3.0 WILDLIFE HABITAT

3.1 Background

In the summer of 2001, preliminary biogeoclimatic ecosystem classification was conducted of the SRI study area. Representative habitats within the study area were assessed and classified. The primary objectives were to

- sample representative sites for each community type
- document the flora and fauna
- classify the habitat
- provide an annotated list of the flora species.

Vegetation studies help to document the current baseline conditions and determine potential project effects on different habitats. The results obtained will assist in providing the basis for designing future wildlife habitat studies and for collecting further habitat-based information.

The classification scheme employed for the SRI wildlife study program was based on the principles of biogeoclimatic ecosystem classification or BEC. The fundamental unit of BEC is the ecosystem; a portion of the landscape which is uniform in the plants and animals inhabiting it, in terrain, soil, hydrology and microclimate and in the interactions between all these aspects. Habitats were initially examined and delineated on aerial photographs.

3.2 Literature Review and Interviews

Prior to implementation of the fieldwork, a literature search was conducted to identify the existence of material relevant to the SRI wildlife study area, and to consolidate and evaluate available literature. A search was conducted at the RWED and Canadian Wildlife Service (CWS) libraries. Additional libraries and databases were searched via the Internet and included the following locations: Environment Canada's library, Arctic Science and Technology Information System (ASTIS), which contains abstracts and indexes on literature about the North; and the Canada Institute for Science and Technical Information (CISTI), which contains abstracts and indexes.

Procite, a computerized database, was also utilized to search for relevant articles in the following journals: *Auk, Bird-Banding, Condor, Ecological Applications, Ecological Monographs, Ecology, Journal of Field Ornithology, Journal of Vegetation Science, Journal of Wildlife Management, Ornithological Monographs, Studies in Avian Biology, Wildlife Monographs, Wildlife Society Bulletin* and the *Wilson Bulletin*.

From the literature review, a preliminary list of species was developed for the flora and fauna of the region. This list was important in helping to define the preliminary scope of work to be undertaken, and should not be considered complete, as certain species will likely be added or removed as our knowledge of the area grows.

3.3 Methods

3.3.1 Sampling Methodology for Flora

Prior to field sampling, a species list was generated for plants based on range maps found in taxonomic guides. For plant species, the list was created using *Vascular Plants of Continental Northwest Territories* (Porsild and Cody 1980) and *Rare Vascular Plants in the Northwest Territories* (McJannet *et al.* 1995). The list was based on plants that have been collected in the general region, within a 200 km radius of Ferguson Lake. Using this approach a species list was generated containing plants known to occur, or hypothetically occur, in the SRI study area. Species hypothetically occurring in an area include species whose known distribution covers, or are adjacent to, Ferguson Lake but have not yet been documented on site.

This study conducted habitat assessments at two different levels of intensity: detailed vegetation plots and ground/air checks. Detailed vegetation plots involved accessing representative sites on foot. The composition of plant communities was determined from visual inspection of sites and subjectively assessed as being representative of a particular community type. The selection of specific sample sites was guided by the physiognomy of the plant cover and the dominance of certain species.

Ground/air checks entailed briefer assessments. Once the field crew became familiar with the ecosystem units, a number of sites were assessed by simply landing and assessing from the helicopter. Ground/air checks were only performed on a limited number of sites that were large and homogenous in vegetation cover.

Each site assessment entailed filling out a standardized data sheet that documented general site information, topographic and site descriptors, and detailed sections on vegetation coverage. For each site the following information was entered onto standardized forms:

- Site number and location
- UTM coordinates using a GPS
- date
- topographic position

- slope
- aspect
- type of dominant vegetation
- percent closed canopy
- ground cover
- moisture regime
- texture of surficial deposits
- landform
- elevation
- plant community type
- plant species
- animal and animal signs.

Site slope was determined using a clinometer (on detailed site assessments only). Moisture regime was subjectively ranked following Walmsley *et al.* (1980) as very xeric, xeric, subxeric, submesic, mesic, subhygric, hygric and hydric. Appendix C describes each moisture regime, their definition, primary water source and relative slope position. Elevation was determined from topographic maps. Detailed information on percent coverage of shrub and ground strata was visually estimated. An attempt was made to identify all vascular plants at each site. Representative samples were collected for species that were difficult to identify in the field, such as willows, sedges and grasses. These were returned to the EBA office for identification under magnification with the aid of taxonomic guides.

