to and from a given area. Dispersal, on the other hand, can be considered permanent movement of an animal away from its natal range; dispersal may or may not be directional, but it is*

> *not regular or seasonal. Ungulates are thought to undertake seasonal migration as a strategy to access higher abundance or quality of forage (McCullough 1985), or to reduce the risk of predation (Fryxell and Sinclair 1988). In temperate climates migrants typically use low elevation winter range and high elevation summer range (summarized in Mysterud 1999). Snow is considered a driver of migration in many areas. Deer, elk and moose avoid areas of deep snow because of increasing energy costs of locomotion (Parker et al. 1984, Daily and Hobbs 1989) and burial of preferred forage species (Pauley et al. 1993), and thus fall migration to lower elevations is generally thought of as a strategy to find wintering areas with shallow snow depths (Nelson 1995). Spatially, migration can be assumed to have occurred if winter and summer ranges (e.g., calculated via 90% fixed kernels) do not overlap (Mysterud 1999).*

Seasonal home ranges can vary considerably from tens of km^2 (Gillingham and Parker 2008a) to hundreds of km^2 (Demarchi 2003) in size. The life span of moose is variable but estimated at 20 years. Full maturity is reached at 5 or 6 years of age, and maximum fecundity occurs at the age of 10 or 11 (Peterson 1974). The primary predators of moose within the Project study area are wolves, bears, and wolverines; however, a significant number of moose are also harvested by humans.

2.3 LOCAL MOOSE POPULATIONS

2.3.1 Baseline Technical Reports

2.3.1.1 Summary

Baseline aerial inventory surveys for moose have been conducted along the Schaft and Mess Creek watersheds within the Project study area (RTEC 2007), and in several other major watersheds within 300 km to the south and east of the Project, including the Stikine, Iskut, Klappan, Bell-Irving, and Turnagain drainages. The results of these inventories (demographics and population size) are summarized in Table 2.3-1.

Table 2.3-1. Comparison of Moose Population Characteristics within Northwestern BC

Population Characteristics	Schaft/Mess Creek Watersheds[a]	Coastal – Stikine Watershed[b]	Interior – Iskut Watershed[b]	Klappan River Watershed[c]	Bell-Irving River Watershed[c]	Turnagain River Watershed[d]
Adjusted Population	314	481	148	312	48	248
Calves per 100 cows	31	59	40	33	64	24
Calves per 100 adults	12	-	-	-	-	17
Sex Ratio (bulls per 100 cows)	93	74	93	46	118	41

[a] *RTEC (2007).*
[b] *RTEC (2006).*
[c] *RTEC (2008, unpublished data).*
[d] *RTEC (2007, unpublished data).*

Literature and data on the moose population surrounding the Project study area was gathered from the sources identified in Table 2.3-2, and are further described below.

Table 2.3-2. Information Sources for the Local Moose Population

Source	Information
Baseline Technical Reports: RTEC (2006); RTEC (2007); RTEC (2007 and 2008, *unpublished data*)	• Aerial surveys to assess the moose population in the Lower Stikine and Iskut Watersheds (RTEC 2006) • Aerial moose inventory survey to identify population, demographics and habitat use within the Schaft and Mess Creek drainages (RTEC 2007). • Baseline inventory data from aerial surveys that identify population, demographics and habitat use within the Klappan, Bell-Irving, and Turnagain River watersheds (RTEC 2007 and 2008, *unpublished data*)
Provincial Moose Inventories: Marshall (1988); Marshall and Steventon (1990)	• Population and habitat use surveys discussing sex ratios, distribution and predator influence. • Investigation on predation of the moose population within the Northern Skeena sub region.
Demarchi (2000)	• Migration and habitat use investigations in the Nass Wildlife Area

2.3.1.2 Schaft Creek Project

Moose extensively used flood plains and river edges as foraging areas; these areas are preferred habitats due to the presence of red osier dogwood and willow species (RTEC 2007). Moose were also observed using aspen-dominated southern aspects at higher elevations and extensive willow-dominated plateaus associated with the SWB BEC near Mt. Edziza Provincial Park when snow pack was not limiting. The local moose population was estimated at 314 (±35 at 90% confidence interval), and described winter capable moose habitat (area where winter snowpack is not expected to limit moose movement) as regions below 1,050 m with slopes less than 60%.

