DEPARTMENT OF RECREATION AND CONSERVATION
PARKS BRANCH
V8W 2Y9

FILE NO. 2-5-4-2

Victoria, B. C.
March 3, 1976

Dr. V. Geist
Associate Professor
Environmental Science
The University of Calgary
2920 - 24 Avenue N.W.
Calgary, Alberta
T2N 1N4

Dear Val:

Thank you very much for your response of February 25 concerning Rod Carswell's report on Spatsizi. Your additional information is very welcome. I will send an addenda sheet to all recipients of the report (there were 12) and correct any errors that would impinge upon your good reputation. Also Jim Pojar's report will be much more definitive and your recent information will be included in that as well.

In regard to your comments on rock ptarmigan, I believe that the report contains valid observations. Jim Pojar claims they saw and identified all three species and that rock ptarmigan were least common and found on the highest ridges. Also page 40 includes a sighting by Guiget in 1959 for Spatsizi and while he didn't collect any specimens, he has to be considered a creditable observer. In 1969 I keyed out rock ptarmigan at 6800 ft. on talus slides above Eaglenest Creek while sheep hunting in the area. I used "Peterson's Guide to Western Birds" as a field guide which I carried with me.

In early March of this year we will be conducting both fixed-wing preliminary flights and helicopter flights of Spatsizi Park. I hope to also include Tatlatui Park and Mt. Edziza Park in the same flying period. I seriously doubt that any ground surveys will be carried out this winter, but perhaps some will take place in conjunction with proposed caribou studies for Spatsizi.

Some of the results of the flying should be tabulated by the Kamloops May 15 banquet so perhaps we can discuss our findings at that time.

Sincerely,

W. G. Hazelwood,
Parks Biologist.

cc W. G. Hazelwood
WGH:lh

THE UNIVERSITY OF CALGARY

FACULTY OF ENVIRONMENTAL DESIGN

1976 February 25

Mr. W. G. Hazelwood, Parks Biologist
c/o Dr. J. B. Foster, Coordinator
Ecological Reserves
Lands Branch
Parliament Buildings
Victoria, Brtish Columbia

Dear Mr. Hazelwood:

I am grateful for your sending me the report on the Gladys Lake Reserve, and I read it at times not without anguish. Had I had a chance to see the report earlier, I could have supplemented it, in parts considerably, since unfortunately much was missed in the limited correspondence I had with Jim Pojar.

Here are some points. Three ram bands of fair size, plus a fourth smaller one, used to live within the present reserve boundary:

(1) opposite Bates Camp on Nation Ridge, about 20 rams. They arrived in July and left in late October; except for a few goats, nothing stayed on Nations Peak in winter;
(2) one band on MacMillan Mountain numbered some 15 rams. These animals came in October, dispersed during the rut, and stayed until June;
(3) one band on Sanctuary Mountain which rose to a maximum of 24 individuals in springtime;
(4) a small band of less than 10 individuals was occasionally seen at Marmot Peak. I paid no attention to this group.

The count of 86 sheep (see p 23) for 1962 applies only to those that rutted about Gladys Lake. There were sheep beyond MacMillan Mountain and Marmot Mountain also. These were not included in the figure I gave. However, some 25 additional sheep would be a conservative figure.

I did not state (see p 25) that rams could be seen on Nations Peak year-round; they stayed here only to fatten for the rut.

I urge that a good winter count from the ground be made; in summer, sheep were usually hard to find and there could be a better population than the one indicated in the report.

The ecological reserve is an important calving area for caribou. Every major ridge, such as Ovis, Rangifer, Ales Ridges and Fossil Flats, have female caribou on them at parturition time. At that time, because creeks carry high water, it is difficult to move around, but you do find caribou with young wherever you go.

THE UNIVERSITY OF CALGARY 2920 24 AVE. N.W. CALGARY ALBERTA CANADA T2N 1N4
AREA CODE 403, TELEPHONE 284 6601

Caribou rut in good numbers (about 50 animals) around Bates Camp and stay here in the dwarf birch zones during early winter, but not late winter. Only in spring do they reappear, the pregnant females that is, moving up the creeks to give birth on the high ridges.

During my study up to 1965, a band of 6 wolves visited Gladys Lake at reasonably regular intervals.

A kestrel nest used to be within 200 yards of the cabin. Mergansers do appear on the creeks around Gladys Lake, albeit rarely.

I challenge the sighting of rock ptarmigan! Unless there are specimens at hand, I don't believe it. Willow ptarmigan populations were very dense in 1961-63. A major wintering area for these animals is Gladys Lake. The same is valid for white-tailed ptarmigan.

Gladys Lake in winter contains overwintering populations of rainbow trout, lake trout, dolly varden, grayling and whitefish. The latter come in fall in dense swarms along the creeks moving into Gladys Lake. In 1965, U.B.C. took samples of these fish, and I sent some of the fish to the U.B.C. Museum in 1963. There ought to be records of these specimens available. In summer and fall, fishing is no good at Gladys Lake, but it is quite good in March to May at the inlet Tommy and I called MacMillan Creek.

There are other points that can be raised pertaining to goat, moose, etc. I urge, in closing, some careful winter counts of animals, and in particular an attempt to find out <u>where</u> animals now winter as compared with where they used to stay. If the population figures reported now are anywhere close to the truth, an appalling destruction of sheep and goats has taken place.

With the best regards,

Sincerely yours,

V. Geist
Associate Professor
Environmental Science

VG/MJES
(Signed for Dr. Geist in his absence)

MEMORANDUM

TO T. E. Lee
Director
Parks Branch

Attn.: K. R. Joy
i/c Interpretation

PARKS BRANCH
DEPARTMENT OF RECREATION AND CONSERVATION

OFFICE OF W. G. Hazelwood
Parks Biologist

1-5-4-2

February 2 .76

RE: Spatsizi Report

This Report was largely prepared by a wildlife student, Rod Carswell, hired by the Parks Branch as part of a multi-agency cooperative study of the Gladys Lake Ecological Reserve prior to its creation. His duties were mainly in support of Dr. Jim Pojar, a botanist who was to carry out botanical studies in this area. He was to supplement this work by observing and recording faunal values in the proposed reserve and to communicate with other informed sources that knew the area and include their wildlife data into the report. This he has done and the results speak well for the perseverance and dedication that was so obviously exemplified by the study team during their field research.

The Report was edited by his employer only to clarify any ambiguity and to minimize grammatical errors. Dr. Pojar also kindly reviewed the manuscript in draft and supplied the botanical appendices. Parks Branch Interpretation Division made funds available which enabled the author to write and complete the manuscript in early December 1975.

Due to a lack of drafting personnel, only a master copy of wildlife sightings maps will be completed and retained on file. Those Government agencies requiring copies of this data can request to transfer the information to their maps with their personnel carrying out the task.

The completion and distribution of this report, fulfills the obligations of Parks Branch to the other member agencies of the Committee struck to carry out the study. I trust it meets with your approval.