Not any one taxonomic plant key is sufficiently comprehensive to adequately address all genera. Certain plant keys provide better treatment of select genera than other texts, and are typically based on the author's personal experience. Consequently, an array of plant keys and general plant books were utilized to identify plant species. Specific technical taxonomic plant keys were used to identify problematic species and included Cody (2000), Argus (1973), Cobb and Annas (1963), Douglas (1982), Johnson *et al.* (1995), Moss (1977), and Porsild and Cody (1980). Other literature of a more general nature, was also relied on for photographic attributes, including Burt (1991), Courtenay and Zimmerman (1972), Scotter and Flygare (1986) and Trelawny (1983).

Datasheets were completed for each site sampled. Photographs were taken to capture the most representative aspects of a given ecosystem unit. UTM coordinates were obtained and stored using a Garmin 12 XL GPS and subsequently recorded on the datasheets.

3.3.2 Sampling Methodology for Wildlife Habitat

The field method employed for observing and recording wildlife information was an extension of the process used for documenting the flora, and was conducted concurrently. The presence of wildlife (based on actual observations, or inferred from tracks, burrows, browse, animal remains and droppings or scat) was recorded during vegetation surveys. Additional information was noted on the habitat features associated with wildlife sign and how the suspected wildlife frequenting these sites were likely interacting with the habitat, such as browsing, digging, etc. In addition, some SRI site personnel, *i.e.* Allen Cole, with extensive field experience, were interviewed.

Wildlife observations were recorded using the same datasheets used for vegetation assessments. Photographs were taken where appropriate, *i.e.* grizzly bear diggings for arctic ground squirrels. UTM coordinates were obtained for each observation of sign. Wildlife and wildlife sign observed on an opportunistic basis were also documented as encountered during the investigations, *i.e.* outside of the formal habitat assessments.

3.4 Results

A total of 60 sites were assessed: 46 formal ground assessments and 14 ground/air assessments from the helicopter (Figure 6). Plant data were also collected at 14 additional sites during other work, *i.e.* wildlife-focused activities. A total of 543 plant observations were documented, comprising 138 different species (Appendix D). No rare or endangered plant species were found during the 2001 field survey report.

The classification for the SRI study area is comprised of 12 ecosystem units (Table 1). A description of each ecosystem unit is presented below and is summarized in Table 2. The mesic tundra ecosystem (BL) is the 'zonal' ecosystem. It represents average soil conditions for a given region and describes a site that is intermediate in the availability of soil moisture nutrients. All other ecosystem units are considered to be wetter, drier, richer, or poorer than this zonal site. This vegetation unit is typically a well-developed mat of low shrubs including dwarf birch, willow, Labrador-tea, crowberry, and bearberry. BL is the most common habitat type in the study area (Plates 11 and 12, Section 3.5.1).

Upon close examination, the BL ecosystem unit can be further subdivided into three subdivisions based on the composition of the subdominant species. For example, as already mentioned, BL is the most common ecosystem unit comprising of *Betula* and *Ledum*, with *Betula* and *Ledum* making up the dominant and subdominant covers, respectively. Two other subdivisions exist, based on their subdominant species, which consist of *Vaccinium* and *Empetrum*. However, these two subdivisions cannot

be distinguished or separated through satellite imagery or aerial photographs, only through close field inspection. To compound the issue further, various levels of integration of these three subdominants can occur in the field. Because these three subdivisions cannot be reliably separated through satellite imagery or aerial photography, they have been combined into one ecosystem unit, namely BL.

