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Keele/Itsi/Macmillan Pass Region

Conservation Values
and
Special Management Area Recommendations

Prepared for Renewable Resources, Land Claims Co-ordination Section

Prepared by Parks & Outdoor Recreation Branch

January 1998

Values Summary

LOCATION:
Keele Peak and the Itsi Range are part of the Hess Mountains. In addition to the glaciated mountains, the proposal includes Macmillan Pass, and headwaters of the Ross, Prevost, Macmillan, and Hess rivers.

NATURAL CONSERVATION VALUE:
- Northernmost goat habitat (Itsi Range) in Yukon.
- Summer habitat for up to four woodland caribou herds, on well drained till in large valleys that support extensive shrub/birch/lichen plant communities, with sparse black spruce.
- Rich diversity of bird habitats, from wetlands through to alpine tundra. A total of 128 bird species have been observed in the Macmillan Pass area. Key habitat for gyrfalcon and golden eagles.
- Representative of range of major soil developments in the Selwyn Mountains Ecoregion.
- Full range of glacial and permafrost features, including active alpine glaciers, cirques and tarns, rock glaciers, palsas, peat hummocks, and widespread solifluction activity.
- Likely contains representative geological conditions of the Selwyn Basin, including sedimentary rocks, such as shale, chert argilite and conglomerate, with some metamorphics, and intrusive quartz monzonite forming the notable peaks.
- This proposal is in the Selwyn Mountains ecoregion, which is evenly shared by Yukon and NWT. The proposal includes approximately 13 percent of the Yukon portion of the ecoregion in two stringently protected areas, such as territorial parks.
- Large intact ecosystems exist, with opportunity for nationally significant conservation measures--in a mosaic that accomodates extractive resource interests.

CULTURAL VALUE:
- Macmillan Pass is a traditional hunting ground and travel corridor of the Ross River and Mackenzie River peoples.
- Includes the Canol Road National Historic Site and is adjacent to Canol Heritage Park in NWT.

RECREATION VALUE:
- Very high backcountry hiking and mountaineering potential in both the Keele and Itsi ranges. Portions of three rivers used by kayakers and canoeists (Hess, Macmillan, Ross).
- Road accessible hiking, camping, and wildlife viewing.

TOURISM VALUE:
- The most accessible and diverse bird watching opportunity in the Taiga Cordillera.
- High commercial tourism value along the Canol and as a starting point for wilderness hiking and river trips.

RESOURCE INTERESTS:
- High mineral potential in central portion of the proposal at Macmillan Pass and to the west.
- Important late summer commercial and resident, particularly First Nation, hunting area.

Acknowledgments

This report is the compilation of summary statements on resource values provided by specialists in a number of disciplines. Contributions to the section on ecoregion representation were provided by Catherine Kennedy, Habitat Section Scott Smith Agriculture and Agri-food Canada, and John Meikle, Parks & Protected Areas Branch. The section on wildlife is based on written contributions by Jean Carey and Rick Farnell, Fish & Wildlife Branch, Cameron Eckert, Parks & Protected Areas Branch, and personal communication with Barney Smith, Forest Commission. The description of archaeological and historic resources was written by Ruth Gotthardt and Bruce Barrett, Heritage Branch. Afan Jones and Jack Schick, Parks & Protected Areas Branch, contributed the recreation and interpretive potential sections respectively.

The descriptive material for the Selwyn Mountains Ecoregion is taken from draft reports written for *Ecoregions of Yukon*, which is nearing publication. Since a protocol for citation is not yet developed, the contributors are acknowledged here: Climate by Herb Wahl, Geology by Charlie Roots, Glacial History by Lionel Jackson, Physiography by Karen McKenna, Permafrost by Chris Burns, Soils by Scott Smith, and Vegetation Communities by Karen McKenna.

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1.0) Introduction

This report has been prepared at the request of the Renewable Resources Land Claims office in preparation for land negotiations with the Ross River Dena Council. The purpose is to provide background information on, and rational for, conservation options in the Keele Peak, Macmillan Pass, Itsi Range region. The intention of this report is to set whichever Special Management Areas that may be considered through the claims process in a broader conservation context, as envisioned by the Yukon Protected Areas Strategy.

The first perspective provided is that of the potential for representative protection of the Selwyn Mountains Ecoregion. Secondly is the potential for conserving wildlife habitats and habitat linkages. This is followed by a brief examination of the traditional and current uses of the region, a look at the broader conservation context, and a comment on previous evaluations of this and other conservation options in the ecoregion.

This report is based on the research and professional opinion of experts who have worked in the region, rather than on specific work geared directly to this project.

2.0) Ecoregion Representation

2.1) Ecozonal Context

The Selwyn Mountain Ecoregion is southernmost in the Taiga Cordillera Ecozone. This ecozone is located along the northernmost extent of the Rocky Mountain system and covers most of the northern half of the Yukon and southwest corner of the Northwest Territories.

2.1.1) Climate

Annual precipitation ranges from less than 300 mm in the north to over 700 mm in the southeast (Selwyn Mountains). Mean annual temperatures range from -10oC in the north to -4.5oC in the south. Mean summer temperatures range from 6.5oC to 10oC and are modified by vertical zonation and aspect. Summers are warm to cool with extended periods of daylight. Mean winter temperatures range from -25oC in the north to -19.5oC in the south. Winters are long and cold with very short daylight hours. Weather patterns from the Arctic and Alaskan coasts have a marked influence on this ecozone.

2.1.2) Vegetation

Natural vegetation ranges from arctic tundra (dwarf or low shrubs, mosses and lichens, and cottongrass) in the north, to alpine tundra (dwarf shrubs, lichens, saxifrages, and mountain avens) in higher elevations, and taiga or open woodland in the south (white spruce and white birch), mixed with medium to low shrubs (dwarf birches and willows), mosses, and lichens.

2.1.3) Landforms and Soils

Steep, mountainous topography, consisting of repetitive, sharply etched ridges and narrow valleys, predominates with foothills and basins also present. The bedrock is largely sedimentary in origin with minor igneous bodies. Much of the area is mantled with colluvial debris with frequent bedrock exposures and minor glacial deposits. The northwest portion of this ecozone consists of unglaciated terrain. Brunisols, Regosols, and Cryosols tend to be the predominant soils. Most wetlands, which in some ecoregions are extensive, are underlain by permafrost. Abundant permafrost features, such as peat hummocks, palsas, and peat plateaus, are common in peatlands. The unglaciated portions of this ecozone commonly exhibit periglacial features such as cryoplanation terraces and summits and various forms of sorted and unsorted patterned ground. Continuous permafrost underlies most of the ecozone with the exception of the western half of the Mackenzie and Selwyn Mountains ecoregions.

2.1.4) Wildlife

Wildlife in the area is diverse. Characteristic mammals include Dall's sheep, woodland and barren-ground caribou, moose, mountain goat, black and grizzly bear, wolf, lynx, arctic ground squirrel, American pika, hoary marmot, and a large concentration of wolverine. Important birds include gyrfalcon, willow and rock ptarmigan, and waterfowl. Most of the area remains a wilderness. The Yukon's Old Crow Flats is a large wetland complex which has received international recognition for its value to swans, Canada Geese, and other waterfowl species that nest or stage here each year in the tens of thousands.

2.1.5) Human Activities

Present activities include hunting, trapping, ecotourism, and outdoor recreation, as well as exploration for minerals. During the 1960s and 1970s much exploration for hydrocarbons was undertaken in the Old Crow and Eagle Plains basins. Mineral exploration has been focussed in the sourthern half of the ecozone, from the tungsten deposits in the Logan Mountains, the barite, copper, lead and zinc deposits at Macmillan Pass, the mineral rich brecchias of the Wernecke Mountains through to the skarn related deposits in the South Ogilvies. The Dempster Highway is the major transportation route through the ecozone, linking the Mackenzie Delta communities with the south. Total population is roughly 300 of which over 80% reside in the remote settlement of Old Crow, the Yukon's most northern settlement.

2.2) Ecoregion Summary

This ecoregion is located in the Selwyn and southern Mackenzie mountains that span the Yukon-Northwest Territories border. For the most part this is a rugged mountain wilderness, a northern extension of the Rocky Mountains. The highest mountains found in the Northwest Territories occur in this ecoregion. Climatic conditions vary with elevation. The ecoregion is characterized by alpine tundra at upper elevations and by subalpine open woodland vegetation at lower elevations. The ecoregion includes the Selwyn Mountains and a small portion of the southern Backbone Ranges of the Mackenzie Mountains in its easternmost section. The Selwyn

Mountains, which have been extensively glaciated, are composed of Palaeozoic and Proterozoic strata intruded by granitic stocks. They are divided into several ranges by broad, northwesterly-trending valleys. Some contain alpine and valley glaciers. Mount Keele, at 2950 m asl, is the most outstanding peak. Local alpine glaciers exist in the highest ranges of this ecoregion. Bare rock outcrops and rubble are common at higher elevation. Permafrost is extensive but discontinuous in the western part and continuous with low ice content in the eastern part of the ecoregion. Dystric and Eutric Brunisols on alluvial, fluvioglacial, and morainal veneers and blankets are dominant in the region. Static and Turbic Cryosols with Dystric Brunisols or Regosols are developed on upper-elevation, steeply-sloping colluvium. Characteristic wildlife includes caribou, grizzly and black bear, Dall's sheep, moose, beaver, fox, wolf, hare, raven, rock and willow ptarmigan, and bald and golden eagle. Climate and resources provide opportunities for hunting and trapping of wildlife, ecotourism, and mineral exploration. There are no major permanent settlements in the ecoregion.

2.3) Climate

This ecoregion is located on the western slopes of the continental divide between Yukon and Northwest Territories. Elevations rise from near 1000m along this ecoregion's eastern boundary to an average of 1700m along the divide. There are however many ranges within this ecoregion with elevations of 2000 to 2500m and some individual peaks extend to 2800m. Seasonal variations and the effect of elevation results in a complex climate. Limited but useful climatological data are available from Sheldon Lake (Twin Creeks) Yukon and Tsichu River and Tungsten, N.W.T.

Mean annual temperatures are believed to range from -5 to -8. Mean January temperatures are expected to be near -20 and for July ranging from plus 10 to 5 with the lower July temperatures at the higher elevations. Temperature extremes in January in the valley floors can range from -55 to plus 3 but over the higher terrain would probably range from -30 to -5. In July extremes would range from -5 to plus 30 in the valley floor but to -5 to plus 15 over higher terrain. Frost can be expected at any time of the year.

Precipitation is moderate to heavy with annual amounts of 600 to 700mm. The winter months have mean amounts of 30 to 50mm with the least amounts from February to April. The wettest months are July and August with mean amounts of 60 to 90mm. Even during the warmer months the precipitation may be in the form of snow or snow pellets.

There is little wind data but it is expected that winds would be light to moderate. Due to funneling effects in the mountain ranges it is expected that periods of strong winds should be expected at any time of year.

2.4) Geology

The geology of the Yukon part of this ecoregion differs markedly from that portion in the adjacent Northwest Territories. It is characterized by dark-weathering Paleozoic clastic sedimentary rocks of the Selwyn Basin tectonic assemblage, rather than the colourful Proterozoic and Paleozoic carbonate strata of the Mackenzie Platform in the N.W.T. Regional geological maps exist for most of the Yukon portion (Gabrielse et al., 1973; Gordey and Irwin, 1987; Gordey and Anderson, 1993) although some are in preliminary form (Blusson, 1966; Cecile and Abbott, 1994; Roots et al., 1995).

Selwyn Basin was a deep water depositional environment with periodic clastic influx and reducing conditions. The oldest rocks are a thick, widely exposed sequence of coarse sandstone, conglomerate and maroon shale of the Hyland Group (this and all subsequently mentioned units are described in Gordey and Anderson, 1993). These Late Proterozoic to Cambrian sediments are overlain in adjacent areas by dull grey-brown shale (Gull Lake Formation) and thin bedded limestone (Rabbitkettle Formation) of Cambrian age. The most widespread unit, commonly underlying subdued topography, consists of black and locally silvery weathering shale (Road River Group), and, increasingly toward the north, grey (locally green and blue) chert. In Middle Devonian time (about 380 million years ago) Selwyn Basin was inundated by chert-quartz sandstone and chert pebble conglomerate of the Earn Group eroded from the above mentioned units further west (Abbott et al., 1987). Atop these dark coloured rocks, thin remnants of turbiditic sandstone and shale of the Tsichu, Mount Christie and Jones Lake formations are locally preserved. Numerous sub-circular plutons of hornblende and/or biotite granite (Selwyn Plutonic Suite; 92-106 Ma) form extremely rugged massifs, such as Horn Peak, Keele Peak, Itsi Range and Mount Billings. The plutons are encircled by a 0.5-2 km wide zone of contact metamorphosed, resistant and commonly rusty weathering sedimentary rocks but surrounding areas are typically low relief.