W. G. Hazelwood
Parks Biologist
Interpretation

cc Dr. Bristol Foster - Ecological Reserves
Mr. Don Eastman - Fish & Wildlife Branch
Mr. Dan Blower - E.L.U.C. Secretariat

WGH:lh

WILDLIFE INVENTORY

GLADYS LAKE ECOLOGICAL RESERVE

Rod Carswell - 1975

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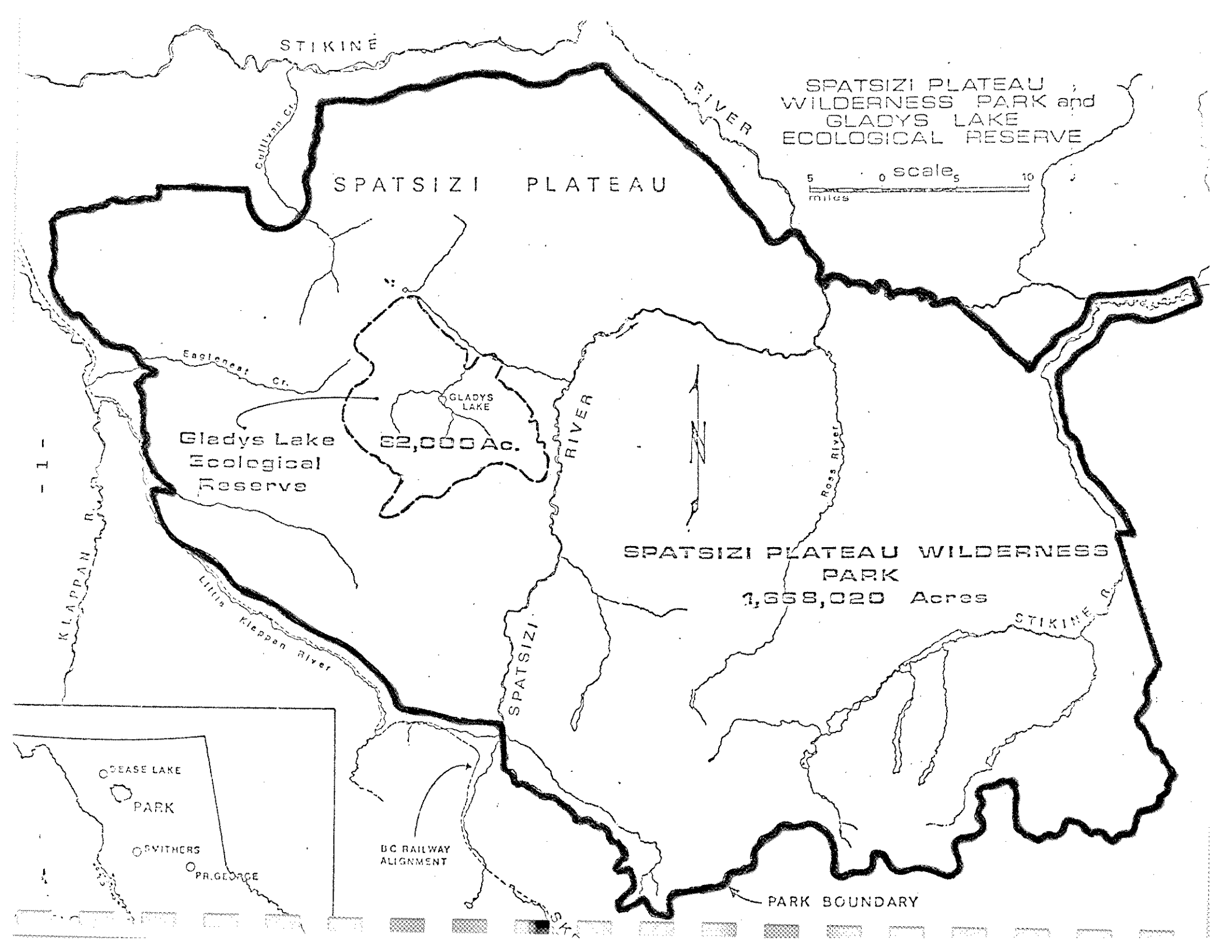
SPATSIZI PLATEAU WILDERNESS PARK and GLADYS LAKE ECOLOGICAL RESERVE
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KLAPPAN R.
Little Klappan River
STIKINE R.
SPATSIZI
DEASE LAKE
PARK
SMITHERS
PR. GEORGE
BC RAILWAY ALIGNMENT
PARK BOUNDARY

1.0 INTRODUCTION

In 1971 The Ecological Reserves Act was passed by the B. C. government. Ecological reserves are established for scientific purposes and are managed as outdoor laboratories, benchmark areas and genetic banks (B. Foster, 1975). They are created with the intent of permanence. As of December 11, 1975, there were 73 ecoreserves in the province of B. C.

The Gladys Lake area of northcentral B. C. covered by this report was also established as an ecological reserve on December 3, 1975. The specific intent of this reserve is to protect populations of mountain goat (Oreamnos americanus) and Stone's sheep (Ovis dalli stonei) through habitat preservation and removal of hunting pressure.

An additional large proposal allowed for the establishment of a wilderness conservancy to act as a buffer-zone around the reserve. Wilderness conservancies are established for recreational purposes and little or no development is permitted. An Order-in-Council of December 3, 1975 established the Spatsizi Plateau Class A Park. This 1,700,000 acre area is bounded by the Stikine, Klappan and Spatsizi rivers.

In the past, the proposed ecoreserve was used primarily by hunters. In 1949, Tommy Walker, a hunting guide and outfitter established a camp at Coldfish Lake (see Fig. 3). The operation has since changed hands several times and is presently run by Howard Paish of Paish Ventures Ltd. The ecoreserve area has also been used occasionally by other outfitters as a hunting area. Their known camps are shown in Fig. 3. With improved air transportation come increasing numbers of non-guided resident hunters. These individuals in the recent past have made up the majority of users