Table 1

Habitat Classification of the SRI Study Area - Ferguson Lake, NU

Ecosystem	Formal Name	Common Name	Map Code
1	*Betula – Ledum*	Mesic Tundra	BL
2	*Saxifraga – Silene*	Esker Top	SS
3	*Betula – Empetrum*	Esker sides, tundra crests	BE
4	*Betula – Rubus chamaemorus*	Birch Hummock	BR
5	*Betula – Calamagrostis*	Birch Seep	BC
6	*Eriophorum vaginatum – Andromeda*	Cottongrass Tussock	EA
7	*Carex chordorhiza – E. russeolum*	Sedge Meadow	CE
8	*Salix – Rubus arcticus*	Willow Riparian	SR
9	*Carex aquatilis – E. angustifolium*	Sedge Fen	CA
10	*Arctophila – Ranunculus*	Emergent Marsh	AR
11	Lichen	Lichen – Boulder Field	BF
12	Exposed Bedrock		RB
Modifiers:			
B	30% or more of the surface cover is boulders		
R	30% or more of the surface cover is bedrock		
S	Slope is 15% or greater		
E	Unit occurs on an esker		
G	Unit has more than 30% cover of shrubs greater than 50 cm in height		

Xerophytic herb tundra (SS) occurs almost entirely on the top of eskers and is referred to as esker tops. A large portion of these units is sparsely vegetated, due to the dry nature of the sites. The most critical ecological factor influencing these ecosystems is their coarse soils and exposure to strong winter winds, which limit the availability of soil moisture and the capacity of plants to become established. Saxifrage and moss-campion are common plant species with scattered crowberry and bearberry (Plates 13 and 14, section 3.5.1).

The *Betula-Empetrum* (BE) habitat type occupies esker side slopes and morainal veneers on slope crests. Vegetation is typically an open mat of dwarf birch, crowberry and bearberry with significant lichen cover (Plates 13 and 14, Section 3.5.1).

Table 2
Description of Ecosystem (Landscape) Units Within the Ferguson Lake Area

Ecosystem Unit	Description	Plate
Heath Tundra	Includes bouldery tundra (BLb), rocky tundra (BLr) and non-esker *Betula-Empetrum* (BE) habitats. All typically have a mat of dwarf birch and prostrate shrub vegetation.	Plates 11 and 12
Esker complex	All ecosystem units occurring on esker landforms; SSe on esker tops, BEe on side-slopes, and BLe and occasionally BRe at the base of eskers.	Plates 13 and 14
Birch hummock	All polygons typed as BR.	Plates 15 and 16
Birch seep	All polygons typed as BC.	Plates 17 and 18
Willow riparian	All polygons typed as SR.	Plates 19 and 20
Wetland complex	A complex of cotton-grass tussock (EA), sedge meadow (CE), and occasionally sedge fens (CA) and emergents (AR).	Plates 21 - 24
Tussock tundra	All polygons typed as EA.	Plate 21
Bedrock and boulder fields	Includes exposed bedrock (RB), which is relatively rare, and boulder fields (BF), which are more common. Both support little vegetation other than lichens and have generally low capability for wildlife.	Plates 25 and 26

Birch hummock (BR) habitats comprise the typical hummocky terrain of the tundra. Dwarf birch is abundant, with a well-developed moss layer composed of sphagnums. Cloudberry and Labrador lousewort are also common. Where depressions occur, these often support vegetation typical of the cottongrass tussock (EA) ecosystem unit. BR, EA and sedge meadow units (CE) often occur together in complexes (Plates 15 and 16, Section 3.5.1).

Two riparian habitat types occur: birch seeps (BC) and willow riparian (SR). They differ in structure, and in their value to wildlife. Birch seeps (BC) are dominated by dwarf birch often achieving heights of 1 - 1.5 m. Low amounts of willow are also present. This unit occurs in areas of active seepage through boulder lag deposits (Plates 17 and 18, Section 3.5.1). It is often found on the edges of and surrounding willow riparian (SR) ecosystem units.

SR habitats occur along actively flooding stream channels where relatively thick veneers of fine-textured materials have been deposited. The productive soil medium and constant flowing water support a tall shrub community (up to 2.5 m) of willow. A few SR habitats contain a high percentage of green alder in the western portion of the study area. The herb layer is well developed. This habitat is the most productive of all in the study area. In terms of area, however, it occupies only a fraction of the entire wildlife study area (Plates 19 and 20, Section 3.5.1).

Cotton-grass tussock (EA) consists of the tussock-forming sheathed cotton-grass. A well-developed sphagnum layer is typical (Plates 21 and 22 [outer edges of light green zone], Section 3.5.1). Within a wetland complex, sedge meadows (CE) occupy the lowest depressions (Plates 22 [inner zone of light green area] and 23, Section 3.5.1). This unit has the appearance of grassy meadows, as opposed to the hummocky appearance of BR and EA. The primary vegetation consists of sedges.