In Late Jurassic and Early Cretaceous time, the sedimentary strata were intensely deformed into tight folds, separated by thrust faults. Seemingly enormous thicknesses of similar strata are really the same thin, competent beds imbricated by layer-parallel thrust faults. Furthermore, flat-lying thrust faults, rarely apparent without regional structural analysis (e.g. Gordey, 1981), underlie most of the ecoregion. Two regional scale, dextral transcurrent faults, the Hess and Macmillan (Abbott and Turner, 1990), extend northwest from the headwaters of their namesake rivers. Large unexplained earthquakes occasionally shake the region (Wetmiller et al., 1989) and may trigger the rockslides which favour jointed, well bedded carbonate rocks perched above glacially deepened valleys (Eisbacher, 1977, 1978).

Most known mineralization consists shale-hosted zinc-lead, and tungsten in altered carbonate near granite plutons; thus certain sedimentary horizons and plutons have potential for ore deposits. Near Macmillan Pass Zn-Pb-barite deposits (105O#1,6,9; all numbered occurrences in Yukon Minfile; INAC, 1993) are spatially related to syndepositional faults (Abbott and Turner, 1990) in the Earn Group, which also contains barite deposits (e.g. 105O#21) and geochemistry anomalies. Road River shales contain large stratiform Zn-Pb-Fe deposits at Howards Pass (105I#12, 37, 53), 40 km southeast of Macmillan Pass. Mactung (105O#2), 5 km northeast of Macmillan Pass, and Cantung (105H#62) 105 km north of Watson Lake, are the known scheelite deposits in Yukon. Sub-economic Zn-Pb-Ag (Cu-W) skarn showings are abundant around the granite north of Mount Billings, east of Tillei Lake. Other deposit types include the Plata-Inca argentiferous galena in quartz veins cutting black shale (105N#3; 105O#15) 15 km northeast of the mouth of Rogue River, and visible gold and bismuthenite in sheeted quartz veins within the Emerald Lake pluton (105O#9).

2.5) Glacial History

The Selwyn Mountains was a region of ice accumulation and intense glacialerosion during the last ice age, called the McConnell Glaciation in Yukon (Bostock 1966). Spectacular alpine landforms such as horns and aretes are common in this area. Significant accumulations of glacial sediments are present only in the bottoms of major valleys. Ice crossed the Continental Divide from west of the Nahanni Valley to feed the Selwyn Lobe of the Cordilleran Ice Sheet (Jackson, 1987). The Selwyn Mountains shed ice south into the Liard basin (Dyke,1990 a) and also fed eastward flowing glaciers which merged with the Laurentide Ice Sheet in Mackenzie Valley

(Jackson 1994, Jackson et al. 1991; Jackson and Mackay, 1991).

The major expansion of glaciers in this region occurred after ca. 26 ka B.P. (Jackson and Harington, 1991; Jackson et al 1991). Deglaciation occurred from the top down with upland areas being the first to emerge whereas valleys remained under stagnating valley glaciers (Jackson, 1987; Jackson, 1994). During the post glacial period, streams incised into the glaciated terrain leaving flights of stream terraces and building alluvial fans. Intense mechanical weathering and mass wasting processes created mantles of colluvium on moumtain slopes. Cirque glaciers and rock glaciers advanced during the Little Ice Age of the past few centuries. Rock glaciers remain active in many areas (Dyke, 1990b; Jackson, 1987; Jackson and MacDonald, 1980) .

2.6) Physiography

The Selwyn Mountains Ecoregion consist of the Hess and Logan Mountains which form the Yukon-Northwest Territories border between 61 and 64 degrees north latitude. About half of the ecoregion extends into the Northwest Territories.

The Hess and Logan Mountains are rugged at high elevations . They consist of mountains and ridges separated by broad valleys. Between the Hess and Logan Mountains is a less rugged area with broader valleys, the headwaters of the Pelly River. The Tasin, Rogue and Itsi Ranges are smaller ranges that make up the Hess Mountains. Most of the higher mountains are cored by more resistant intrusive rocks. The summits of the highest peaks, Keele Peak, the Itsi Range and peaks in the Logan and Rogue Range are glaciated.

Keele Peak is 2971 meters a.s.l. the highest point in the ecoregion. Numerous other mountains are over 2200 meters a.s.l. and much of the area lies above 1500 meters a.s.l.. Relief is 900 to 1500 meters.

2.7) Permafrost

Selwyn Mountains ecoregion is in the widespread discontinuous permafrost zone. Harris (1986) suggests that permafrost is continuous above 1300 m a.s.l. in northern parts of the ecoregion, and above 1450 m in the south. In valleys permafrost is often absent or discontinuous, due to the extent of snow accumulation in winter. At MacMillan Pass (1106 m a.s.l.) permafrost occurs in the valley bottom as isolated palsas (Kershaw and Gill 1979; Harris and Nyrose 1992), and is not extensive. The active layer in these peat mounds is <60 cm thick, and overlies up to 5 m of permafrost (Kershaw and Gill 1979). Mean near-surface ground temperatures in the valley at MacMillan and Howards Passes are above 0°C (Burgess et al. 1982).

At higher elevations, however, there are plenty of features that indicate the presence of permafrost. Hundreds of rock glaciers were noted by Dyke (1990) in the southern portion of the ecoregion, as well as debris-covered glaciers and small cirque glaciers. The terrain was glaciated, hence most mountain sides are covered by a veneer of drift, in which solifluction lobes are developed. The active layer in this drift is often over 1 m deep, due to its coarse nature (Dyke 1990). Ground ice is prevalent in glaciolacustrine sediments and is ubiquitous in organic soils, which form blanket bogs in some valleys (Jackson 1987).

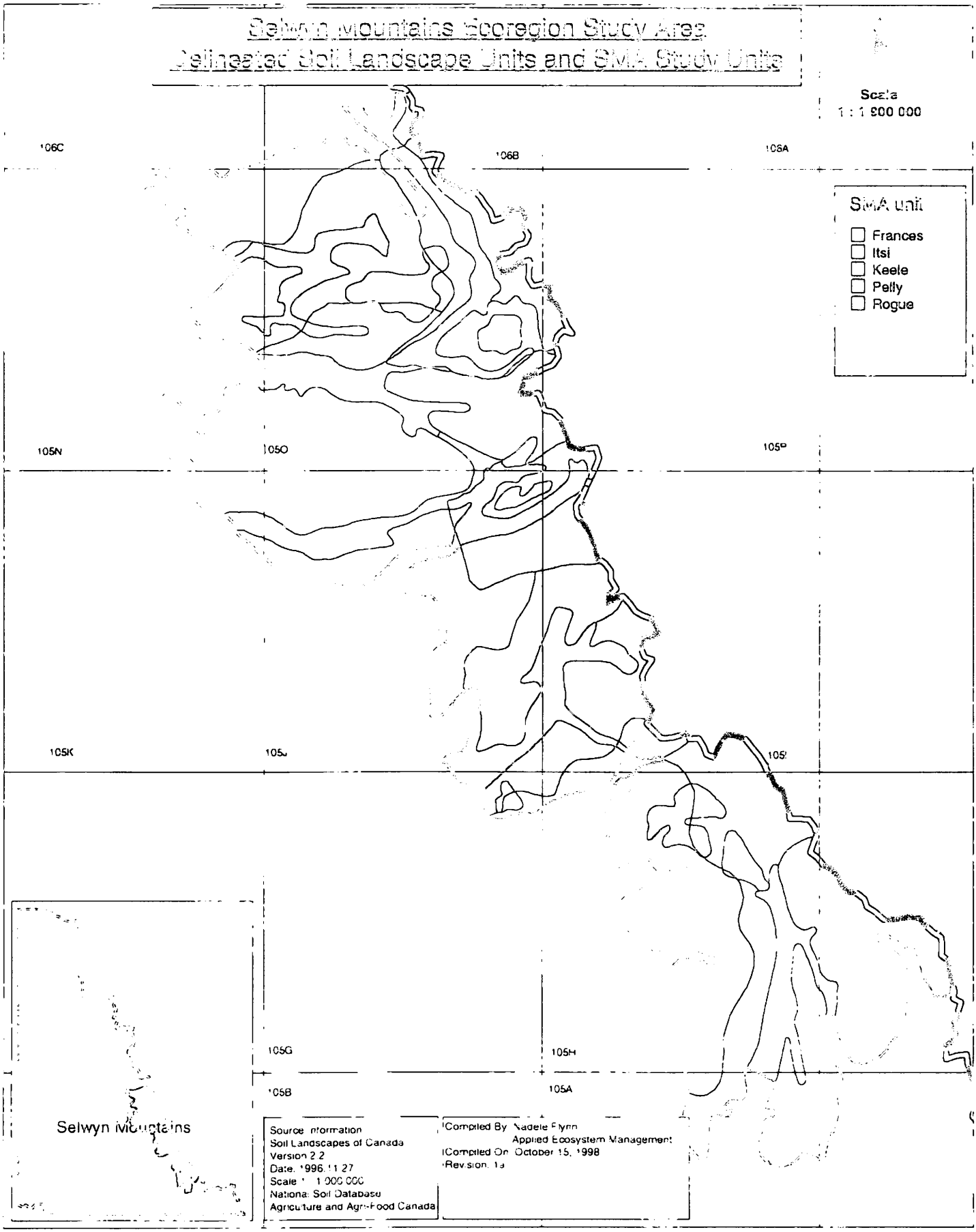
2.8) Soils

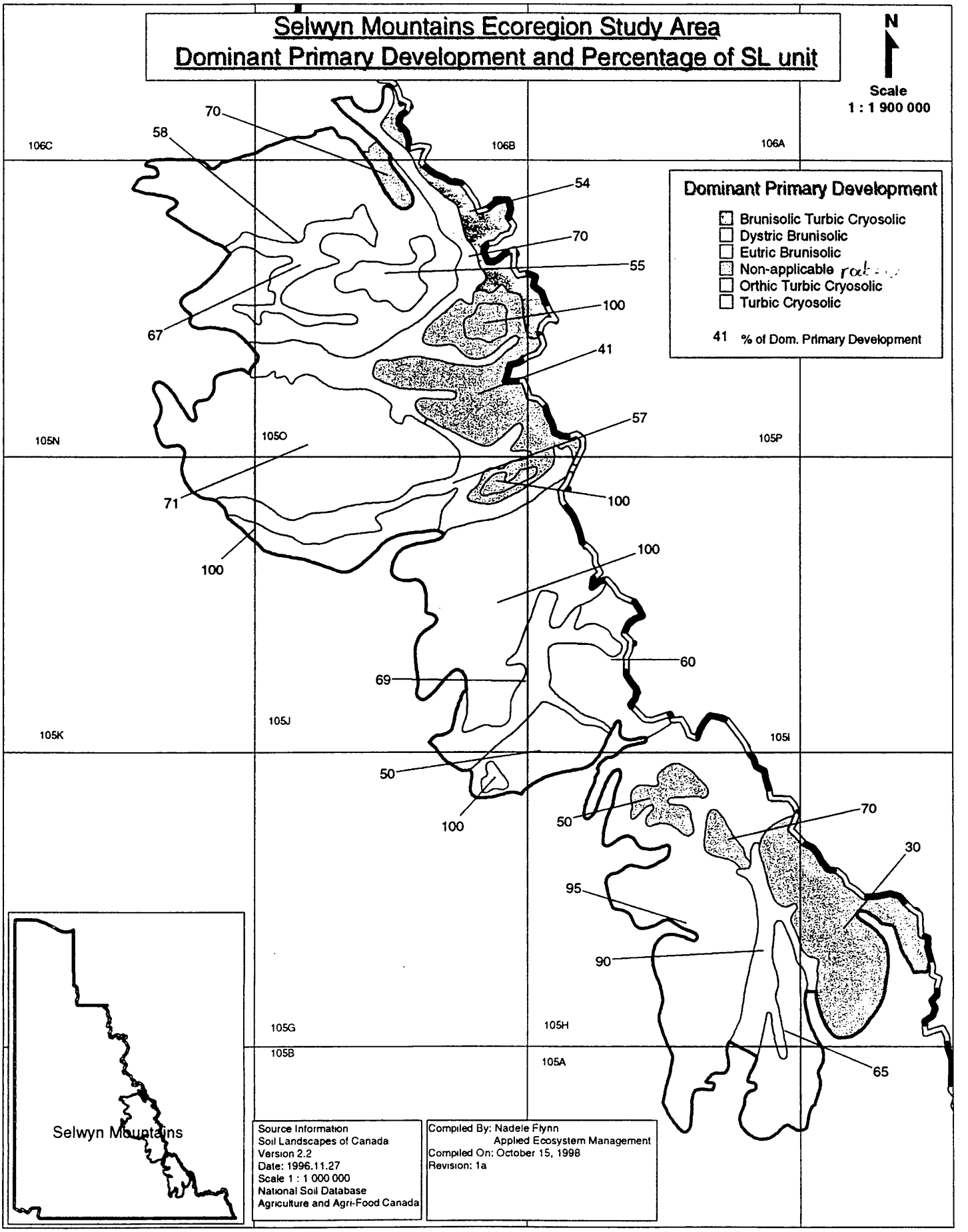
This mountainous ecoregion covers the very rugged terrain of the northern Rocky Mountains. Soils have formed under the influence of a relatively moist, continental climate on a variety of sedimentary geologic parent materials. Much of the ecoregion is buried under deep winter snow packs which limit somewhat the establishment of permafrost. Previous detailed soil studies have been conducted in the northern part of the ecoregion in the MacMillan Pass area (Department of Renewable Resources 1981) and in the southern portions of the ecoregion in the upper Hyland River watershed (Zoladeski and Cowell 1996).