2.3.1.3 Stikine and Iskut River Watersheds

Baseline moose aerial surveys were conducted along the Stikine and Iskut River drainages for the Galore Creek Project (RTEC 2006). This Project area has both coastal and interior influences. In the coastal areas, the moose population was estimated at 481 (±40 at 90% confidence interval). Winter capable moose habitat was described as regions below 500 m elevation with slopes less than 40%, with highly capable habitat identified below 100 m with slopes less than 40%. Within the interior, the moose population was estimated at 148 (±52 at 90% confidence interval), and moose were observed at higher elevations in areas with rooted forage produced by recent timber harvesting. Movements of moose in the Galore Creek Project area occur from the higher elevation sites to lower coastal areas in the Stikine valley in Alaska (Doerr 1983; Craighead et al. 1984). Migratory distances vary with winter conditions and with individual moose but can be up to tens of kilometres.

2.3.1.4 Klappan and Bell-Irving River Watersheds

Moose population was estimated at 312 individuals (±33 at 90% confidence interval) within the Klappan River drainage, and 48 individuals (±10 at 90% confidence interval) within the southern Bell-Irving River drainage (RTEC 2008, *unpublished data*). Moose were observed in three of the six available biogeoclimatic sub-zones within these drainages; BWBSdk1 (Boreal White and Black Spruce zone, dry cool subzone between 550 and 1,050 m), SWBmk (Spruce Willow Birch zone), and the ICH (Interior Cedar Hemlock). Preferred habitat was in riparian areas and steep areas that had lower snow packs and greater amounts of forage. Moose were presumed to migrate to lower elevations during the winter. However, during mild winters, the population was expected to be more widely distributed. Capable habitat was defined for the Klappan River drainage as the area below 1,200 m elevation with slopes less than 60%. Capable habitat for the Bell-Irving River drainage was defined as the area below 925 m elevation with slopes less than 60%.

2.3.1.5 Turnagain River Watershed

The local moose population within the upper Turnagain River and Zuback Creek watershed was estimated at 248 moose (±25 at 90% confidence interval) and capable habitat was described as areas below 1,355 m with slopes less than 40% (RTEC 2007, *unpublished data*).

3. Collaring Programs

3. Collaring Programs

There are advantages to obtaining animal positions from GPS over other methods (reviewed by Tomkiewicz et al. 2010 and Hebblewhite and Haydon 2010). Instead of collecting ground-based telemetry locations in a biased and non-random fashion, GPS telemetry can provide systematic, highly accurate and relatively unbiased data compared with traditional VHF data collection (Hebblewhite and Haydon 2010). GPS can obtain spatial and temporal location data about animal movements over small time intervals spanning 24-hour periods irrespective of weather conditions or other restrictions that limit VHF studies (Tomkiewicz et al. 2010). Methods to tackle habitat- and animal-induced bias in GPS fix-rate are rapidly developing (Frair et al. 2010). GPS data can be reviewed, selected, filtered and statistically analyzed to help ensure accuracy (Frair et al. 2010). Combined with the data-retrieval power of Argos, researchers can obtain high precision and temporal resolution data on most medium-sized or large species (Hebblewhite and Haydon 2010). And because GPS/Argos technology removes the substantial time investment of manually collecting animal location data, this should provide more opportunities to collect additional information on vegetation, forage or behaviour that are vital to understanding animal movements (Hebblewhite and Haydon 2010).

To better inform management strategies, wildlife research has long focused on understanding use of habitats and, when combined with the availability of resources, what animals select and avoid on the landscape (Gillingham and Parker 2008a). GPS telemetry has enabled significant improvements to our understanding of the basic ecology of many wide-ranging and difficult to study species, including identifying important foraging areas, movements and distribution, and contributed to understanding human impacts on animals (Hebblewhite and Haydon 2010). Conservation benefits have led to the protection of habitat and movement corridors. GPS has linked observations on movements with more animal-based definitions of what is available to animals across the landscape (Beyer et al. 2010). Understanding habitat availability has improved the ability to identify mechanisms that may drive larger scale movement patterns, such as migration. Migration has been hypothesized among migratory ungulates as a response to seasonal variation in forage resources across the landscape (Hebblewhite et al. 2008). Populations of many wide-ranging species move over areas that are orders of magnitude larger in scope than revealed by conventional studies (Hebblewhite and Haydon 2010). The availability of GPS collars and advances in remote sensing and geographic information systems (GIS) now enable researchers to more easily examine variation in selection among individuals (Thomas and Taylor 1990, 2006). The literature contains numerous examples of successful studies using GPS positioning (reviewed in Tomkiewicz et al. 2010).

Our best understanding of variation in resource selection by ungulates comes from study designs in which use and availability of resources are measured for individual animals (e.g. Design III in Thomas and Taylor 1990, 2006 [*sic*] Gillingham and Parker 2008a). GPS locations can provide relatively accurate estimates of use by ungulates, barring potential terrain-induced bias in fix acquisition success (D'Eon et al 2002, Frair et al. 2004). Understanding selection of habitat attributes, in addition to measures of habitat use, allows for a better understanding of the relative values of specific habitats in different landscapes over time (Gillingham and Parker 2008a). The following brief annotated bibliography summarizes the results from five relevant moose collaring studies in British Columbia, and represents the types of information that can be obtained from a well-designed collaring program.