Sedge fens (CA) are mostly restricted to lake and stream margins where the water table is above or near the surface during the growing season. The vegetation is predominately water sedge (*Carex aquatilis*). Emergent marsh (AR) occurs in shallow lakes and shoreline areas. This ecosystem unit is rare in the study area, only one occurrence was documented (Plates 23 and 24, Section 3.5.1).

The lichen-boulder field ecosystem unit (BF) can dominate large areas. Vegetation is sparse and consists of various lichen species and vascular plants where thin organic layers have developed in crevasses among boulders (Plates 25, Section 3.5.1).

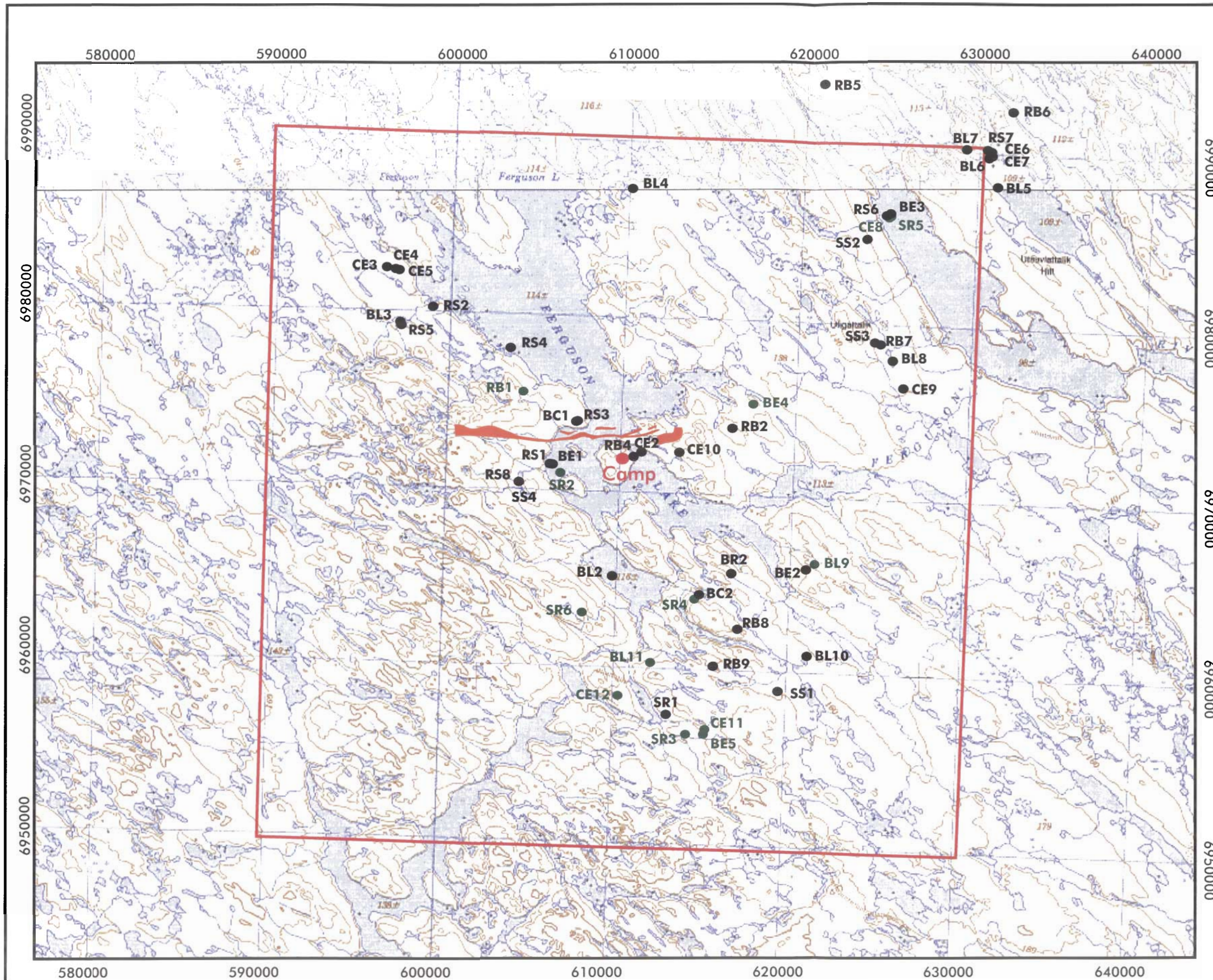
Exposed bedrock ecosystem unit (RB) is often associated with ridge tops. These sites are dominated by exposed bedrock with small amounts of soil occurring in crevasses. Environmental conditions determine what species occur on site. The most critical ecological factor influencing these ecosystems is their solid rock face and exposure to strong winter winds, which limit the availability of soil moisture and the capacity of plants to become established. This habitat supports very little vegetation other than rock lichens (Plates 26, Section 3.5.1).