Mountain summits and ridges are characterized by bedrock outcrops and shallow soils over bedrock. Coarse colluvium associated with felsenmer formations or active alpine glaciers supports Regosolic soil formation. Alpine environments present a mosaic of soils such that a complex of frost churned soils (Turbic Cryosols) and alkaline brown forest soil (Eutric Brunisols) co-exist depending on moisture regime and the extent and location of permafrost. North-facing slopes and seepage areas tend to be underlain by permafrost particularly in the northern portion of the ecoregion where unweathered frost churned soils (Regosolic Turbic Cryosols) and unweathered frost churned soils (Orthic Turbic Cryosols) are found on slopes under open canopy black spruce forests. Warmer slope aspects tend to be without permafrost and support alkaline (Eutric) and acidic leached soils (Dystric Brunisols) depending on the mineralogy of parent geologic materials. Occasional Orthic Humo Ferric Podzols occur on well drained parent materials at subalpine elevations.

A variety of glacial materials are found on lower slopes and valley bottoms. Morainal materials most often support Eutric Brunisol formation. Strong leaching in gravely glaciofluvial materials leads to the development of Dystric Brunisols and in some localities, Orthic Humo Ferric Podzols. This is the only ecoregion in the Yukon where Podzolic soils have significant occurrence.

There are some extensive wetlands in major valley systems. Sedge dominated wetlands (fens) are often without permafrost and their associated soils are classified as Typic Mesosols. Where sphagnum peats accumulate, peat plateau bogs underlain by near-surface permafrost support Organic Cryosolic soil formation.


Selwyn Mountains Ecoregion Study Area
Delineated Soil Landscape Units and SMA Study Units
Scale
1 : 1 000 000
106C
106B
106A
SMA unit
Frances
Itsi
Keele
Petty
Rogue
105N
105O
105P
105K
105J
105I
105G
105H
105B
105A
Selwyn Mountains
Source information
Soil Landscapes of Canada
Version 2.2
Date: 1996.11.27
Scale: 1:1 000 000
National Soil Database
Agriculture and Agri-Food Canada
Compiled By Nadele Flynn
Applied Ecosystem Management
Compiled On October 15, 1998
Revision 1a


Selwyn Mountains Ecoregion Study Area
Dominant Primary Development and Percentage of SL unit
N
Scale
1 : 1 900 000
106C
106B
106A
105N
105O
105P
105K
105J
105I
105G
105H
105B
105A
70
58
54
70
55
100
67
41
57
71
100
100
100
60
69
50
100
50
70
30
95
90
65
Dominant Primary Development
Brunisolic Turbic Cryosolic
Dystric Brunisolic
Eutric Brunisolic
Non-applicable rock
Orthic Turbic Cryosolic
Turbic Cryosolic
41 % of Dom. Primary Development
Selwyn Mountains
Source Information
Soil Landscapes of Canada
Version 2.2
Date: 1996.11.27
Scale 1 : 1 000 000
National Soil Database
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1) PARENT MATERIALS

	Ecoregion	Rogue	Keele	Itsi	Pelly	Frances	Keele & Itsi
Colluvial	46.8	45.7	42.3	25.2	33.6	65.6	35.3
Morainal	29.9	4.2	25.9	45.7	45.2	30.3	34
Rock	14.1	33.9	21.1	11.2	7.9	2.5	17.1
Fluvioglacial	6.8	4.2	8.3	16.4	11.9	0	11.6
Lacustrine	0.9	8.5	0	0	0	0	0
Organic	0.7	2.1	0	0	1.4	0	0
Ice	0.6	1	2.4	1.5	0	1.6	2.1
Alluvial	0.2	0.9	0	0	0	0	0
Total	100	100.5	100	100	100	100	100.1

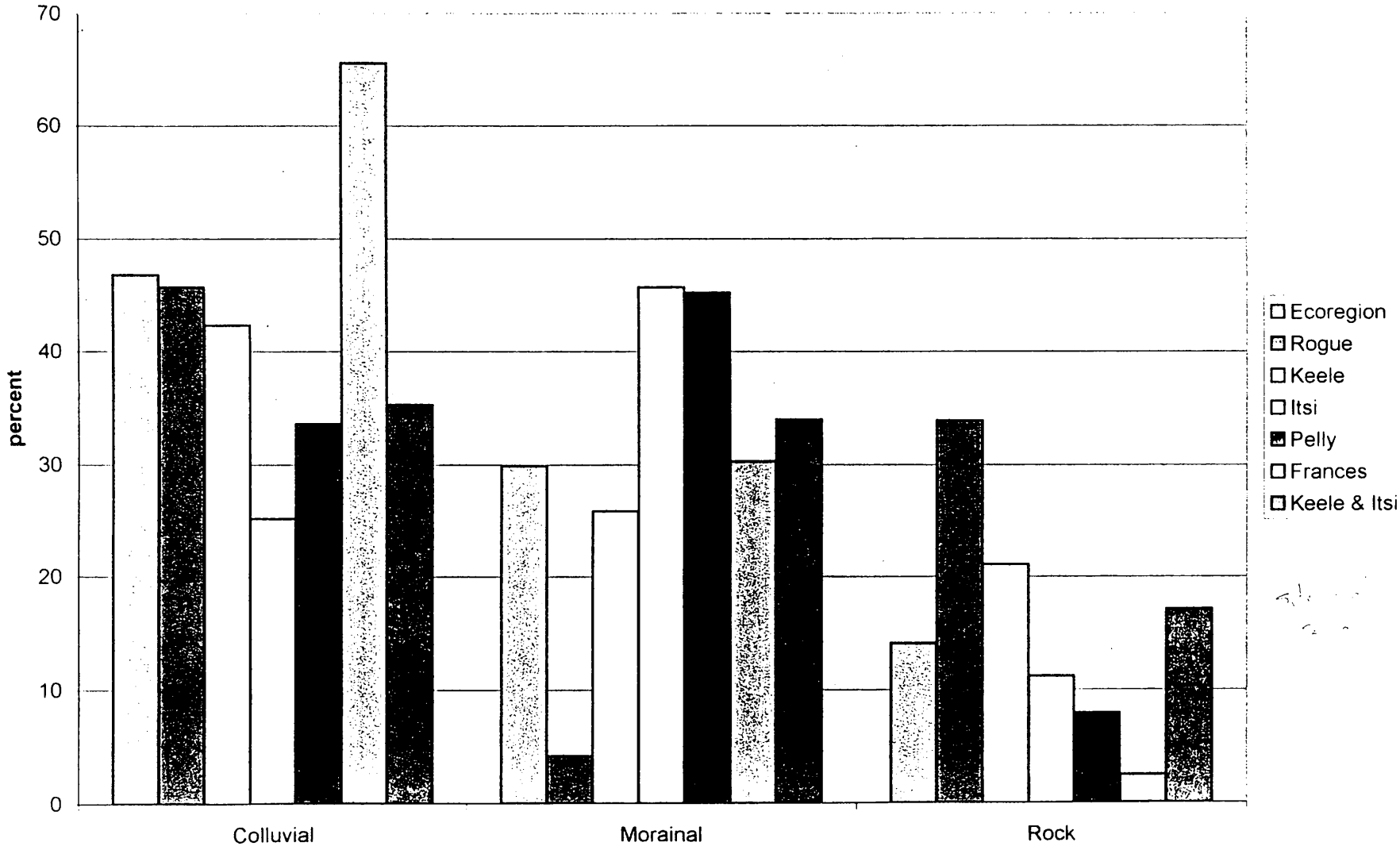
2) SOIL DEVELOPMENTS

	Ecoregion	Rogue	Keele	Itsi	Pelly	Frances	Keele & Itsi
Acidic	50.9	4.8	28.2	65.1	54.8	87.4	43.5
Frost Churned	30	60.5	48.3	22.4	21.9	0	37.6
Rock	14.1	33.7	21.1	11.1	8	2.5	16.9
Alkaline	2.4	0	0	0	15.4	0	0
Unweathered	2	0	0	0	0	8.5	0
Ice	0.6	1	2.4	1.5	0	1.6	2.1
Total	100	100	100	100.1	100.1	100	100.1