Demarchi (2003)

A radio telemetry (VHF based) study of 38 adult moose was conducted in the Nass Wildlife Area (NWA), British Columbia, from 1997 to 2000. At least 71% of the moose were migratory. Bulls and cows moved ≤ 75 km between 2 seasonal ranges within the NWA. Migration from winter to non-winter range during April to June (pre-calving) and return to winter range in December to January appeared to be in response to change in snowpack. Migratory moose used ranges separated primarily by latitude or elevation. Moose occurred at elevations ranging from 200 to 1,500 m (mean 400 m). Higher elevations were used during non-winter. Moose used areas throughout the NWA in non-winter, but concentrated their use in the south during winter. Multiannual home range sizes of individual moose varied considerably, with a mean of 171 km^2 (kernel density method) and 262 km^2 (minimum convex polygon method). Overall seasonal range size of collared moose was 594 km^2 in winter (December through April) and 910 km^2 in non-winter (June through November). Moose migrate across the Nass River at several key locations. Information gained during this study is being used by the provincial government and the Nisga'a Lisims government to co-manage moose in the NWA.

Poole and Stuart-Smith (2006)

Winter range has been identified as an important component of moose (*Alces alces* L., 1758) conservation in managed forests, yet there have been few studies on habitat associations in montane ecosystems. Habitat selection by moose at landscape and stand scales was studied during late winter in southeastern British Columbia using global positioning system (GPS) collars on 24 adult moose cows in each of two winters. The strongest determinant of late-winter range at the landscape scale was decreasing elevation, while moose also selected for areas of gentler slopes and higher solar insolation. Elevation likely is a surrogate for snow depth, which is probably the primary causative factor influencing late-winter distribution of moose. Within late-winter range, topographic variables had little influence on moose habitat selection. Lower crown closure was the strongest determinant of stand-scale selection, although the resultant model was weak. There was no disproportionate selection for stands with high crown closure, and there was little evidence for greater use of cover stands with increasing snow as winter progressed. Within late-winter range, moose selected forage habitats (42% use vs. 30% availability) over cover habitats (22% use vs. 37% availability). The delineation of late-winter moose range can be based on snow-depth, or elevation as its surrogate.

Poole, Serrouya, and Stuart Smith (2007)

Parturient ungulates are relatively more sensitive to predation risk than other individuals and during other time of the year. Selection of calving areas by ungulates may be ultimately related to trade-offs between minimizing the risk of predation and meeting nutritional needs for lactation. Digital and field data were used to examine selection of calving areas by 31 global positioning system (GPS) collared moose (*Alces alces*) in southeastern British Columbia. Movements were examined 12 days before and after calving, and habitat selection was analyzed at 2 scales of comparison: the immediate calving area to the extended calving area (100 ha), and the extended calving area to the surrounding home range. Maternal moose exhibited 1 of 2 distinct elevational strategies for calving area selection during the days leading up to calving: 16 moose were climbers and 15 were nonclimbers. Climbers moved a mean of 310 m higher in elevation to calve, whereas nonclimbers showed little change in elevation. Hourly movements by all maternal females increased 2- to 3-fold in the 1–4 days before calving and were generally directional, such that all calving areas were outside of areas used during the 12 days before calving. At the broad scale, elevation was the strongest predictor of the extended calving area within the home range. At the fine scale, climbers selected areas with reduced tree density, reduced forage, and increased distance from water, whereas nonclimbers selected areas with increased forage, decreased distance from water, and decreased slope. Beyond the obvious elevation difference between climbers and nonclimbers, moose appeared to exhibit 2 distinct calving strategies in mountainous ecosystems. A functional explanation for the 2 strategies may be that climbers moved into areas where forage quantity and quality were relatively low, but where the risk of predation (mainly by grizzly bears [*Ursus arctos*]) also was reduced. Nonclimber moose calved in areas with higher forage values, and appeared to select areas at the finer scale to reduce predation risk (e.g., association with water and reduced tree density for visibility).