3.5 Habitat Communities

Habitats do not occur singly but often as complexes of more than one type. For example, a community named "4BLb3BC3EA" is a complex consisting of 40% bouldery tundra or heath mat, 30% birch seep and 30% cotton-grass tussock. Lakes are not given unique identifiers within the ecosystem process.

The most common ecosystem units within the study area are closed and open mat tundra (BL). The least common ecosystem unit is willow riparian. The importance of a particular habitat association to a wildlife species is a function of many factors including how common or rare it is, its species composition and the value of these plants to wildlife, and its distribution across the landscape, including its juxtaposition in relation to other ecosystem units.

Figure 6: Habitats Assessed Within the Study Area



0 km 10 km

Scale - 1 : 227,500

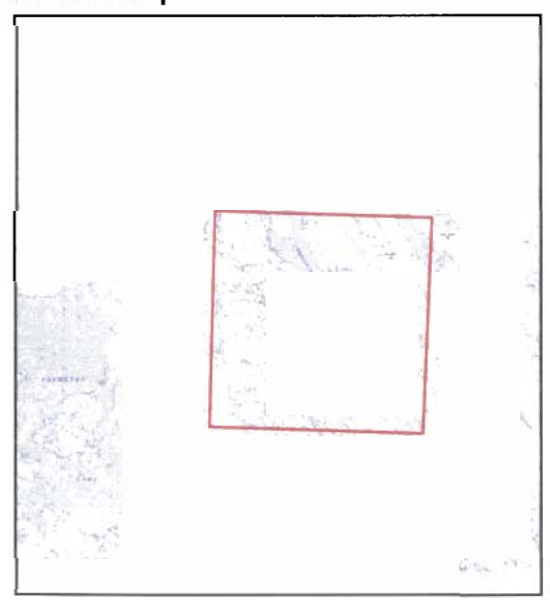
Date: April, 2002
Projection: UTM, Zone 14
Company: EBA Engineering Consultants Ltd.
Project #: 01-14863

Legend

- Ground Assessment
- Ground/Aerial Assessment
- Interpreted UTEM Conductors (Project Exploration Area)
- Camp Location
- Study Area Boundary

Note: Observation label denotes waypoint ID

Inset Map



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3.5.1 Photographs of Representative Ecosystem Units

Plate 11 ***Betula-Ledum*** **Tundra Ecosystem Unit**

Plate 12 **Aerial View of *Betula-Ledum* Tundra Ecosystems (Dark Green) with Patches of Sedge Meadows (Light Green)**

Plate 13 **Esker Complex with *Silene-Saxifraga* (SSe) on Esker Top, *Betula-Empetrum* (BEe) Esker Type on Side Slopes and *Betula-Ledum* Esker Type (BLe) at Base**

Plate 14 **Esker Complex with *Silene-Saxifraga* (SSe)**

Plate 15 A Birch Hummock, *Betula-Rubus* (BR), Ecosystem Unit

Plate 16 A Birch Hummock, *Betula-Rubus* (BR), Ecosystem Unit

Plate 17 **A Birch Seep BC, *Betula-Calamagrostis* (BC), Ecosystem Unit**

Plate 18 **Aerial View of a Birch Seep BC, *Betula-Calamagrostis* (BC), Ecosystem Unit**

Plate 19 A *Salix-Rubus arcticus* or Willow Riparian (SR) Ecosystem Unit

Plate 20 Aerial View of a Willow Riparian (SR) Ecosystem (Dark Green Strip of Vegetation)