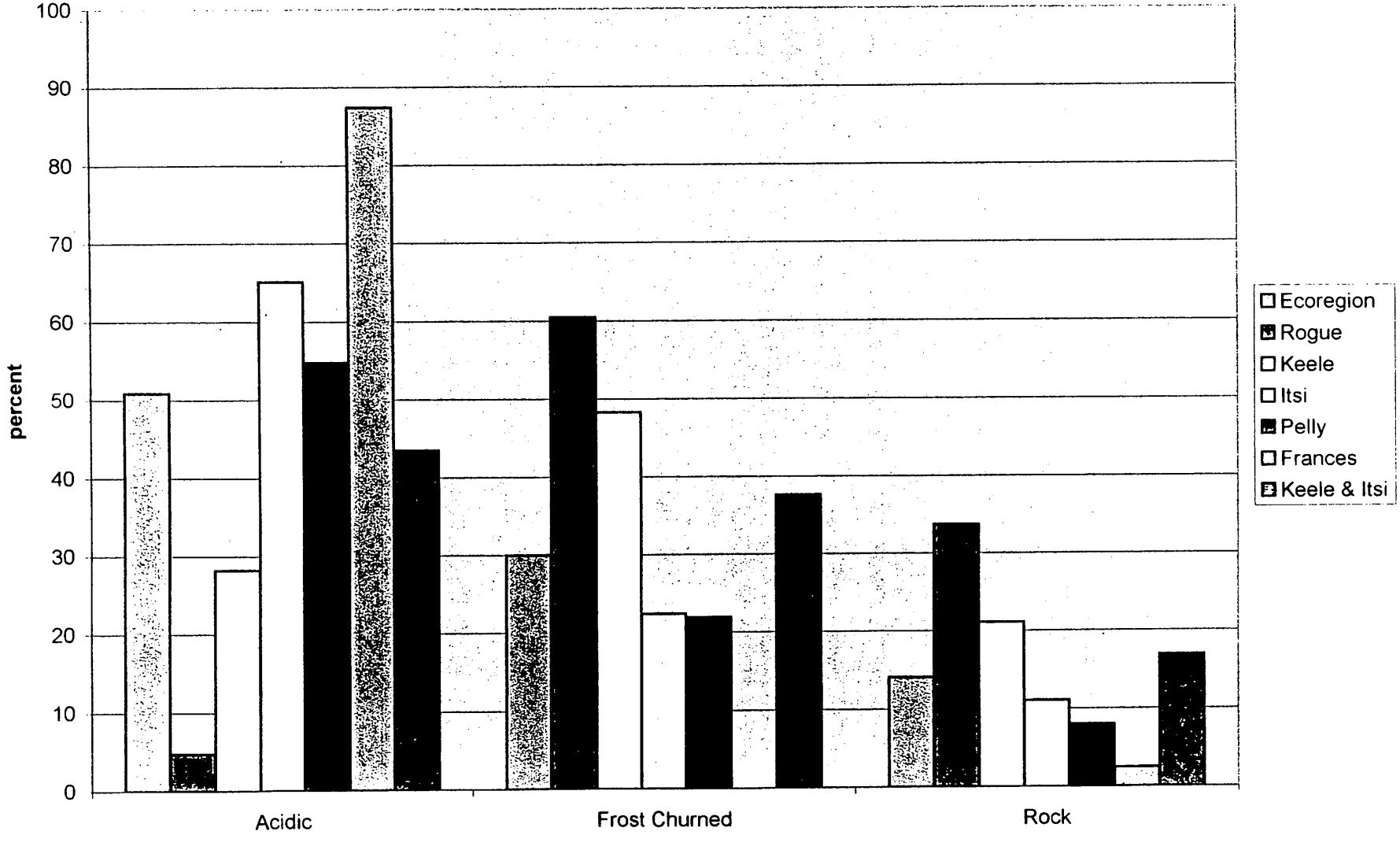
SURFACE FORM

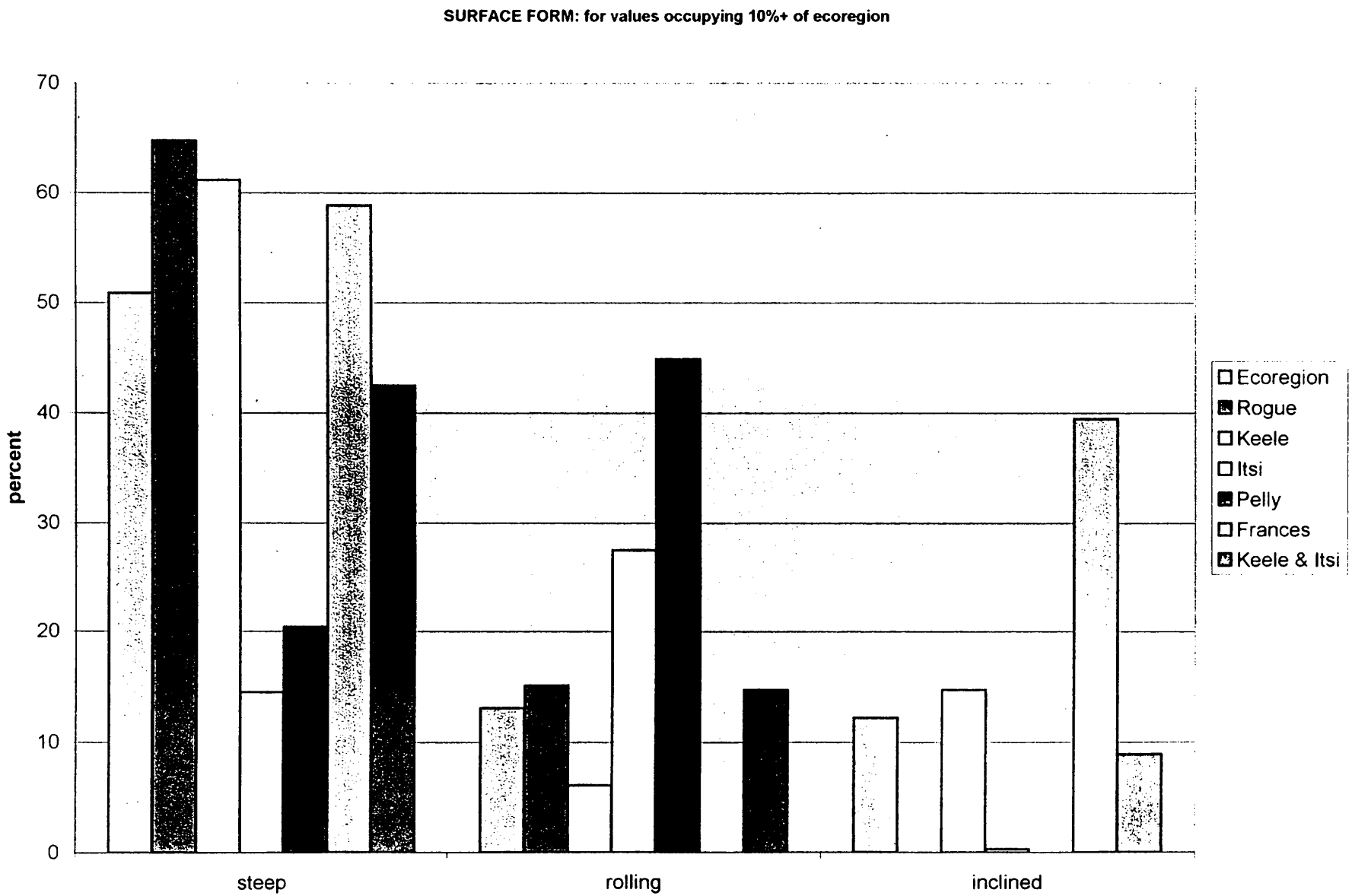
	Ecoregion	Rogue	Keele	Itsi	Pelly	Frances	Keele & Itsi
steep	50.9	64.8	61.2	14.5	20.4	58.9	42.5
rolling	13.1	15.1	6.1	27.5	44.9	0	14.7
inclined	12.2	0	14.7	0.3	0	39.5	8.9
dissected	5.1	0	0	17.7	21.4	0	7.1
terraced	5.1	0	0	18.6	11.9	0	7.5
undulating	4.7	12.8	0	0	0	0	0.0
hummocky	4.7	0	7.2	19.8	0	0	12.3
level	1.9	4.2	8.3	0	0	0	5.0
knoll & kettle	1	0	0	0	0	0	0.0
peat plateau bog	0.7	2.1	0	0	1.4	0	0.0
Ice	0.6	1	2.4	1.6	0	1.6	2.1
total	100	100	99.9	100	100	100	100.1

PARENT MATERIAL: for values occupying 10%+ of ecoregion



SOIL DEVELOPMENTS: for soils occupying 10%+ of ecoregion




SURFACE FORM: for values occupying 10%+ of ecoregion
70
60
50
40
30
20
10
0
percent
steep
rolling
inclined
Ecoregion
Rogue
Keele
Itsi
Pelly
Frances
Keele & Itsi

Soils are a useful measure for protected area representation evaluation as they are the long term expression of ecological conditions; in particular, the interactions of parent materials, climate, and biota. The percent cover of the dominant soil developments is displayed in Table ___ and Figure ___ for the Yukon portion of the ecoregion. The Soil Landscape Units are mapped according to the dominant soil development, but a range of developments exist within each unit, according to the conditions and associations described above. The following themes were assessed for the study area based on the Soil Landscapes of Canada, version 2.2, data set: Parent Material; Soil Developments; and Surface Form. These data were applied to the entire Yukon portion of the Selwyn Mountains ecoregion. In addition, they were applied to the Keele and Itsi areas, and for comparative purposes, to options defined by the Rogue and Pelly rivers, along with the watershed for the Frances Lake east arm. Note that because most options were delineated using watersheds, they are not all of equal size. Consequently they cannot be compared absolutely, as larger areas or combinations will have a greater likelihood of representing the overall ecoregional character.

The following observations can be made:

- The dominant soil development in the ecoregion is acidic soil (Dystric Brunisol, 50.9%). The Keele/Itsi area adequately represent these soils, along with the Pelly option. They are underrepresented by the Rogue option and overrepresented by the Frances option
- The other soil development that occurs commonly in the ecoregion is frost churned soil (cryosols, 30.0%). This soil development is represented proportionally by the Keele/Itsi area and by the Pelly option. There is little expression of it in the Frances option and it is the dominant development in the Rogue option.
- Regionally rare soil developments have very limited distribution and so will be unlikely to be captured in representative protected areas. Notably: poorly weathered soils (regosols 2.0%) are found only in the south of the ecoregion, and comprise part of the Frances option; and alkaline soils (Eutric Brunisols, 2.4%) are found only in the relatively lowlying Pelly drainage.
- Parent Materials reflect the recent glacial history of the ecoregion. Three materials comprise over 90% of the ecoregion: colluvium (46.8%), morainal material (29.9%) and exposed rock (14.1%). Again, all three are reasonably well represented by the combined Keele and Itsi areas. The Frances option has very little rock and is mostly colluvial. The Pelly option is close proportionally to the ecoregion, while being slightly lower in rock and higher in morainal material. The Rogue option is skewed in favor of exposed rock.
- The Surface Form most commonly described for the ecoregion is *steep* (50.9%). All of the options, except for the Pelly, represent this element well. (Note: on its own, Itsi is lowest for this element).
- The next two most common Surface Forms, *rolling* (13.1%) and *inclined* (12.2%), are best represented by the combination of Keele and Itsi.
- Less common surface forms such as dissected and terraced reflect deeper glacial drift and post-glacial conditions of lower areas. They are found only in the Itsi and Pelly options.

2.9) Hydrology

The most notable feature of the ecoregion is that it is a headwater to rivers that are part of the Yukon River drainage, the Liard River drainage, and rivers flowing directly into the Mackenzie River. On the Yukon side, the ecoregion includes the headwaters of the Stewart, Lansing, Rogue, Hess, Macmillan, Ross, Prevost, Frances, Coal and Hyland rivers. Major drainages on the NWT side include the Nahanni, Keele and Mountain.

There are no large lakes, and only a few mid-sized lakes, including Fortin and Pelly Lakes, Otter, O'Grady and Fuller lakes. There are a sprinkling of smaller lakes, including Keele Lake and the Itsi chain within the area of interest.

The Hess Mountains drain mainly west to the Stewart, Macmillan and southwest via the Ross River. The Logan Mountains drain west via the Pelly River and south through tributaries of the Frances, Hyland and Coal Rivers to the Liard. Lakes are found occasionally throughout the ecoregion but are more common in the broader valleys between the Hess and Logan Mountains. Pelly Lakes are the largest in the ecoregion.

2.10) Vegetation Communities

The vegetation communities which comprise the Keele Peak/Itsi Mountains study area are generally very representative of the Selwyn Mountains Ecoregion in the Yukon. One important exception is the absence of lodgepole pine, which is restricted to old burns in the lower part of the Hyland River valley and possibly other lowland areas on the margins of the ecoregion.

The vegetation of the Selwyn Mountains is mainly alpine and subalpine. Alpine ridges and peaks are sparsely vegetated. Lichen / grass communities, interspersed with exposed soil and rock dominate the most extreme sites at high elevations. Dwarf shrub communities are common on slopes and ridges between 1200 and 1800 meters occupying slightly moister sites than the lichen dominated communities. Cassiope tetragona (arctic white heather), crowberry and blueberry, grass, sagewort, gentian, feathermoss and Cetraria and reindeer lichens are the typical species found. Rock lichen colonizes scree slopes. The vegetation composition of these alpine areas varies greatly within short distances due to microtopography, microclimate and changes in bedrock lithology. More nutrient rich limestones and carbonate rich shales host different plant assemblages including more forbs than other more acid bedrock.

Shrub birch / willow communities dominate much of the subalpine including many colluvial slopes, coarser deposits of subalpine valleys and gentle morainal slopes in the northern part of the ecoregion along the Northwest Territories border (e.g. the Keele/Itsi Study Area). Shrub birch, with willow on moister sites, is underlain by blueberry, crowberry, feathermoss and lichens. Most soils are probably Brunisols though permafrost is likely at depth, however the shrub dominated slopes of the northern part of the ecoregion are permanently frozen and are classed as cryosols.

Alpine fir is also common in the subalpine found between about 1200 and 1600 meters. Sparser trees and krummholz growth forms predominate with increasing elevation. On dry southerly exposures sparse patches of fir krummholz form the treeline Denser stands of fir and fir krummholz are found on north facing slopes. Forb-rich communities may occur in association with or adjacent to fir communities .

Black spruce predominates at lower elevations through much of the ecoregion. In the valleys, patches of white and black spruce and alpine fir and mixed stands are interspersed with shrubland and wetlands. White spruce feathermoss stands are restricted to river floodplains associated with rego gleysol soils.