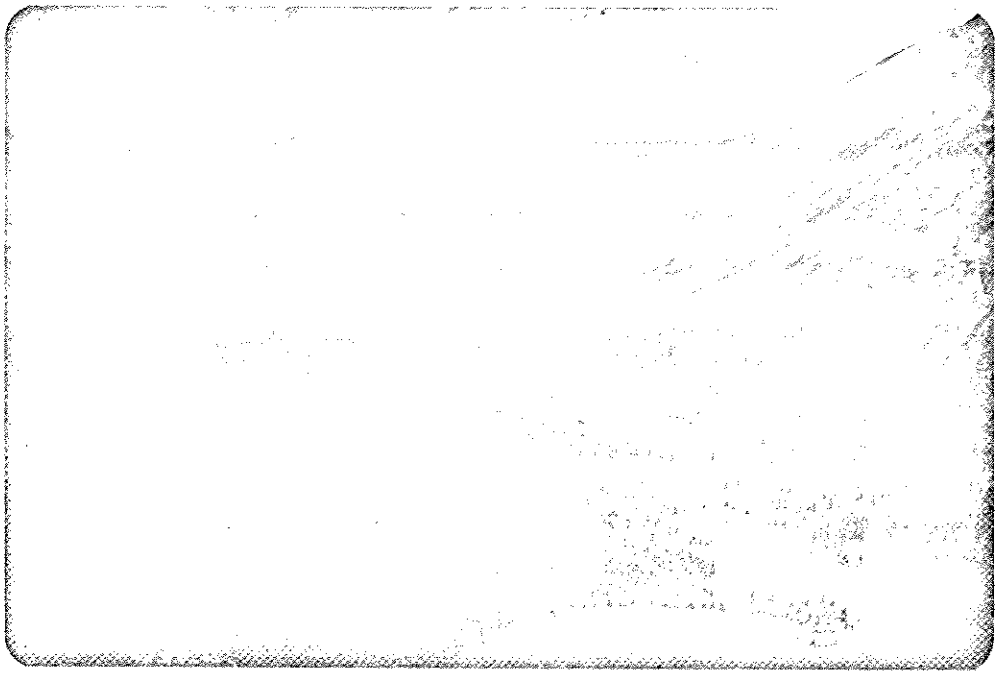

Fig. 1

Gladys Lake in foreground looking northeast to Coldfish Lake.

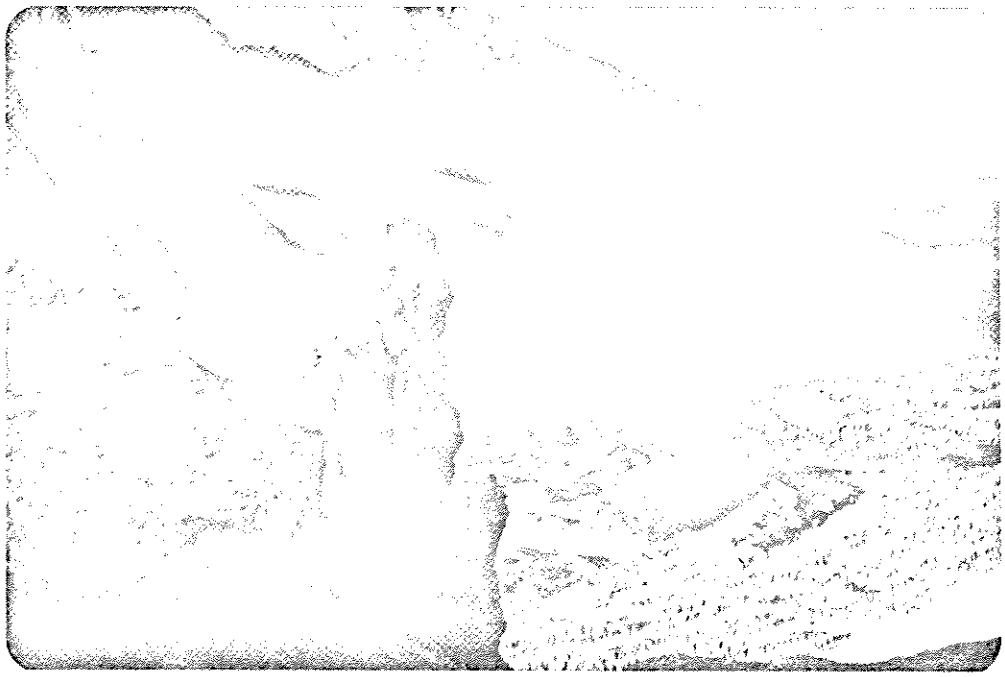

Fig. 2

Wind erosion feature of Alces Ridge. Landslide from Ghost Mountain - Coldfish Lake visible in background.

of Gladys Lake as an access point to the high country.

An eight mile radius surrounding Gladys Lake was the site in 1961, 1962, 1963 and 1965 of studies of Stone's sheep by Valerius Geist upon which much of his book on mountain sheep is based.

The B. C. Forest Service and the Geological Survey of Canada have both done recent studies in the ecoreserve and surrounding wilderness park. Other than sporadic mining exploration and occasional horseback visitors, the ecoreserve receives little human visitation except in the autumn for hunting.

According to the Geological Survey of Canada (1974), the area has little potential for mineral development. The quality and quantity of timber in the area is insufficient to realize a viable profit from a forestry operation (B.C.F.S., 1968).

In the summer of 1975 a recognizance level survey was conducted in the ecoreserve proposal. This survey was to examine the floristic and faunal character of the area. The project was funded inter-departmentally by the Ecological Reserves Committee of the Lands Branch, the Parks Branch, the Fish and Wildlife Branch, and the Secretariat wildlife division. Dr. Jim Pojar, a botanist employed by the Ecological Reserves Committee examined the flora and vegetation of the ecological reserve. Rod Carswell was employed as support staff and to conduct a wildlife survey, with the following objective:

- to photograph unique and interesting aspects of the proposed ecological reserve;
- to map major game and horse trails;
- to locate and map wildlife features e.g. rub trees, eagle eyries, mineral licks;

- to compare present game populations in the proposed Ecological Reserve with what they were in Tommy Walker's and Valerius Geist's time through correspondence and conversations with these individuals;
- to compile a species list of birds observed;
- to note any behavioral characteristics in observations of ungulate species;
- to compile a species list of mammals observed;
- to include any information on fish collected;
- to discuss the PRELIMINARY ASSESSMENT OF UNGULATE LAND CAPABILITY ON PROPOSED SPATSIZI WILDERNESS AREA, classified by Dan Blower and A. J. Luckhurst;
- to examine the types of future wildlife research which could be performed in the area;
- to consider regulation enforcement in this area;
- to compile data on small mammals collected.

The study team remained in the area from June 19th to September 1, 1975 and worked out of the Gladys Lake, U.B.C. research cabin. This report then is the product of the four month survey carried out there.

2.0 METHODS OF STUDY

A main objective of the survey was to traverse as much of the new ecoreserve as possible to assess floral and faunal character. Most of the area was covered on foot as funds were limited for aerial survey. When in the field, as much as possible of the following data were recorded:

Animal - species
- elevation sighted at - (determined by altimeter and/or relative position on map)
- aspect sighted at - (determined by position on map)
- age - any reference made to 'immatures' will include 'young of the year'
- sex

Other animal data recorded were:
- behavioral traits
- mineral licks - location and size
- game trails
- track density and type - scat

Also recorded in a daily journal was the amount of cloud cover during the daylight hours, rainfall and temperature although the latter two recordings were approximate.

Mineral licks, trails, outpost hunting camps, rub trees and any other significant data were plotted on 1" = 2,000' map sheets (see fig. 3). All flights and wildlife sightings were plotted on 1:250,000 map sheets. Wildlife sightings were also tabulated (see tables).

Bird, mammal and fish species lists have been compiled and are listed in tables. The bird and mammal lists were compiled mostly on the basis of personal observations. The fish list was derived from

personal catches and reports from Coldfish Lake fishermen.