Plate 21 **A Wetland Complex (EA) Ecosystem Unit With *Eriophorum* spp. as Dominant Plant Cover**

Plate 22 **Aerial View of a CE/CA Wetland Complex (Light Green) Ecosystem Unit with *Eriophorum* spp. Tussocks**

Plate 23 **A Wetland Complex CA Ecosystem Unit with *Carex* spp. as Dominant Plant Cover**

Plate 24 **Aerial View of a CE Wetland Complex (Light Green on Lake Margins) with BL on Adjacent Higher Ground (Brown)**

Plate 25 A Lichen-Boulder Field (BF) Ecosystem Unit

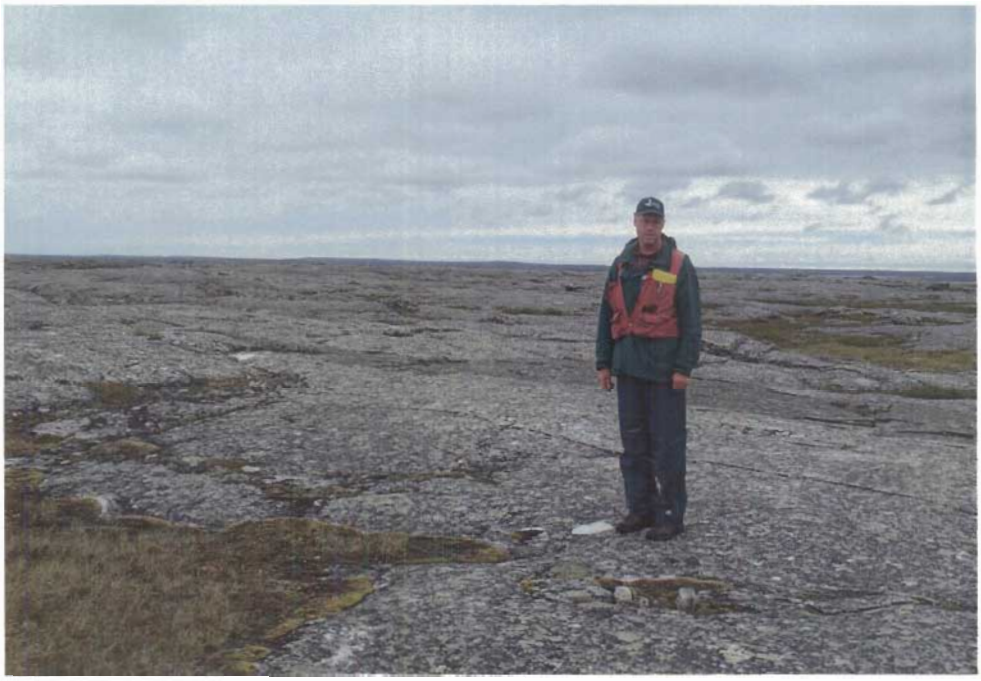

Plate 26 Exposed Bedrock (RB) Ecosystem Unit

3.6. Conservation Status of Plants

The biological diversity of plants has become increasingly important to researchers and Canadians in general. The lack of protection for rare plants can be detrimental to their populations. The species listed below are part of the rare flora listed in Rare Plants of Northwest Territories (McJannet *et al.* 1995).

A rare species is one that because of its biological characteristics, or because it occurs at the edge of its main range, or, for some other reason, exists in low numbers or in very restricted areas in the region of consideration (McJannet *et al.* 1995).

Within in this context, as it pertains to NU and NWT, rarity is defined as taxon which occur in very few localities or are restricted to a small area of NU or NWT (McJannet *et al.* 1995). The methodology applied for ascribing conservation status to individual plant species was originally devised by The Nature Conservancy (TNC) and applied by McJannet *et al.* (1995) to species occurring in NU and NWT.

The ranking methodology applied on this project is the same as that applied by TNC and McJannet *et al.* (1995). Seven plant species have been listed by McJannet *et al.* (1995) as occurring within a 200 km radius of Ferguson Lake: *Carex rufina*, *Draba norvegica*, *Juncus stygius* ssp. *americanus*, *Pedicularis macrodonta*, *Polygonum caurianum* ssp. *hudsonianum*, *Potamogeton obtusifolius*, and *Puccinellia kurilensis*.

No species recorded in that reference were found on the sites examined.