Black spruce is found on poorly drained lower slopes or level areas with shrub birch, willow, labrador tea, spagnum, feathermosses and lichen associated with near surface permafrost, and cryosolic soils on organic or morainal parent materials. On slightly better drained mounds,and morainal slopes lichen and shrub birch dominate the understory

2.11) Representation Assessment

- The area encompasses the full range of elevations, landforms and most vegetation ecosystems found in the Selwyn Mountain ecoregion within the Taiga Cordilleran ecozone ecoregion.
- The Yukon portions of the ecoregion lies within a zone of relatively high annual precipitation. This precipitation regime is expressed as glaciers on the highest peaks, a relatively luxuriant woodland vegetation and valley bottom wetlands at low elevations. Precipitation increases with increasing elevation which is typical for the Mackenzie and Selwyn Mountains along the Yukon-NWT border.
- The range of vegetation includes forests composed of white and black spruce and extensive shrub cover in subalpine elevations. Alpine fir is the predominant tree species amougst the shrub-dominated subalpine vegetation zone. Alder shrub-covered avalanche tracks are common on steep mountain slopes as the results of heavy snow accumulation during the winter. Lodgepole pine, which occurs sporadically in the southern portions of the ecoregion, is not present in the proposed area.
- There are numerous permafrost features in the proposed area that are typical of the ecoregion. Permafrost is widespread discontinuous.
- The full range of major soil developments and parent materials are well represented by the combination of Keele and Itsi.
- At higher elevations, however, there are plenty of features that indicate the presence of permafrost. Rock glaciers are common as well as debris-covered glaciers and small cirque glaciers. The terrain was glaciated, hence most mountain sides are covered by a veneer of drift, in which solifluction lobes are developed.
- The proposal includes headwaters of the Hess, Macmillan, Ross and Prevost rivers. It includes one of the larger lakes in the ecoregion, Fuller Lake, and a few of the sparsely distributed smaller lakes, such as Keele Lake in the Hess watershed and the Itsi Lakes, part of the upper Ross River.
- As core representative protected areas the Keele and Itsi areas work together. The linkage of the two areas across the Macmillan River valley is important. Neither of Keele or Itsi, as currently proposed, are of sufficient size to satisfy long-term sustainability criteria if they are viewed as independent or isolated protected areas.
- This proposal is in the Selwyn Mountains ecoregion, which is evenly shared by Yukon and NWT. The proposal includes approximately 13 percent of the Yukon portion of the ecoregion in two stringently protected areas, such as territorial parks. A small component (approximately 1.3%) of the ecoregion is included in Nahanni National Park. There are no other protected areas in the ecoregion.

2.10) Special features

- Keele Peak at 2962 m asl is the highest peak in the ecoregion (and ecozone) and supports the largest alpine glaicer complex in the Mackenzie Mountains. It's neighbour , Itsi Range includes peaks as high as 2660 m asl also supporting alpine glaciers although of lesser extent.
- These high elevations, coupled with high precipitation regimes results in the proposed area containing most of the alpine glaciers in eastern Yukon.
- Very heavy snow accumulations are common at all elevations during the winter months such that avalanche tracks are common here.
- Deep snow and high summer rainfall, produce some of the most leached soil types found in the Yukon, including the northern most occurrence of Podsolic soils (strongly leached, acidic, forest soils) in Canada.
- Northern-most limit of mountain goats in Yukon (Canada).
- Douglas et al (1981) has reported 18 rare species of vascular plants as occurring in the Selwyn Mountains Ecoregion. Given the high representivity of the Keele Peak/Itsi Mountains regarding the vegetation of the ecoregion as a whole, it is likely these species occur in the study area.
- Cody, taxonomist and author of the Flora of the Yukon Territory adds (pers.comm) that the study area probably hosts a considerable number of species at the northern limits of their ranges, as well as some Amphiberingian species that are at or near their eastern limit of their ranges.

3.0) Wildlife Populations and Habitats

3.1) Caribou

There are four woodland caribou herds whose summer ranges are believed to overlap in the vicinity of Macmillan Pass. The Nahanni Herd, which is centred largely in the Logan Mountains, was estimated at 2 000 animals in 1995. While there is little information on the exact range or well being of this herd, Nahanni National Park began a monitoring program in 1994. The Finlayson Herd is centred on the Ross and Pelly river watersheds. This herd was estimated to be at 4 500 animals in size in 1996. It is considered to be stable to decreasing. A management plan has been prepared for the herd. The Tay River Herd, centred on the Tay and Macmillan watersheds, is considered to be stable. Its population was estimated at 4 000 animals in 1991. Finally, the Redstone Herd straddles the continental divide north of Macmillan Pass. An inventory program is being planned, for commencement in 1998. In 1981 the herd was estimated to contain between 5 000 and 10 000 individuals.

3.2) Moose

Moose stratification survey results during late fall found concentrations of moose in the headwaters of the McMillian, Prevost, Ross, and Pelly River watersheds. During winter these moose are absent. Therefore it can deduced that they have moved down these valleys to lowland riparian winter ranges, likely as a response to increasing critical snow depths during winter. This indicates a significant movement pattern for moose occurrence in the upland area. This is a general observation not back up with radio-collar study but not a data free estimate either. In

addition, based on outfitter data, the region consistently produces individuals of unusually large size, compared to the rest of Yukon.

3.3) Goats

The Itsi mountains are home to the Yukon's northernmost mountain goat population. This would also likely make them the world's most northerly population (since mountain goats are native to North America). While less than 20 have ever been seen on a survey, local residents report a population closer to 60 animals.

Mountain goats are rare in Yukon because so few habitats are suitable. Yukon goats appear to be generally associated with very rugged areas which receive substantial precipitation, and are often associated with active glaciers. The mountains themselves tend to be composed of rugged metamorphic or igneous rocks which provide better footing than softer sedimentary rocks.

The Itsi Mountains are contained within Game Management Subzone 11-01. Zone 11 is currently open to any resident hunter with a mountain goat seal; the outfitter has a quota of 5 goats in 5 years. The inaccessibility of this area has protected it from any serious hunting concerns. Should access be improved and attention focused on this population, further hunting restrictions would likely be necessary.

A mountain goat was once reported shot on Keele Peak, but there is no evidence that a population has ever become established.

The nearest adjacent population of goats is found 130 km south in the Logan Mountains. While exchange between the Itsi and Logan populations is not well understood, it is important to ensure that the ecological integrity of the corridor between the two ranges is not degraded so as to not isolate the Itsi population. Populations at the edge of a species range are considered to be key to the long-term species viability. These populations experience, and make genetic responses, to conditions not experienced by the species generally. The resulting genetic diversity within the species is important to the species ability to respond to species range-wide environmental change.

3.4) Sheep

In July, 1982, 102 sheep were seen during a survey of Keele Peak. Since that time, no systematic work has been done in the region. The sheep population is part of the eastern Cordilleran meta population, comprised of pure Dall's sheep. While not as isolated from other populations as are the goats, these sheep populations are also more likely to exchange north-south along the Rocky Mountains, than they are across the Yukon Plateau. There are no known factors that would make this sheep population unique.

3.5) Birds

Despite the apparent abundance of suitable nesting habitat for Golden Eagles and Gyrfalcons, very low densities of Golden Eagles occur in this region and few Gyrfalcons have been reported (Theberge et al. 1986). These areas of rock outcrops, boulder fields and talus slopes do however support Rock ptarmigan and rarely, White-tailed Ptarmigans. In summer, Gray-crowned Rosy Finches are also found in these high alpine areas along with breeding Wandering Tattlers and Horned Larks (Theberge et al. 1986). Snow Buntings are found breeding on areas of permanent snow usually on north facing slopes of these mountains (Theberge et al. 1986; Godfrey 1986). At slightly lower altitudes, Short-eared Owls, American Kestrels, and Water Pipits occupy the alpine

TABLE 2: Total number of species observed in the Macmillan River and Macmillan Pass area by species

Species Group	Number of Species
loon/grebe	6
waterfowl	21
raptor	10
grouse	5
rails	1
coots	1
cranes	1
shorebird	13
jaegers/gulls	6
owls	4
nighthawk	1
kingfisher	1
woodpecker	3
passerine	55

Wildlife Summary

- The proposed area encompasses a significant calving and post-calving habitat for caribou. Substantial numbers from the Redstone, Finalyson, Tay River and Nahanni herds occur in this area from May to September. Protection would secure important key habitat for these herds.
- The area provides important subsistence hunting opportunity for First Nations people for both moose and caribou during late summer. Moreover, it is the heart of P. Koser's outfitting concession. Consideration should be given to how the protected area will impact these uses as they are important sustainable components to the Ross River economy and culture.
- The proposed area captures the northern most limit of mountain goats, which are a common mammal species in the southern portion of the ecoregion. The range of habitat conditions makes it likely that the full range of mammals found in the ecoregion are likely to be present with the proposed area.
- Moose population appears to be uniquely migratory, and is comprised of large sized individuals.
- Seasonal movements within the range of wildlife populations such as moose and caribou herds rely on the large valleys of the region. Valleys such as the upper Hess River are considered to be particularly important. Maintaining corridors for movement north-south appears to be important for the long-term exchange between populations for goats and sheep. The only nearby goat population is found in the Logan Mountains. While exchange between the Itsi and Logan populations is not well understood, it is important ensure that the ecological integrity of the corridor between the two ranges is not degraded so as to not isolate the Itsi population.

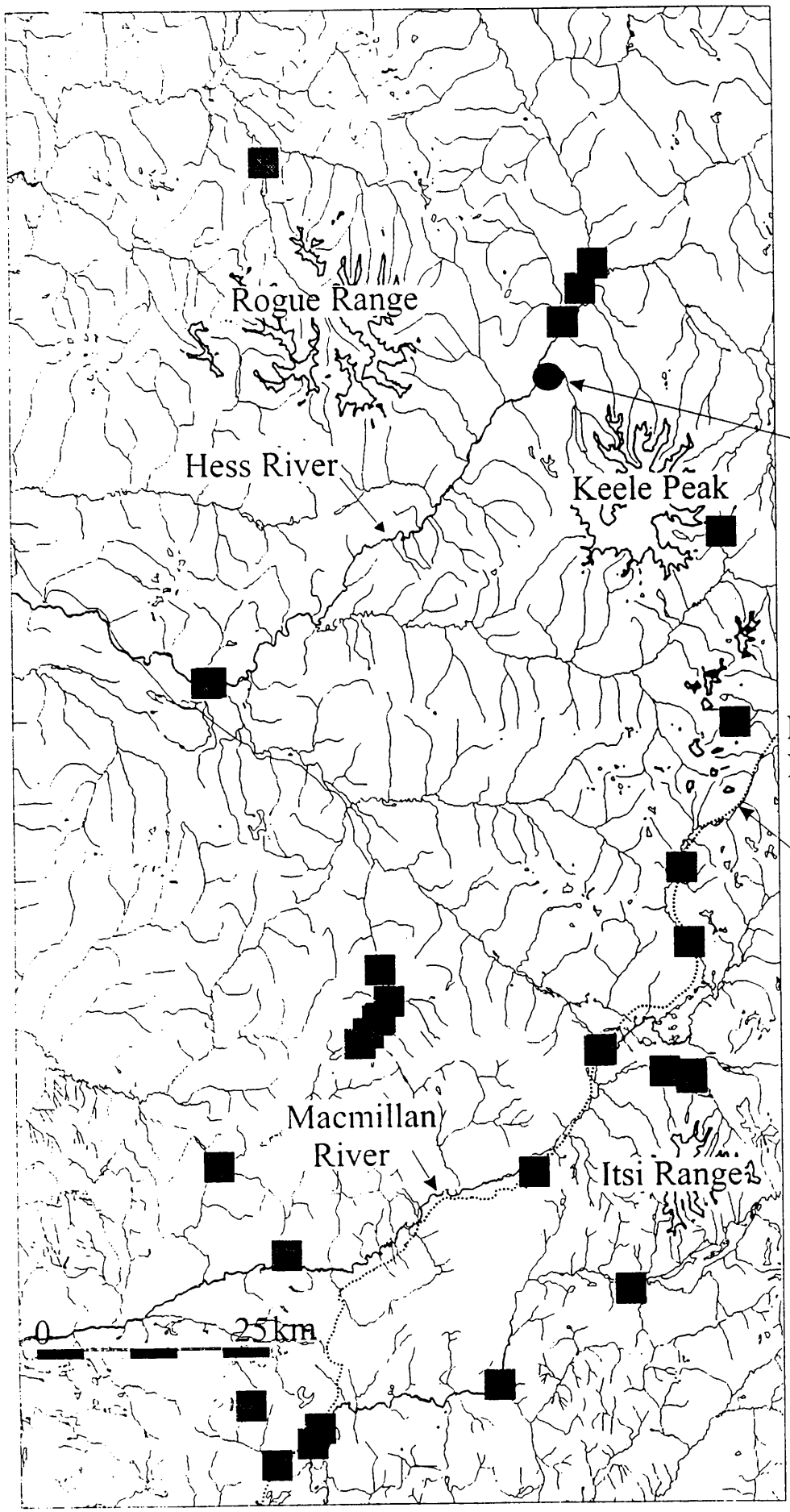
4.0) Archaeological Resources

A preliminary archaeological inventory in the Macmillan Pass/North Canol Road area in 1981 identified approximately 30 archaeological sites within the proposed Keele Peak/Itsi Range Special Management Area (Greer 1982). Predicted in the record of traditional land use, archaeological site density is low and the majority of sites identified are small in size (less than 10-15 m2 in horizontal extent), reflecting a mobile lifestyle by small family groups. Larger, multicomponent sites and site clusters occur on the major lakes of the region: John Lake, Arrowhead Lake, Fuller Lake, Oly Lake (unofficial name), and Kettle Lake (unofficial name). A large site was also recorded on a prominent look-out on the Hess River, at the south end of the Selwyn Valley. The Hess Look Out probably owes its size to use over thousands of years by many different groups of people hunting and traveling through the valley. This is the only site known at present within the study area to relate to occupations older than 5,000 years ago. Additional survey and particularly excavation will be required to better understand events in the prehistoric past of the Keele Peak/Itsi Range area, and relationships between groups in the interior Yukon and the Mackenzie. The role of bison hunting in the economy of past people needs to be addressed in the light of an apparent late persistence of bison, at least in the vicinity of Ross River. As well, a comprehensive programme of oral history with the Ross River Dena is required to document traditional land use and events in the history of the region.