As the ecoreserve area lacked baseline data on wildlife, conversations and correspondence with individuals familiar with the area were utilized.

Tommy Walker, the original guide-outfitter of Coldfish Lake, provided a knowledge of the geography, geology and trails on a map. This map was a valuable aid in research travel through the ecoreserve and beyond. Records he furnished greatly supplemented the data on hunter harvest over the years.

Work conducted by Valerius Geist on Stone's sheep in the early 1960's provided information on the sheep as well as other wildlife species. His book, '<u>Mountain Sheep</u>' (see Bibliography) discusses Stone sheep distribution, habits and movement trends. Correspondence with Geist provided even better localized data on the fauna.

Also useful and appreciated was information furnished by Mrs. Rosemary Fox of the Sierra Club in describing her trip to Klahowya Lake area from July 26, 1975 to August 17, 1975. (Klahowya Lake is not in the new ecoreserve but is in wilderness Class A Park). Her correspondence with the Fish and Wildlife Branch in which useful data on wildlife was contained is included.

Other reports were consulted that had studies in the ecoreserve area and they are also listed in the bibliography.

3.0 RESULTS

3.1 Wildlife Sightings in and near the Gladys Lake Ecological Reserve

Since the wildlife survey was concentrated in the ecological reserve, most of the wildlife sightings in the following tables are from that area. Sightings from the Spatsizi Wilderness Park are marked with an '*'. Sightings that are footnoted are those of people other than the study team.

TABLE 1 - MOUNTAIN GOAT SIGHTINGS

Date	Location	# of Animals				Elev. (ft.)	Aspec
		M	F	Imm.	Uncl.		
June 21	Guardian Mountain	3	-	-	-	6500	S.E.
26	" "	1	-	-	-	6100	S.W.
July 2	Ochre Cliffs	1	-	-	-	6000	W.
3	" "	-	-	-	2	6500	S.W.
3	Guardian Mountain	-	-	-	1	5500	S.E.
4	" "	-	-	-	2	6000	S.E.
10	Spatsizi Mountain	-	-	1	1	3500	S.E.
10	Fossil Flats	-	8	4	-	6000	N.W.
10	Ochre Cliffs	-	-	-	2	6500	S.W.
15	Alces Ridge	-	-	-	1	6000	S.W.
Aug. 15	Rainbow Mountain	-	-	-	1	6500	N.E.
15	1 mi. west of Rainbow Mtn.*	-	3	2	-	6500	S.E.
28	Festuca Ridge	2	6	6	-	7000	W.
29	Macmillan Mountain	2	6	6	-	6200	N.E.
30	Mink Creek	-	1	-	-	4000	valle botto
Sept. 1	Spatsizi Mountain	-	-	-	5	5000	N.E.

TABLE 2 - STONE SHEEP SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspec
June 20	Ovis Ridge	-	3	3	-	6500	East
21	Guardian Mountain	-	1	1	-	6500	S.E.
July 3	Ochre Cliffs	-	1	1	-	6500	S.W.
9	Rangifer Ridge	-	1	-	-	6700	West
10	1/2 mi. SE Moss Campion Mtn.*	2	-	1	5	6500	West
11	Mt. Will	-	2	-	-	6200	East
19	Marmot Mountain	-	2	1	-	6500	S.E.
19	Spermophilus Saddle	6	3	1	-	5600	S.E.
25	Hoodoo Valley	-	1	1	-	6000	Sout
25	Maternity Ridge	-	~ 58 ~		-	5600	N.W.
25	2 mi. SW Bug Lake*	-	19	5	-	6000	Sout
30	Ochre Cliffs	-	1	-	-	6000	S.W.
Aug. 6	Airplane Valley	-	~ 14 ~		-	6200	N.W.
7	Danihue Pass	2-	-	-	-	5400	S.E.
12	Spermophilus Saddle	6	5	2	-	5600	S.E.
15	Wolverine Ridge*	-	[illegible]	[illegible]	-	6800	Flat
15	Wolverine Ridge*	-	35	15	-	6900	Flat
16	Marion Creek*	-	~	45 ~		6500	Sout
16	Marion Creek*	4	-	-	-	6500	Sout

TABLE 3 - CARIBOU SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspec
July 9	Fossil Flats	1	2	-	-	7000	Flat
9	Rangifer Ridge	-	2	1	-	6200	Sout
10	1 mi. N. of Black Fox Cr.*	-	-	-	13	6000	Flat
11	Fire Flats*	272	27	-	43	4200	Flat
14	Ghost Mountain	-	1	1	-	5600	Sout
16	Flatiron Mountain	2	-	-	-	5500	N.E.
25	Maternity Ridge	1	6	-	-	5900	S.W.
25	Columbine Ridge	-	1	1	-	6000	Sout
27	Ursus Cirque	-	1	1	-	6200	S.E
Aug. 6	Danihue Pass*	-	1	-	-	5300	Nort
8	Black Fox Creek*	-	3	-	-	5500	N.W
15	Wolverine Ridge*	1	-	-	-	6300	S.E
17	Rainbow Creek*	-	1	-	-	6000	N.W
17	Wheatear Ridge*	-	8	-	-	6000	N.W
19	Sanctuary Mountain	-	1	-	-	6000	East
28	Ursus Valley	-	3	-	-	5900	East
Sept. 1	Sanctuary Pass	-	2	-	-	5500	Nor
1	Fire Flats*	4	-	-	-	4200	Fla

TABLE 4 - MOOSE SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspe
June 25	Red Canyon Creek	-	1	1	-	4700	Soutl
July 9	Rangifer Ridge[1]	-	-	-	1	4400	East
Aug. 15	Mink Creek	1	-	-	-	4100	Flat
16	Marion Creek(*)[2]	1	-	-	-	5000	Flat
17	Rainbow Valley(*)	-	1	1	-	6300	East

1 sighted by Mike Hamilton, geologist

2 sighted by a guide with a hunter from Cache Creek

TABLE 5 - MULE DEER SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspe
Aug. 23	Mink Creek	1	-	-	-	4100	Flat

TABLE 6 - WOLF SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspe
July 10	Sedge Saddle	-	-	-	1	6900	East
Aug. 27	*Festuca Ridge	-	-	-	1	6200	Flat

* sighted by hunters

TABLE 7 - BLACK BEAR SIGHTINGS

Date	Location	# of Animals M	F	Imm.	Uncl.	Elev. (ft.)	Aspe
July 3	Ochre Cliffs	-	-	-	2	4500	West
24	Kestrel Crags(*)	-	1	3	-	4500	S.W.
27	Ursus Creek	-	-	-	1	5400	West

3.2 Wildlife Sightings in the Spatsizi Wilderness Park

The following sightings were made by Carl Simmons, a helicopter pilot, during trips made in summer, 1975. Sightings that are duplicated in section 3.1 of this report are not listed here.