Gillingham and Parker (2008a)

Understanding resource use and selection has been central to many studies of ungulate ecology. Global positioning satellite (GPS) collars, remote sensing, and geographic information systems (GIS) now make is easier to examine variation in use and selection by individuals. Resource selection functions, however, are commonly developed for global (all animals pooled) models and important information on individual variability may be lost. Using data from 14 female moose (*Alces alces*) collared in the Muskwa-Kechika Management Area of northern British Columbia, differences among global and individual resource models were examined for 5 seasons (winter, late winter, calving, summer, and fall). The global models indicated that moose selected for mid-elevations, and for deciduous burns and *Carex* sedge areas in all seasons. Resource selection models for individuals, however, indicated that no individuals selected the same attributes as the global models. Selection ratios among season were also examined with individual moose as replicates, and within individuals with bootstrapping techniques. The importance of considering individual variation in defining resource selection and habitat use by moose is also discussed.

Gillingham and Parker (2008b)

Elk (*Cervus elaphus*) populations are increasing in the Besa-Prophet area of northern British Columbia, coinciding with the use of prescribed burns to increase quality of habitat for ungulates. Moose (*Alces alces*) and elk are now the 2 large-biomass species in this multi-ungulate, multi-predator system. Habitat use and selection was examined using global positioning satellite (GPS) collars on 14 female moose and 13 female elk, remote sensing imagery of vegetation, and assessments of predation risk for wolves (*Canis lupus*) and grizzly bear (*Ursus arctos*). Annual ranges were highly variable, ranging from 39 to 899 km^2 for moose and from 50 to 1,000 km^2 for elk. Seasonal ranges were typically smallest for moose during calving (18 km^2) and for elk during winter (20 km^2) and late winter (16 km^2). Both species used largest ranges in summer (moose: 133 km^2; elk 118 km^2). Moose and elk moved to lower elevations from winter to late winter, but subsequent calving strategies differed. During calving, moose moved to lowest elevations of the year, whereas elk moved back to higher elevations. Moose generally selected for mid-elevations and against steep slopes; for stunted spruce habitat in late winter, for pine-spruce in summer; and for subalpine during fall and winter. Elk selected for mid-elevations except in summer and for steep slopes in late winter. Use and selection of three habitat classes were prominent for elk: deciduous and *Elymus* burns, and subalpine. Highest overlap between moose and elk occurred during fall and winter when both species used and strongly selected for subalpine habitat. Neither elk nor moose selected areas to minimize the risk of wolf predation, but elk selected areas with lower risk of predation by grizzly bears and higher vegetation quality during calving and summer.

3.1 EQUIPMENT REQUIREMENTS

The use of GPS collars is the preferred option for a habitat use or migration study; the individual collars are more expensive, but VHF collars need to factor in location frequency, data quality, flight and personnel costs, and remoteness of the study area. VHF collars may be most appropriate for mortality or demographic studies where large sample sizes are required. GPS collars provide more accurate data, collect more data per individual, and are unbiased by daylight or weather. GPS location data have some bias in fix success correlated with overstory canopy (Hebblewhite et al. 2007).

For example, the Lotek GPS 3300 collects and stores data such as latitude, longitude, temperature, and activity. These collars are equipped with a drop off mechanism which allows the collar to detach from the animal after a certain amount of time or in response to a signal from a control unit. Lotek Wireless prices the GPS 3300L for moose at $3,900.00/collar, which also includes a mortality sensor. Another type of GPS collar, the GPS 4400 Argos, downloads the data via satellite telephone and the data is e-mailed to the client researcher. This type of collar is the most expensive, but has the advantage of real-time tracking and it removes the need for an expensive trip to retrieve the data. Prices are $5,400.00/collar and $300-$400/year in maintenance fees to the satellite provider.

3.2 METHODOLOGY AND DESIGN

A GPS collaring program provides invaluable data on how animals use the landscape, and allow researchers to infer why certain landscape features might be important to those animals. Researchers can examine spatial and temporal variation in habitat use and selection, variation in home ranges and movement patterns, and interactions with other species and human developments. Furthermore, researchers can identify differences in strategies amongst individuals, which may be important in developing broad-scale land-use plans. Combined with remote sensing and GIS technologies, GPS programs are powerful tools to addressing some fundamental ecological questions.

A GPS collaring program can be conducted irrespective of knowing the initial population size of the target species. How a program is designed is dependent on the objectives, and subsequently, a sufficient number of collars to achieve the required resolution becomes the limiting factor.

The following is based on an objective to examine movements and habitat use and selection by moose in the Schaft Creek Project Area:

- Recommend use of Argos platform GPS collars.
- Minimum 15 collars, all females.
- Ideal: 30+ collars, mix of males and females.
- Location frequency: 4–6 per day.
- Data delivery frequency: Weekly (via Argos).
- Study duration: 2–3+ years (based on battery life with 4–6 locations per day and weekly data downloads).
- Focus capture effort on the Mess and Schaft Creek watersheds.
- Estimated budget: $150,000 (15 collars) to $300,000 (30 collars) over 3 years (includes collar costs, capture, consulting fees, and analysis and reporting).

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