5.0) Historic Resources

The Keele Peak/Itsi Range Special Management Area lies within the traditional territories of the Ross River Dena. Historically, Ross River people have strong ties to the Frances Lake Kaska, the Pelly River Northern Tutchone people and the Dena from the Fort Norman area, across the Mackenzie Mountains. Accounts of events in the 19th century history (cf. Gillespie 1981) indicate that formerly, Macmillan Pass was a key travel corridor between the Yukon and Mackenzie drainages and at times the scene of tensions as Dena and Kaska groups competed for supremacy in the trade between the two regions. Available information on traditional land use within the study area is scant. By the turn of the century, Mountain Dena are reported extensively trapping, hunting and fishing in the basins of the upper Hess River, the North and South Macmillan rivers and the upper Ross River valley (MacNeish 1957) and trading at Ross River, Sheldon Lake, Husky Dog City, Russell Post and Lansing, but maintaining close ties to Fort Norman. The scattered game resources of the region, including woodland caribou, moose and sheep, necessitated a highly mobile lifestyle: "They are continually on the move, only stopping a few days in one place and cover a large tract of country in a year" (Poole Field letters, MacNeish 1957:55). Family groups and extended families often made their headquarters at lakes in the mountains where they also had access to game in the uplands. Other opportunities for larger aggregations are caribou and sheep fence sites constructed along migration routes or near mineral licks.

The preeminent historic feature in this area is the Canol Highway and related remains of the Canol pipeline infrastructure. Built in 1942 as part of the US wartime strategy to provide a secure fuel source for the defense of Alaska, this massive construction project brought crude oil from Norman Wells to Whitehorse for refining, and then on to Skagway and Fairbanks. Dubbed "the biggest boondoggle of World War II" the road and pipeline, which cost hundreds of millions of dollars, was abandoned before producing as much refined fuel as it took to build it. All that remains on the Yukon side of the border today is the road itself, various vehicle and equipment dumps adjacent to the road, and traces of the construction camps and pump stations. The two historic sites nearest Mac Pass are near kilometer 208.5, a vehicle dump and a site with three



Distribution of Archaeological Sites in the Keele Peak/ Itsi Range Area

graders.

These sites are significant historic resources, territorially, nationally and internationally. They represent one of the biggest wartime construction projects ever undertaken, a project that opened up a part of the Yukon and NWT that had been largely unknown to the rest of the world. In combination with the Alaska Highway, this project realigned the pattern of development of the Yukon, and established enduring links with the interior of Alaska. The Canol Road was designated a National Historic Site in 1983, and received a commemorative plaque in 1990. The vehicle dumps in particular provide an opportunity to interpret the Canol project to the visiting public, with the wartime vehicles, still in their olive drab paint with yellow identification markings, much as they were abandoned some 55 years ago.

6.0) Wilderness

"Wilderness can be simply described as a condition of remoteness and naturalness. Beyond this description, the definition of wilderness becomes very individual and personal". (Chilko Lake Study)

Wilderness "means any area of the Yukon in a largely natural condition in which ecosystem processes are largely unaltered by human activity or in which human activity has been limited to developments or activities that do not significantly modify the environment, and includes an arae restored to a largely natural condition" under the Yukon *Environment Act*.

"Wilderness is recognized as having a wide range of psychological, social, cultural, economic and scientific values and uses. Wilderness is not solely about recreation in wild places, although recreation is an important consideration. Its character is defined by a number of factors, including land forms, ecosystems, biodiversity, wildlife habitat and populations, scenery and human use. Each of these contributes to wilderness qualities, yet collectively the whole is greater than the sum of the parts." (Chilko Lake Study)

Generally speaking only a fraction of recreational use takes place in wilderness settings. However, people place a high value on wilderness - non-use preservation value. At the same time it is one of the most vulnerable of resources such that small or incremental changes to wilderness settings may alter the recreational experience forever. (Outdoor Recreation in B.C.)

The Keele-Itsi's have many of the above values and characteristics. For the most part, the ecosystems are undisturbed, human use is limited, and most of the valleys are roadless. In addition, the spectacular scenery and diverse wildlife populations further contribute to the wilderness character of the area.

7.0) Recreation Potential

7.1) Recreation Potential Overview

The Keele Peak massif and the high glaciated summits of the Rouge and Itsi Ranges dominate the central portion of the Selwyn Mountain Range. These rugged settings provide very highly significant opportunities for alpine recreation. Adjacent valley bottoms host challenging whitewater canoeing opportunities and various scenic lakes.

Generally all the areas above 1500 m are rated high to very high on a 4 point scale of feature significance to attract recreational use.* The Keele-Itsi and Rouge alpine areas have a disproportionately large representation of very high significance units for their glacial, landform, rock formation and viewing features. There are numerous high elevation pockets throughout the study area with rock and glacial features, a variety of related landforms and dramatic scenery highly suited to mountaineering potential. Surrounding the three main massifs are many subalpine settings, offering less rugged opportunities for wilderness travel and appreciation.

The alpine recreational experience is enhanced by wildlife viewing opportunities, especially for caribou, sheep and goats.

While large lakes are not abundant in the study area, they are often located in dramatic settings. Keele, Itsi, Emerald and Arrowhead Lakes are located adjacent to the Keele, Itsi and Rouge ranges respectively. Their high values are related to their high quality scenic settings and associated geomorphic features rather than their fishing or boating opportunities. Numerous, small high elevation lakes occur throughout the alpine areas and enrich the visual quality of the landscape.

Four major whitewater canoeing opportunities originate from this Selwyn Mountain area. They include:

- Hess River: 350 km long trip with extensive rapids to grade III, boulder gardens and canyons.
- Rouge River: includes sections of whitewater and unusual braided channels
- South MacMillan River: Thirty kms of sustained grade II rapids parallel the North Canol Road. This south branch offers superior whitewater and scenery.
- Ross River: accessible via Itsi Lakes; grade II - III rapids and boulder gardens in the upper section followed by easier sections downstream.

The most notable historical site for recreation is the Canol Road. Abandoned equipment can be found at four sites adjacent to the North Canol Road within the study area.

7.2) Recreational Access:

The North Canol Road provides the only vehicle access to the area. Some of the remote lakes have been accessed by floatplane for hunting, wildlife viewing and whitewater canoeing purposes. The Barite Mine road provides the only vehicle access to the alpine from the North

Canol Road.

7.3) Wilderness Values:

Current levels of recreational use are very low. Apart from steady canoeing traffic on the South MacMillan, occasional groups on the Hess, Rogue and Ross rivers and dispersed guide outfitter camps on remote lakes, the backcountry witnesses very limited human use. This contributes to the extensive wilderness feel of much of the study area outside the North Canol Road corridor.

7.4) Key Recreation Features:

- Keele Peak: alpine glaciers, extensive for the ecoregion and largest outside Kluane, originate from this dominant pyramid horned peak of 2, 952 m. Mountaineering and viewing qualities are exceptional.

- Itsi Range: six glacial cirque basins with various associated glacial features offer exceptional viewing opportunities to the non-climbing traveler. Features include icefalls and hanging glaciers, recessional moraines, glacial silt lakes, meltwater waterfalls and rock faces providing a dramatic backdrop to Itsi Lakes chain to the immediate south.

- Rogue Range: heavily glaciated massif with various tributary valley approaches. Central portion includes arc of rock walls at the head of south facing cirques, hanging glacier and recessional moraine features. Massif extends west to include Emerald Lake basin surrounded by steep high rock faces. Similar high quality recreational values to Keele Peak.

- Rogue River corridor: scenic headwaters provide logical access to alpine destinations; dramatic waterfalls and canyons and adjacent glacio-fluvial landform features.

- Hess River corridor: sustained grade III whitewater opportunities between Keele Peak and Rogue Range.

- South MacMillan River corridor: numerous small rapids and rock gardens to grade III adjacent to North Canol Road.

Footnote:

* This is based upon each unit's ability to:

1. attract and sustain recreational use
2. provide aesthetic, educational and interpretive opportunities related to the natural environment, and;
3. act as examples of natural areas which exhibit distinctive, unique or characteristic features.

"Areas of very high significance are the most significant units. Such areas normally deserve the greatest amount of protection in order to preserve unique natural features and recreational

opportunities and high quality landscapes. In many instances, areas of very high significance have territorial or national significance." (RFI)

8.0) Interpretive Potential

8.1) Existing Interpretive Initiatives

At present, there is only one interpretive service in this region. This is a private facility on the Northwest Territories side of the border known as Oldsquaw Lodge. Catering to an international clientele, Oldsquaw has proven to be a very popular destination for those in search of pristine wilderness experiences. It offers the gamut of high quality, personal interpretive and recreational services provided by knowledgeable, conservation-oriented biologist/naturalists and is testimony to the fact that there is economic value in recreation/interpretation of natural assets of the region.

Aside from Oldsquaw Lodge, the region is lightly travelled, with the North Canol Highway and a number of lakes being the main access routes. Travel beyond the highway and popular air-access lakes is minimal and likely to remain that way, considering the high cost of helicopter or fixed-wing transportation.

8.3) Access Considerations

Foot travel in summer through the lowlands -- aside from travel on a few outfitter trails -- would likely be unattractive due to the expanse of wetlands and dense vegetation such as shrub birch, willow and other wetland types. However, higher regions apparently have better access. Horse trails and wildlife trails provide some good routes for ardent wilderness backpackers and mountaineers.

Aside from travel on lakes near the Canol Highway, water travel will likely remain limited to ardent whitewater enthusiasts who are planning on a one-, two- or three-week adventure. Waterfalls and rapids, plus lack of convenient take-out points, means that river travelers must go to significant expense to either begin or end their trips by air access.

8.4) Related Interpretive Opportunities/Significant Themes

Without the benefit of an interpretive plan for the proposed protected area, the following is mainly conjecture based on briefs provided by various professionals with knowledge of the region.

It is unlikely that any significant interpretive service or facility would by developed within the proposed protected area or within the region. Without seriously researching the topic, there are a number of significant subjects for interpretive attention such as the following:

- Canol pipeline and highway history
- Kaska -Dena culture and relation to the land
- Mountain goat distribution, ecology in marginal habitat
- Finlayson caribou herd and its relation to this region
- Ecological relationships in this high precipitation interior mountain environment.
- Aquatic ecosystems within the region.
- Techniques for minimal impact recreational use of the region.
- Techniques for minimal impact economic activities (i.e., mineral exploration/development, etc.).
- Geological origin and evolution of Keele-Itsi Peaks.
- Other key topics arising from a more thorough analysis of natural and cultural aspects.

Considering the potential low recreational use of the region in the next twenty years, I would suspect that any interpretive plan would focus on "off-site" interpretation, perhaps with a small interpretive/visitor centre in the village of Ross River.

Although a considerable distance from the area of interest, Ross River is the funnel through which nearly all travelers pass, whether by land or air. Consequently it provides the opportunity for developing awareness and appreciation prior to utilization of the region for whatever purpose. It would also likely by the beginning point for guided tours into the protected area.

With the resident population, this scenario would provide the greatest opportunity for local employment, training in interpretive skills, and for cooperative planning and development of the protected area. Economic benefits would potentially stay within the community, perhaps leading to such enterprises as private wilderness guiding services.

9.0) Regional Conservation Context

North America has had large protected areas in the Rocky Mountains for over 100 years. Increasingly clear indications are that these parks are not protecting the ecosystems they were intended to protect. At the same time, or possibly as a result of situations such as this, schools of landscape ecology, biogeography, wildlife management, and more recently, conservation biology, have converged under the banner of "greater ecosystems." Yukon has been at the front of this discussion with respect to work done by the Porcupine Caribou Managment Board. The Porcupine Caribou Herd is used to define a greater ecosystem. The Board has long been working on monitoring the herd and defining the appropriate conservation measures required. A recent focus has been on defining the habitat needs and priorities, followed by securing protection for the most critical habitat type: calving grounds. A similar initiative that takes in the Keele/Mac Pass/Itsi area is the Yukon to Yellowstone (Y2Y) initiative.