STONE SHEEP

Date	Location	# of Animals	Elevation	Aspect
August	1 mi. W of Cartmel Lake	Size ?	-	-
August	6 mi. E of Cartmel Lake	Size ?	-	-
August	10 mi. SE of Cartmel Lake	Size ?	-	-
July	4 mi. SE Spatsizi Mountain	Size ?	-	-
June-July		12	-	-

MOUNTAIN GOAT

Date	Location	# of Animals	Elevation	Aspect
June	Headwaters Tsetia Creek	?	6000 ft.	S
July	5 mi. S. of Cartmel Lake	10	6200 ft.	S
July	3 mi. E. of Cartmel Lake	17	6000 ft.	?
July	Taylor Peak	12	6200 ft.	S
June-July	E. slopes Rainbow Mountain	6	6000 ft.	SE
July	2 mi. northeast Rainbow Mountain	8	5500 ft.	S
June-Aug.	Skady Mountain	20-30	6000 ft.	N
July	Spatsizi Mountain	8	5000 ft.	E

3.3 Mammals List

The following mammals were sighted within the Ecological Reserve. An asterisk(*) indicates mammals that are suspected to be in the reserve; tracks were seen and there were unconfirmed sightings by various individuals. Generic names are taken from Cowan and Guiget (1965).

Siberian lemming	Lemmus sibericus helvolus
Navigator shrew	Sorex palustris
Little brown bat	Myotis lucifugus

Snowshoe hare	Lepus americanus
Least chipmunk	Eutamias minimus
Arctic groundsquirrel	Spermophilus undulatus plesius
Columbia groundsquirrel	Spermophilus columbianus columbianus
Hoary marmot	Marmota caligata
Red squirrel	Tamiasciurus hudsonicus
Porcupine	Erethizon dorsatum nigrescens
Beaver	Castor canadensis
White-footed mouse	Peromyscus maniculatus borealis
Boreal redback vole	Clethrionomys gapperi
Tundra redback vole	Clethrionomys rutilus dawsoni
Long-tailed vole	Microtus longicaudus
Western jumping mouse	Zapus princeps
*Coyote	Canis latrans
Wolf	Canis lupus
Black bear	Ursus americanus
*Grizzly bear	Ursus arctos horribilis
*Wolverine	Gulo luscus
**Lynx	Lynx canadensis canadensis
Mule deer	Odocoileus hemionus hemionus
Moose	Alces alces
Osborne caribou	Rangifer tarandus osborni
Mountain goat	Oreamnos americanus americanus
Stone's sheep	Ovis dalli stonei
*Red fox	Vulpes fulva

** Lynx skull found in Ecological Reserve

3.4 Hunting Statistics

TABLE OF GUIDED HUNTER HARVEST FROM COLD FISH LAKE, 1949-1974

Year	# Hunters	Animals Taken					
		Caribou	Sheep	Goat	Moose	Black Bear	Grizzly Bear
1949	8	8	8	8	1	*	1
1950	8	4	7	5	1	*	2
1951	9	4	7	10	2	*	4
1952	14	4	9	7	2	*	2
1953	8	7	5	9	0	*	3
1954	10	9	7	16	2	*	3
1955	6	4	5	7	2	*	1
1956	14	7	8	8	0	*	6
1957	16	12	15	29	5	*	7
1958	19	16	17	23	2	*	7
1959	11	10	9	10	3	*	7
1960	18	12	11	18	3	*	12
1961	14	10	7	18	2	*	6
1962	25	13	17	21	4	*	5
1963	*	*	*	*	*	*	*
1964	24	17	16	28	5	1	*
1965	25	18	14	24	9	3	*
1966	28	16	17	19	7	0	*
1967	22	10	16	15	13	1	*
1968	20	16	12	17	12	2	*
1969	9	6	7	9	3	1	*
1970	31	11	19	17	8	3	*
1971	2	0	2	2	1	0	*
1972	5	4	5	4	1	0	*
1973	5	0	3	2	0	0	*
1974	29	18	12	15	14	0	*
		39	11	35			
		16	7	13			

* figures unavailable

Figures of non-guided resident hunters are unavailable

4.0 Discussion

- no attempt to discuss population dynamics
- population size estimates only

4.1 Goats

4.2 Sheep

4.3 Caribou

4.4 Moose

4.5 Mule Deer

4.6 Wolf

4.7 Black Bear

4.8 Grizzly Bear

4.9 Other Mammals

4.10 Birds

4.11 Fish

4.12 Need for/Difficulty of Enforcement

5.0 Conclusions

- wildlife population conclusions

6.0 Future Research Possibilities

4.0 DISCUSSION

4.1 Mountain Goats

The mountain goat is a food generalist that sticks closely to steep cliff terrain (Geist et.al. 1974). The ecoreserve area has many steep south facing cliff areas supporting a broad variety of vegetation types that appeal to resident goat populations.

In the fall of 1962 during his Stone's sheep study, Geist noted the presence of approximately 30 goats in the Gladys Lake area. He also noted, as did Tommy Walker, the presence of a very good mineral lick at the base of Guardian (or Lick) Mountain which was primarily used by goats. Geist stated "goats used to go there in droves". Tommy Walker filmed goats at this location because they could always be depended upon to be there in June and July.

The population seems somewhat altered on the basis of our observations this summer. The largest band of goats we observed was 14 on Festuca Ridge on August 28th. This band was comprised of 2 mature billies, 6 nannies and 6 immature. These animals, and a smaller band of 8 nannies and 4 immatures was sighted July 10th on the northwest slope of Fossil Flats. The ridges and slopes extending from McMillan Mountain to the northwest corner of Fossil Flats constitute excellent mountain goat range. There is ample escape terrain on this southwest facing slope and the grasses and sedges present (Poa alpina, P. arctica, Festuca altaica, Carex podocarpa, C. microchaeta) are lush receiving good amounts of sunshine and rainfall. 'Pastures' existing on Festuca Ridge are extremely lush and have a loose, dusty soil in which goats were observed 'rolling' and relaxing. (see fig. 3-5)

Fig. 3

Goats on goat "Saddle" - Festuca Ridge. Almost every mature nanny had a kid.

Fig. 4

Festuca Ridge illustrating goat saddles. Note escape terrain and range.

Geist, in his book "Mountain Sheep" mentions that the goats concentrate about the salt licks in late June and July. We did not find the mineral lick at the base of Guardian Mountain owing partially to the lack of evidence pointing to its location e.g. tracks and individuals at the lick. We were informed of the presence of this lick by Tommy Walker prior to the study but attempts to find it were unsuccessful. The greatest number of goats observed on Guardian Mountain were 3 on June 21st, thereafter only 1 individual June 26 and 2 on July 4th were seen on Guardian Mountain. Helicopter flights by ourselves and various pilots reported no sightings on Guardian Mountain after July 4th.

Goats were observed on Ochre Cliffs on July 2nd, 3rd and 10th. Ochre Cliffs offers good escape terrain up to the higher reaches of Sanctuary Ridge. The rock outcrops which project from the cliff have grassy 'saddles' on which goats can rest and observe as well as feed. Ochre Cliffs is a range overlap in that both Stone's sheep and mountain goat use the area.