Yukon to Yellowstone also uses a species for delineation of a greater ecosystem: the grizzly bear. Since this species has less well understood population boundaries than do caribou, the initiative has additionally adopted a physiographic unit, the Rocky Mountains, for ecosystem delineation. The rational is built on the concept of umbrella species having value in indicating overall ecosystem health. In a world where scientist have neither time, technique, nor resources to measure everything, monitoring umbrella species is of great importance. Grizzly bears are a reasonable choice in this "greater ecosystem" for the following reasons: they comprise a wide ranging metapopulation, have low recruitment rates, and are top-of-the-food-chain predators.

Data on grizzly bear sub-populations in the lower 48 show a pattern of progressive habitat fragmentation and loss, with resultant species exterpation. To arrest this pattern, Y2Y, borrowing from conservation biology, is proposing a Rocky Mountain network of core protected areas, made viable through a system of meaningful buffers and connective corridors. The core areas address the issue of habitat loss while the connectors address the issue of habitat fragmentation.

The proposal presented in this paper could become a key component of this greater ecosystem initiative. It provides two core options: Keele Peak and the uppermost Hess River watershed and secondly, the Itsi Range and headwaters of the Ross and Prevost rivers. It includes a buffer zone in the area of highest impact, the Macmillan Pass area. Finally, the proposal provides for linkages. The link southward is to Nahanni National Park and possibly the Frances SMA. To the west is the opportunity to create a habitat link into the Ross River wetlands SMA. There is opportunity to link northward to the proposed Arctic Red River protected area and the Bonnet Plume Canadian Heritage River. This would be a very significant conservation achievement, built around much smaller core protected areas than would be required if they were envisioned as stand-alone designations.

10.0) Parks Canada Evaluation

The Government of Canada has committed to the completion of the system of National Parks by the year 2000. The commitment is to have a National Park representative of each of the 39 terrestrial natural regions. Derived through slightly different criteria, and at different points in time, the Selwyn Mountains ecoregion is bisected by two National Parks natural regions. The delineation conforms to the two geological terranes that divide the Selwyn Mountain ecoregion. To the east is the Mackenzie Mountains Natural Region, which is quite similar to the southern half of the Taiga Cordillera Ecozone. It is represented by Nahanni National Park.

Still unrepresented is the Northern Interior Plateaux and Mountains Natural Region. This natural region is bounded on the east by the Rocky Mountains and on the west by the Coastal Mountains. It encompasses Dawson City in the north and Hazelton B.C. in the south. It is similar in extent and character to the Boreal Cordillera Ecozone. The Keele Peak area was one of twelve candidates considered in a preliminary review conducted in 1997.

The review examined three parameters: representativeness, naturalness, and special features. It reached the following conclusions concerning the Keele area. Of the twelve candidates, the Keele area was ranked lowest on the representivity scale, while areas central to the natural region ranked higher. This result affirms the more recent (1995) delineation of Ecozones; the Keele area is transitional between the two Natural Regions, and is not boreal cordilleran.

The Keele area ranked highly on the naturalness scale. Criteria used include: percent of area roaded, number of settlements, where disturbances occur (central vs peripheral to the proposal), and the number of mineral deposits. If the same assessment included Macmillan Pass the ranking would have been lower on account of all criteria but the number of settlements.

Of least importance in the selection process, some consideration was given to special features. Drawing on a preliminary and incomplete data base for this assessment, the Keele Peak area ranked highly for this parameter. The valuation noted unglaciated terrain, endemic plants and First Nation cultural sites as important special features.

11.0) Alternate Sites within the Yukon portion of the ecoregion

There has been no systematic work done in either Yukon or NWT toward the identification of representative areas of interest for the Selwyn Mountains ecoregion. Other than Keele Peak and Itsi Ranges, the only other expressions of interest have been the Frances Lake region and the Coal River headwaters.

The Frances Lake park reserve, established in 1973, is largely within the Liard Basin. It does contain a small portion of the Selwyn Mountains ecoregion alongside the East Arm of Frances Lake. An expanded Frances SMA into the headwaters of the Frances drainage and south to Mount Billings is an option. This option has numerous areas of ecological importance and appears to contain many of the characteristics of the ecoregion. It is less central to the ecoregion and is more likely to be expressive of the ecotone.

A protected area is being considered for the lower Coal River that includes consideration of a heightened level of management for the watershed of the main river (that is, exclusive of the West Coal and Rock rivers). The proposal suggests that an appropriate designation would manage for wilderness and other aesthetic values and ecological values, without requiring any

resource allocation withdrawals. Given the level of management proposed and the minor incursion into the Selwyn Mountains ecoregion, this is not a candidate for representative protection.

11.0) Boundary Considerations

The map of the study region, figure ___, outlines boundary and designation options that attempt to do the following:

1. Represent the character of the Selwyn Mountains ecoregion, in sizable blocks with high level ecological integrity;
2. Provide options for less stringent SMA designations that connect the two core areas and other adjacent protected area options (including (a) completion of the Ross River watershed headlands connecting to the mid-Ross River wetland SMA option, which includes Sheldon Lake; (b) possibility of a habitat link southward to the proposed Frances Lake SMA and/or Nahanni National Park; (c) northward linkage to Arctic Red River headwaters, currently a Canadian Heritage River, under consideration for protection by the Interim Gwich'in Land Use Planning Board and the Bonnet Plume Canadian Heritage River; and (d) prospect of complementary designations in the NWT).
3. Provide for recognition and special management of important wildlife habitat, hunting, wildlife viewing, and tourism values in the Macmillan Pass area, while enabling potential development of the area of highest known mineral potential in the region.
4. Maintain significant regional wilderness character and backcountry recreational opportunities.
5. Protect northern extent of goat range and other key habitats; and
6. Place under special management a section of the Canol Road National Historic Site for historic conservation and interpretive value.

The boundary option presented attempts to meet a wide range of conservation objectives, while not unnecessarily alienating commercial resource extraction potential and current wildlife harvesting activities. As such, the option proposes a heightened level of management without withdrawal for the Macmillan Pass area, proposes full protection from industrial use areas centred on Keele Peak and the Itsi Range, and excludes areas with similarly high conservation values such as the Rogue Range to the northwest and Howard's Pass to the southeast. In addition, this proposal anticipates linkages to the north and south along the Rocky Mountains, downstream to the Ross River wetlands, and across the divide incorporating important sites in NWT.

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Appendices

Appendix 1: Species List of Vascular Plants of the Macmillan Pass Study Area (source: Davies et al.)

NOTE
This list only includes species recorded or collected by members of the vegetation field crew during the 1981 field season. Many specimens were submitted and verified by W.J.Cody of the Biosystemics Research Institute Herbarium of Agriculture Canada in Ottawa, while others were identified by the field crew.

Species List of Vascular Plants of the Macmillan Study Area

	Common Name
POLYPODIACEAE - Fern Family	
Cystopteris fragilis (L.) Bernh.	fragile fern
EQUISETACEAE - Horsetail Family	
Equisetum arvense L.	common horsetail
Equisetum palustre L.	marsh horsetail
Equisetum scirpoides Michx.	dwarf scouring-rush
Equisetum silvaticum L.	wood horsetail
Equisetum pratense Ehrh.	meadow horsetail
LYCOPODIACEAE - Club-Moss Family	
Lycopodium alpinum L.	alpine club moss
Lycopodium annotinum L.	bristly club moss
Lycopodium clavatum L.	running club moss
Lycopodium complanatum L.	ground cedar
Lycopodium selago L.	mountain club moss
PINACEAE - Pine Family	
Abies lasiocarpa (Hook.) Nutt.	alpine (subalpine) fir
Juniperus communis L.	ground juniper, common mountain juniper
Juniperus horizontalis Moench	creeping juniper
Picea glauca (Moench) Voss	white spruce
Picea mariana (Mill.) B.S.P.	black spruce
Pinus contorta Loud	lodgepole pine
GRAMINEAE - grass family	
Agropyron violaceum (Hornem.) Lange	violet wheatgrass
Alopecurus aequalis Sobol	foxtail
Arctagrostis arundinaceae Griseb.	arctic reedgrass
Arctagrostis latifolia (R.Br.)Griseb.	reedgrass
Calamagrostis canadensis (Michx.)Beauv.	bluejoint reedgrass
Calamagrostis neglecta (Ihrh.)Gaertn., Mey & Schreb.	reed-bentgrass
Calamagrostis purpurascens R. Br.	purple reedgrass
Deschampsia brevifolia R. Br.	hairgrass
Festuca altaica Trin.	rough fescue
Festuca brachyphylla Schultes	fescue
Festuca rubra L.	red fescue

Festuca saximontana Rydb.	fescue
Hierochloë alpina (Sw.) R.&S.	holy grass
Hierochloë odorata (L.) Beauv.	sweet grass
Phleum commutatum Gaud	mountain timothy
Poa alpigena (Fr.) Lindm.	blue grass
Poa lanata Scribn. & Merr.	blue grass
Trisetum spicatum (L.) Richt.	
CYPERACEAE - Sedge Family	
Carex aquatilis Wahlenb.	water sedge
Carex bigelowii Torr.	sedge
Carex brunnescens Poir.	sedge
Carex canescens L.	silvery sedge
Carex concinna R. Br.	sedge
Carex leptalea Wahlenb.	sedge
Carex membranacea Hook	sedge
Carex michrochaeta Holm	sedge
Carex physocarpa Presl	sedge
Carex podocarpa R. Br.	sedge
Carex praticola Rydb.	sedge
Carex rostrata Stokes	beaked sedge
Carex rufina Drej.	sedge
Carex vaginata Tausch	sheathed sedge
Eriophorum angustifolium Honckn.	tall cotton grass
Eriophorum brachyantherum Trautv.	cotton grass
Scirpus caespitosus L. ssp. *austriacus* (Pallas) Asch. & Graeb.	bulrush
JUNCACEAE - Rush Family	
Juncus castaneus Smith	bog rush
Luzula arcuata (Wahlenb.) Sw.	wood rush
Luzula confusa Lindebl.	wood rush
Luzula parviflora (Ehrh.) Desv.	wood rush
LILIACEAE - Lily Family	
Streptopus amplexifolius (L.) DC.	twisted stalk
tofieldia sp. Huds.	false asphodel
PORTULACACEAE - Purslane Family	
Claytonia tuberosa Pall.	spring beauty
CARYOPHYLLACEAE - Pink Family	
Arenaria capillaris Poir	
Cerastium beeringianum Cham. & Schecht.	mouse-ear chickweed
Moehringia laterifolia (L.) Fenzl	grove sandwort
Silene acaulis L.	moss campion
Stellaria longipes Goldie	chickweed
Wilhelmsia physodes (Fisch.)McNeill	
RANUNCULACEAE - Crowfoot Family	
Aconitum delphinifolium DC.	monkshood
Anemone drummondii Watts.	anemone
Anemone multifida Poir.	anemone
Anemone narcissiflora L.	anemone
Anemone parviflora Michx.	anemone
Anemone richardsonii Hook	anemone
Delphinium brachycentrum Ledeb.	larkspur
Delphinium glaucum Wats.	larkspur
Ranunculus Eschscholtzii Schlecht.	buttercup
Thalictrum sparsiflorum Turcz.	meadow rue

CRUCIFERAE - Mustard Family	
Barbarea orthoceras Ledeb.	winter cress
Draba aurea M. Vahl	golden draba
Draba nivalis Liljebl.	
Parrya nudicaulis (L.) Regal	
CRASSULACEAE - Stonecrop Family	
Rhodiola integrifolia Raf.	roseroot
SAXIFRAGACEAE - Saxifrage Family	
Chrysosplenium tetrandum (Lund) Fries	northern water carpet
Leptarrhena pyrolifolia (D. Don) Ser.	leather-leaved saxifrage
Parnassia fimbriata Koenig	fringed grass-of-parnassus
Parnassia montanensis Fern & Rydb.	grass-of-parnassus
Parnassia palustris L.	widewor'd parnassia, bog star
Ribes hudsonianum Richards	northern black currant
Veratrum Eschscholtzii A. Gray	false hellebore
Zygadenus elegans Pursh	death camass
ORCHIDACEAE - Orchid Family	
Habenaria obtusata (Pursch) Richards	northern bog orchid
Spiranthes romanzoffiana Cham. & Schlecht.	ladies' tresses
SALICACEAE - Willow Family	
Populus balsamifera L.	balsam popular
Populus tremuloides Michx.	trembling aspen
Salix alaxensis (Anderss.)	Alaska willow
Salix arctic Pall.	arctic willow
Salix bebbiana Sarge.	long-beaked willow
Salix commutata Bebb	willow
Salix glauca L.	diamond willow
Salix lanata L. ssp. *richardsonii* (Hook.)Skvortsov	Richardson's willow
Salix longistylis Rydb.	willow
Salix myrtillifolia Anderss.	willow
Salix planifolia Pursch	willow
Salix pulchra Cham	willow
Salix reticulata L.	netted willow
Salix scouleriana Barratt	willow
BETULACEAE - Birch Family	
Alnus crispa (Ait.) Pursch	green alder
Alnus incana (L.) Moench ssp. *tenuifolia* (Nutt.)Breitung	speckled alder
Betula glandulosa Michx.	shrub birch
Betula occidentalis Hook.	birch
SANTALACEAE - Sandalwood Family	
Geocaulon lividum Fern	northern comandra
POLYGONACEAE - Buckwheat Family	
Oxyria digyna (L.) Hill	mountain sorrel
Polygonum alaskanum (Small) Wight	knotweed
Polygonum bistorta L.	bistort
Polygonum tripterocarpum Gray	knotweed
Polygonum viviparum L.	bistort
Rumex arcticum Trautv.	arctic dock
Ribes triste Pall.	northern red currant
Saxifraga flagellaris Willd.	spider plant
Saxifraga nivalis L.	alpine saxifrage
Saxifraga oppositifolia L.	purple mountain saxifrage
Saxifraga punctata L.	saxifrage
Saxifraga radiata Small	saxifrage

Saxifraga tricuspidata Rottb.	prickly saxifrage
ROSACEAE - Rose Family	
Dryas integrifolia M. Vahl	mountain avens
Dryas octopetala L.	mountain avens
Geum aleppicum Jacq.	avens
Geum macrophyllum Willd.	avens
Potentilla fruticosa L.	shrubby cinquefoil
Potentilla gracilis Dougl.	cinquefoil
Potentilla hyparctica Malte	cinquefoil
Potentilla palustris (L.) Scop.	marsh cinquefoil, marsh five finger
Potentilla uniflora (Ledeb.	cinquefoil
Rosa acicularis Lindl.	prickly rose
Rubus arcticus L.	arctic raspberry
Rubus chamaemorus L.	cloudberry
Rubus idaeus L.	raspberry
Sibbaldia procumbens L.	sibbaldia
Spiraea Beauverdiana Schneid.	Alaska spiraea
LEGUMINOSAE - Pea Family	
Astragalus alpinus L.	alpine milk-vetch
Astragalus eucosmos Robins	milk-vetch
Hedysarum alpinum L.	licorice-root
Lupinus arcticus Wats.	arctic lupine
Lupinus nootkatensis Donn.	lupine
Oxytropis Maydelliana Trautv.	locoweed
Oxtropis nigrescens (Pall.)Fisch.	locoweed
EMPETRACEAE - Crowberry Family	
Empetrum nigrum L.	crowberry
VIOLACEAE - Violet Family	
Viola epipsila Ledeb.	marsh violet
ELAEAGNACEAE - Oleaster Family	
Shepherdia canadensis (L.) Nutt	soapberry, soopalallie
ONAGRACEAE - Evening Primrose Family	
Epilobium arcticum Samuelss.	fireweed
Epilobium angustifolium L.	fireweed
Epilobium latifolium L.	river beauty, broad-leaved willow-herb
Epilobium leptophylllum Ra.	willow herb
UMBELLIFERAE - Parsley Family	
Heracleum lanatum L.	cow parsnip
CORNACEAE - Dogwood family	
Cornus canadensis L.X. *suecica* L.	bunchberry
PYROLACEAE - Wintergreen Family	
Moneses uniflora (L.) Gray	single delight
Pyrola asarifolia Michx.	rosy wintergreen
Pyrola grandiflora Radius	large-flowered wintergreen
Pyrola minor L.	wintergreen
Pyrola secunda L.	one-sided wintergreen
ERICACEAE - Heath Family	
Andromeda polifolia	andromeda

Arctostaphylos alpina (L.) Spreng.	alpine bearberry
Arctostaphylos rubra (Rhed. & Wils) Fern.	bearberry
Arctostaphylos uva-ursi (L.) Spreng.	kinnikinnick, bearberry
Cassiope tetragona (L.) D. Don	white heather
Chamaedaphne calyculata Moench	leatherleaf
Kalmia polifolia Wang.	bog laurel
Ledum decumbens (Ait.) Lodd.	Labrador tea
Ledum groenlandicum Oeder	Labrador tea
Oxycoccus microcarpus Turcz.	dwarf bog cranberry
Phyllodoce empertriformis (Sm.) D.Don	mountain heather
Vaccinium uliginosum L.	bilberry; alpine blueberry
Vaccinium vitis-idaea L.	lowbush cranberry
PRIMULACEA -Primrose Family	
Dodecatheon pulchellum (Raf.) Merr.	shooting star
Dodecatheon frigidum C. & S.	shooting star
GENTIANACEAE - Gentian Family	
Gentiana glauca Pall.	gentian
Gentiana propinqua Richards	gentian
MENYANTHACEAE - Buckbean Family	
Menyanthes trifoliata L.	bog buckbean
POLEMONIACEAE - Phlox Family	
Polemonium acutiflorum Willd.	Jacob's ladder
BORAGINACEAE - Borage Family	
Mertensia paniculata (Ait.) G. Don	bluebell
Myosotis alpestris Schm.	forget-me-not
SCROPHULARIACEAE - Figwort Family	
Lagotis Stelleri (Cham. & Schlecht.) Rupr.	
Linaria vulgaris Hill	toadflax
Pedicularis capitata Adams	lousewort
Pedicularis Kanei Durand	lousewort
Pedicularis labradorica Wirsing	Labrador lousewort
Pedicularis lanata Cham. & Schlecht.	wooly lousewort
Pedicularis sudetica Willd.	sickletop lousewort
Pedicularis verticillata L.	lousewort
Veronica Wormskjoldii Roem. & Schult.	speedwell
OROBANCHACEAE - Broom - Rape Family	
Boschniakia rossica (Cham. & Schlect.) Fedtsh.	
LENTIBULARIACEAE - Bladderwort Family	
Pinguicula villosa L.	butterwort
RUBIACEAE - Madder Family	
Galium boreale L.	northern bedstraw
CAPRIFOLIACEAE - Honeysuckle Family	
Viburnum edule (Michx.)Raf.	highbush cranberry
Linnaea borealis L.	twinflower
VALERINACEAE - Valerian Family	
Valeriana capitata Pall.	valerian
Valeriana sitchensis Bong.	valerian
CAMPANULACEAE - Bluebell Family	
Campanula lasiocarpa Cham.	bellflower

Appendix 2: Complete list of 128 species observed in the upper Macmillan River and Macmillan Pass area as of January 1998.

Red-throated Loon	Golden Eagle	Great Horned Owl	American Pipit
Pacific Loon	American Kestrel	Northern Hawk-Owl	Bohemian Waxwing
Common Loon	Merlin	Great Gray Owl	Northern Shrike
Yellow-billed Loon	Peregrine Falcon	Short-eared Owl	Tennessee Warbler
Horned Grebe	Gyrfalcon	Common Nighthawk	Orange-crowned Warbler
Western Grebe	Spruce Grouse	Belted Kingfisher	Yellow Warbler
Tundra Swan	Blue Grouse	Hairy Woodpecker	Yellow-rumped Warbler
Trumpeter Swan	Willow Ptarmigan	Three-toed Woodpecker	Townsend's Warbler
Brant	Rock Ptarmigan	Northern Flicker	Blackpoll Warbler
Canada Goose	White-tailed Ptarmigan	Olive-sided Flycatcher	Northern Waterthrush
Green-winged Teal	Sora	Western Wood-Pewee	Common Yellowthroat
Mallard	American Coot	Yellow-bellied Flycatcher	Wilson's Warbler
Northern Pintail	Sandhill Crane	Alder Flycatcher	American Tree Sparrow
Blue-winged Teal	American Golden-Plover	Say's Phoebe	Chipping Sparrow
Northern Shoveler	Semipalmated Plover	Horned Lark	Clay-colored Sparrow
American Wigeon	Lesser Yellowlegs	Tree Swallow	Savannah Sparrow
Ring-necked Duck	Solitary Sandpiper	Violet-green Swallow	Fox Sparrow
Lesser Scaup	Wandering Tattler	Bank Swallow	Song Sparrow
Harlequin Duck	Spotted Sandpiper	Cliff Swallow	Lincoln's Sparrow
Oldsquaw	Ruddy Turnstone	Gray Jay	Golden-crowned Sparrow
Surf Scoter	Semipalmated Sandpiper	Common Raven	White-crowned Sparrow
White-winged Scoter	Least Sandpiper	Black-capped Chickadee	Dark-eyed Junco
Barrow's Goldeneye	Baird's Sandpiper	Boreal Chickadee	Lapland Longspur
Bufflehead	Short-billed Dowitcher	Winter Wren	Snow Bunting
Common Merganser	Common Snipe	American Dipper	Red-winged Blackbird
Red-breasted Merganser	Red-necked Phalarope	Ruby-crowned Kinglet	Rusty Blackbird
Ruddy Duck	Long-tailed Jaeger	Mountain Bluebird	Gray-crowned Rosy Finch
Osprey	Bonaparte's Gull	Townsend's Solitaire	Pine Grosbeak
Bald Eagle	Mew Gull	Gray-cheeked Thrush	Red Crossbill
Northern Harrier	Herring Gull	Swainson's Thrush	White-winged Crossbill
Sharp-shinned Hawk	Sabine's Gull	American Robin	Common Redpoll
Northern Goshawk	Arctic Tern	Varied Thrush	Pine Siskin

RECREATION FEATURES INVENTORY
SOUTHERN YUKON

Map ____ of 39 Scale: _____ Mapping: _____

NOTE: THE INFORMATION ON THIS MAP IS BASED LARGELY UPON THE INTERPRETATION OF AIR PHOTOGRAPHS AUGMENTED BY LIMITED FIELD CHECKING. THE INFORMATION REPRESENTS A RECONNAISSANCE INVENTORY FOR RESOURCE PLANNING PURPOSES; IT SHOULD NOT BE EXPECTED TO BE ACCURATE FOR DETAILED, SITE-SPECIFIC ANALYSIS NOR FOR INDICATING THE SAFETY OF AREAS FOR PUBLIC USE SUCH AS FOR WATER NAVIGATION. CLASSIFICATION IS BASED ON THE B.C. MINISTRY OF ENVIRONMENT MANUAL, "OUTDOOR RECREATION CLASSIFICATION FOR BRITISH COLUMBIA" BY BLOCK & HIGNETT, 1982.

ABBREVIATED MAP LEGEND

RECREATION FEATURES

A ANGLING
B BEACH
C CANOEING
D HYDROLOGIC FEATURE
E^1 ALPINE/SUB-ALPINE VEGETATION
E^5 FOREST COVER
E^8 WETLAND VEGETATION
F WATERFALL OR RAPIDS
G GLACIER OR SNOWFIELD
H ABORIGINAL HISTORIC FEATURE
I EUROPEAN HISTORIC FEATURE
K DEVELOPMENT POTENTIAL
L LANDFORM
M SMALL SURFACE WATERS
N LARGE SURFACE WATERS
P MAN-MADE FEATURE
Q TOPOGRAPHIC PATTERNS
R ROCK FORMATION
T SPRINGS
U PROTECTED WATER
V VIEWING
W WILDLIFE
Y BOATING

FEATURE SIGNIFICANCE

(++) VERY HIGH SIGNIFICANCE
(+) HIGH SIGNIFICANCE
(-) LOW TO MODERATE SIGNIFICANCE
(=) VERY LOW SIGNIFICANCE

ANNOTATIONS - NUMBERS IN CIRCLES ACCOMPANYING CLASSIFICATION SYMBOLS INDICATE THAT ADDITIONAL INFORMATION WILL BE FOUND IN THE MAP SHEET NARRATIVE.

EXAMPLE CLASSIFICATION

V E^1 Q (+) (4)

IDENTIFIES A LANDSCAPE UNIT WITH VIEWING OPPORTUNITIES (V), ALPINE OR SUB-ALPINE VEGETATION (E^1) AND ATTRACTIVE TOPOGRAPHIC CHARACTERISTICS. THE UNIT IS CONSIDERED TO HAVE HIGH RECREATION FEATURE SIGNIFICANCE AS INDICATED BY (+). THE NUMBER 4 REFERS TO AN ANNOTATION OF ADDITIONAL INFORMATION ACCOMPANYING THE MAP NARRATIVE