The rugged range on the eastern boundary of the reserve (stretching from Sanctuary Pass to Spatsizi Mountain) also supports an apparently distinct population of goats, but its numbers are unknown.

One individual goat was observed on the southwest slopes of Alces Ridge July 15th. Alces Ridge is limited as a good alpine ungulate range owing to slope severity and lack of vegetation.

A lone nanny was observed August 30th swimming Mink Creek (see fig. 5). This individual crossed at a point which is used by horseback travellers in the area as well as by moose and caribou;

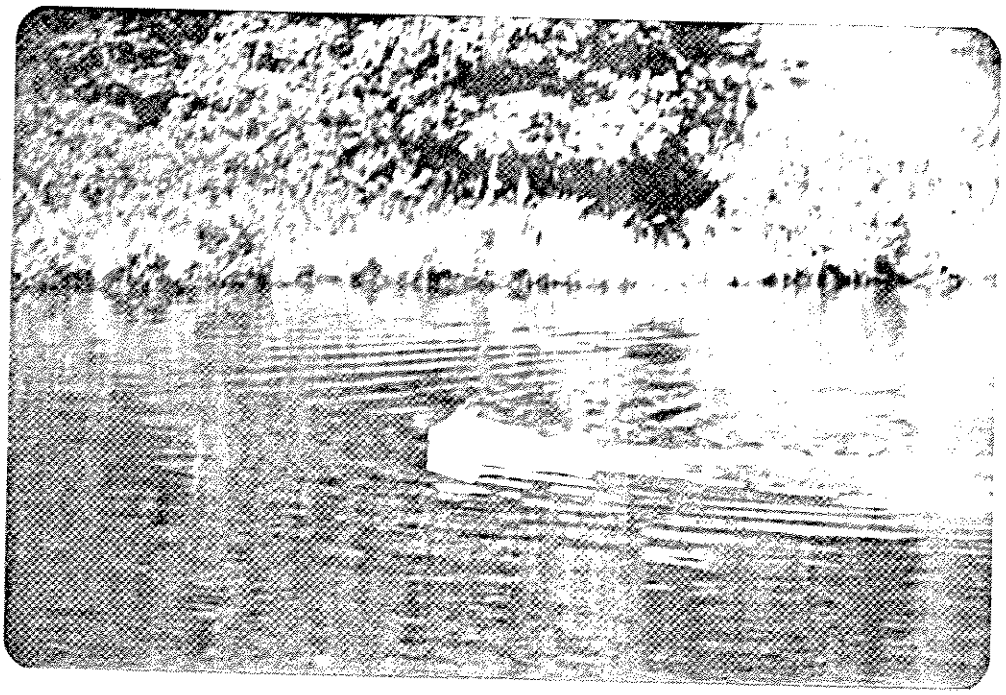

Fig. 5

Goat observed swimming across Mink Creek. It had descended from Spatsizi Plateau and was heading toward Sanctuary Mountain.

Fig. 6

Rainbow Trout caught in Mink Creek in early August. Fish had fed heavily on freshwater snails.

evidenced by tracks seen to emerge on each bank of river. This individual female appeared to have descended from the slopes of Rainbow Mountain and then proceeded to ascend the north slopes of Sanctuary Mountain.

Goat populations reported by Carl Simmons (see sec. 3-2) give an idea of populations elsewhere in the Wilderness Park. The goat population presently around Cartmel Lake seems substantial.

As a result of the present Gladys Lake ecological reserve hunting closure, Cartmel Lake may receive more goat hunting pressure. Good management practices will hopefully prevent the Cartmel goats from suffering the effects of intensive hunting pressures.

Caves were noted containing high amounts of goat pellets. The temperature of these cave habitats is somewhat cooler than the ambient during hot periods. Tracks of a nanny and kid were observed entering a cave on Ochre Cliffs. Fresh pellets indicated they had remained for a short period then left. Temperature highs were 74° F and 75° F for July 10th and 11th, the time of these observations. Other bedding depressions were noted often at the interface between the rock moss and the top of the talus slopes. Pellets often accompanied shed hair in these spots indicating a resting-shelter area. Such spots included locations along Ochre Cliffs, Ovis Ridge and Oreamnos Ridge.

Goats observed were typically found on Dryopteris fragrens (lichen-moss) associations ranging to rock outcrops or sheep/goat saddles which characteristically supported a Poa-Carex-Hierochloe alpina-Potentilla association (see Appendix 1). It was on these 'saddles' that goats were usually observed.

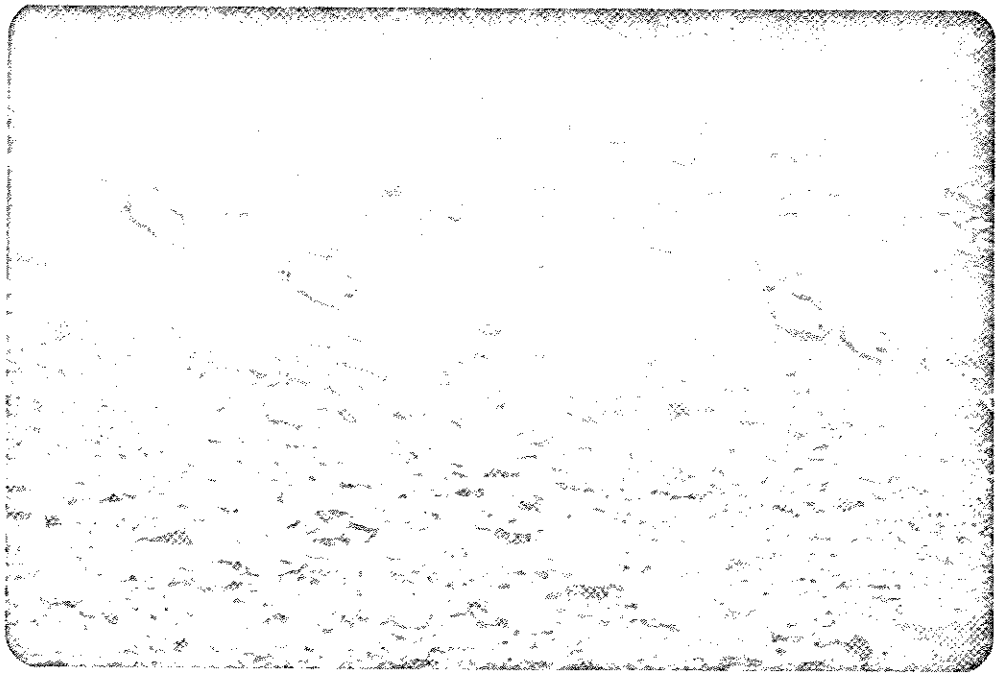

Fig. 7

Goats bedding in loose gravel on Festuca Ridge. The day was especially warm - 19° Celsius.

Fig. 8

Shrew - a common representative of the Microtines found in Gladys Lake area.

4.2 Stone Sheep

The Stone sheep population appears to have suffered a substantial reduction from past numbers based on reports by Tommy Walker and Valerius Geist in comparison to what is now there. This may be attributable to the intensive hunting pressure the Gladys Lake area has received in recent years. Resident hunters, whose main objective has been Stone sheep rams, have numbered up to 30 individuals during one week (according to guest book entries at U.B.C. research cabin, Gladys Lake). These hunters were after sheep, goat and caribou in a descending order of importance. From the entries in the book their relative success seemed quite good. The absence of any ram over 4 1/2 years old (summer sightings) stands as an indicator of hunter efficiency in this area. The total number of individuals we observed within the ecological reserve was 42. Of these 20 were ewes, 16 yearlings and 6 rams.

Based on reports of other individuals and sightings by pilots the estimated number of Stone sheep in the ecoreserve area was between 60-70 as of August 30th (8 males - oldest in 6 year range, 30-40 females and 15-20 immatures).

The animals were distributed in approximately the following manner; roughly 30 ewes and lambs were present in Airplane Valley (and perhaps ranged along the high ridge system S.E. to Ghost Mtn.), a band of 14 (ewes-lambs and 5 males) were present on 'Spermophillus Saddle'. The rest were found scattered on Sanctuary Ridge, Ovis Ridge, Rangifer Ridge, Oreamnos Ridge and Fossil Flats. Occasional sightings were also made on the slopes of Mount Will during the summer.

Geist quotes a figure of 86 wintering sheep around Gladys Lake in 1962 of which 28 were rams. There is an inherent problem involved

Fig. 9

Stone's sheep (Ovis dalli stonei) ram and ewe at a low elevation salt lick. Part of a band that remained for most of summer on "Spermophilus Saddle".

Fig. 10

4 1/2 year old ram from "Spermophilus Saddle". Oldest ram that was observed in entire Ecoreserve.

when comparing summer observations to winter observations. The biggest discrepancy arises when one attempts to assess the status of rams in the population. In this regard it should be considered that Geist says ram bands could be found regularly on McMillan Mountain, Sanctuary Mountain and Nations Peak. Geist reported a ram band of between 12-22 rams on Nations Peak ~~year round~~ during the pre-rut. All we recorded (after searching intensively) was a juvenile ram on the mid-slopes observed by a hunter with field glasses from Bates Camp.

Now apparently no ram bands exist within the ecoreserve during the summer. The closest ram bands were located on the west side of Cullivan Creek and at Marion Creek. Both of these bands are receiving hunting pressure.

The sheep we observed in bands seemed to concentrate their summer activity largely around mineral licks. This was noted to be true in the case of the band at Spermophillus Ridge and Cullivan Creek.

The Cullivan Creek sheep population is especially interesting in that the lamb-ewe summer activity occurred on the S.E. side of the valley where they utilize a substantial mineral lick. The ram band on the N.W. side of the valley occupy rougher terrain and are more wide ranging. Hunting pressure on this ram band is reported to be heavy. An extremely valuable piece of habitat exists here for the sheep and on the higher slopes to the S.E. caribou calving grounds are known to exist.

4.3 Caribou

Caribou were not concentrated in great densities in the Ecoreserve. Geist (1974) states that "Caribou are infrequent wanderers through the valleys". Lone individuals occurred in the

Fig. 11

Yearling lamb utilizing mineral lick at the base of "Spermophilus Saddle". Lick was being used daily by the band during summer months.

Fig. 12

Caribou cow on fossil flats, a high elevation plateau in Ecoreserve - June. Note sparse alpine vegetation.

lowlands and occasional caribou track crossings. We saw most individuals at the higher elevations in the ecological reserve; quite frequently on Fossil Flats or the outriding ridges extending from Fossil Flats. It is questionable if these individuals were stable in their location on the slopes of Ursus Cirque and Rangifer Ridge. Caribou cows and calves were observed. In Ursus Cirque track and scat indicated that the cow and calf observed had been there quite a while. Possibly the cow had calved in this cirque. Wandering through the valley bottoms was a common trait indicating that the caribou were extremely fluid in summer location. Alpine tundra was a preferred location through most of the summer season. Caribou were observed feeding on all slopes, not favouring any particular aspect.

Mineral Licks

In only two areas were caribou tracks and droppings observed in salt lick areas. On black fox creek (August 8) at 4900 ft. level on a horse trail heading north, caribou droppings and tracks were intense in 200 sq. metre area. (A seepage area which emerged from a slope). Three female caribou were observed a 1/2 km. further up the trail. Charlie Quant, an Indian guide employed by Howard Paish, stated that he had seen caribou utilizing the lick in years past. The other salt lick utilized by caribou lies at the junction of Danihue Pass and Kettle Hole Pass. This lick is similarly in a wet seepage area. In this lick, caribou have pawed the bank away on all edges of the lick. Caribou and moose antlers were strewn all about in adjacent areas. Calf tracks (caribou) were noted in this lick as well. In a few other licks caribou tracks were observed in close proximity to the lick but their use was not confirmed.

Caribou calving grounds in the Ecoreserve can be found in a few high elevation areas. Geist (et.al.) states that these localities are rarely visited by wolves and these are areas where the ground is relatively dry and temperatures are fairly high thus constituting good calving sites. These localities usually are high ridges with unvegetated scree and small rock outcroppings.

Kelsall, 1968, cited by Geist (1974) states that caribou cows drop antlers shortly after parturition. Rangifer Ridge and Fossil Flats as well as Sanctuary Ridge showed much evidence of shed antlers and the favourable set of conditions mentioned above. Tommy Walker noted this area as a rearing area for caribou (pers. comm. and on maps). Flower Ridge also generally qualified under these criteria and a set of tracks belonging to a juvenile and a female were observed here. Mountain caribou calving habits contrast to barren ground caribou which congregate at density calving grounds; the mountain caribou disperse and calve in seclusion, forming only small, temporary nursery bands and disbanding soon after. (Geist et.al. 1974). In this light, a lot of the ridge tops around Gladys Lake would qualify as potential calving ground but may be alternately used in different years e.g. Sedge Saddle, Spermophillus Saddle. A specific vegetative zone related to heavy caribou use is difficult to assess. During the summer the caribou were observed in almost all of the vegetative regions favouring elevations above 5500 ft. The caribou seen within the Ecoreserve were almost all females. They were typically close to or on snow patches at high elevations. Activities included standing on snow patches, lying on snow patches, eating snow, females coming close to observers to satisfy curiosity, male with head down on plateau, half circle arc to catch scent when aware of observer - male stayed behind as female advanced.

4.4 Moose Sightings

Moose sightings in the ecological reserve were relatively few from June through August. Track frequency and shed antlers in certain lowlands indicated seasonal utilization by moose, probably in autumn and early winter. The moose observed were recorded in willow - dwarf birch communities at relatively low elevations. Geist (et.al. - 1974) states that "In general, the moose is an exceedingly adaptable species which thrives in widely differing landforms and plant communities, from sea level to above timber line, as long as the plant communities contain shrubs and trees, and the temperature is not too hot". Gladys Lake would satisfy this set of requirements; possessing several varieties of trees and shrubs as moose browse. In particular, willow is abundant and is a preferred browse species. The approximate mean monthly temperatures for Gladys Lake were: July - 54° F (June 19-30) - 61° F., August - 51° F.

Geist et.al. (1974) speaks of a moose river as "a slow-running, annually flooding body which causes continuous stream erosion and sediment deposition such as alluvial flats, and which fills the potholes and marshes annually with flood waters. In doing so it creates the required environmental conditions for dense willow flats to grow along the marshes and potholes and on its freshly deposited alluvium or exposed gravel bars and islands." Connector Creek and Landslide Creek satisfy these requirements in quite a few places. Castor Creek is becoming increasingly suitable habitat as beaver activity in that valley is retaining larger amounts of water. Geist (1971) in his book "Mountain Sheep", states that moose concentrate in the willow thickets on alluvial flats in early winter. A few

moose leave these valleys in late fall and early winter to return in late May and June when most of the snow has gone, but many others remain year around in the high country. He found them all winter along moraines and on the south slopes or alluvial flats where the snow blanket was thin. He also says that "in summer the moose live in the alpine fir thickets where their deep trails, soft droppings and beds in the lush herbacious vegetation reveal their presence." Most tracks and droppings we observed were down along the south slopes of Hierochloe Peak, Rhizocarpon Ridge, Columbine Ridge to Landslide Ridge, and along southwest-facing slopes of Salix Valley. Their most pronounced areas of activity and feeding were in the lush meadows and thickets fed by streams from the mountains. Up higher these meadows were found mostly between 4,000 ft. and 6,000 ft. Other areas of summer activity included the area between the lower northern slopes of Guardian Mountain and Coldfish Lake, extending in a broad arc around the southern end of Coldfish into the bottomlands surrounding Mink Creek.

Moderate frequency of sign occurred during June and increased towards the later part of August in the Mink Creek area. Pellet group counts were conducted in Mink Creek area, Connector Creek, and Landslide Creek for moose but these were later deemed insignificant due to migrating factors.

Better moose habitat is to be found in other parts of the wilderness Park such as along the Spatsizi River below Mink Creek down to Beaver Valley where swampland and willow thickets dominate the valley bottom. Reports of moose in Spatsizi also came from guides and hunters southeast of Mink Creek along the Spatsizi to Hyland Post. As the wilderness Park is bounded by three major river valleys, much prime moose habitat has been included.

Around Klahowya Lake, Mrs. Rosemary Fox reported some moose sightings.

Winter flights of February 1 & 2, 1975 by Dan Blower, Bristol Foster, and Dave Spalding yielded a total of 5 moose present in Ecological Reserve area, 12 moose between Beaver Valley and Kliweguh Valley along Spatsizi River in the wilderness Park.

4.5 Mule Deer

One buck mule deer was observed in the ecoreserve near the head of Mink Creek. It should be noted that mule deer have been rarely recorded in this area in the past. A herd of approximately 20 animals is said to exist around Hyland Post. These animals were recorded by Tommy Walker. The present status of these individuals is not clearly known other than they are a group disjunct from other major concentrations of mule deer. Tommy Walker reports that small numbers of mule deer also exist along the Klappan Valley on the west boundary of Spatsizi Park.

4.6 Wolf

Observations of wolf tracks and scats were common at most elevations throughout the summer. The frequency of these tracks was greater in the valley bottoms but sign was frequently observed along the higher slopes and ridgetops of the mountains. Tracks seen indicated individual wanderings, no more than two sets of tracks were observed at any one time.

We observed no recent kills directly attributable to wolves. Any moose kills found appeared to be past winters' kills. One wolf 'den' was discovered on the west slope of Ovis Ridge at the 5500 ft. level. This den was typified by a depression in the rock face

accompanied by strewn bones. No vocalizing by wolves was heard during the study although two individuals were sighted during this survey. Most of the scats observed contained small bones and hairs suggesting summer utilization of mice and rodents prey.

4.7 Black Bear

Hatler (1967) states that wet meadows constitute important feeding habitats for black bear who rely on green herbacious vegetation for the bulk of their dietary needs. Most of the wet slopes contained lush meadows and scats and tracks were most frequently observed in these locations.

The bears observed did not remain in any one spot for an extended period but moved along the slopes in search of forage. Berries were not abundant in the region and this is perhaps a contributing feature to the low bear population. The black bears were encountered frequently around the hunting camps operated by Howard Paish. Scats observed from black bears feeding on Sanctuary Mountain showed that rose hips were part of their local diet.

4.8 Grizzly Bear

No grizzly bears were observed by us during the survey in the ecoreserve area. Hunters reported seeing a few (3 total) in the Eaglenest area but exact locations were unclear. These bears were within the boundaries of the wilderness Park but outside of the ecoreserve. In mid-August hunters reported sighting a buff-coloured grizzly on the N.W. side of Danihue Pass (outside the ecoreserve).

One set of tracks was observed in Castor Creek valley but the individual was simply passing through. No other tracks were observed within the ecoreserve. Geist in his book Mountain Sheep lists grizzly bears as 'infrequent visitors' to the Gladys Lake area.

One grizzly bear taken in Cache Creek (Spatsizi Plateau) area by hunters measured 67 inches total length. This specimen was relatively small having a 12 3/4 inch skull width, 5 in. X 7 in. front foot track and 5 in. X 9 in. hind foot track. Hide hair was mottled and rubbed. The teeth were in good shape. The stomach contents contained bunchgrass and large chunks of meat. It had been raiding supplies at the camp.

4.9 Other Mammals

The smaller mammals were predominantly found at the lower elevations throughout the ecoreserve. The small mammals are widely distributed in the area with the Siberian lemming occupying the higher elevations in the alpine areas. In the lower sites the white-footed mouse, the boreal redback vole and tundra redback vole find a niche to the middle elevations. The shrews and jumping mice were frequently found in the lowest streambank areas although the jumping mice were also found in the higher wet meadows.

Arctic groundsquirrels and Columbia groundsquirrels found suitable habitat on most hillsides and on flatter well drained sites. Least chipmunks occupied similar habitat generally preferring a rockier site e.g. broken rock slopes and talus.

Snowshoe hares and porcupine occupied the white spruce - willow areas in the lowlands, porcupines being sparsely distributed while the hares remained almost exclusively in the willow - dwarf birch scrub zones.

Beaver activity was noted in all the major creeks in the ecoreserve; Connector Creek, Landslide Creek and in Gladys Lake and Castor Lake. The individuals that had built in Castor Lake seemed either to have abandoned the lake or been killed. (Willows

surrounding the lake had been harvested up to a 100 metres off of the very steep lakeshore). Evidence of intense feeding activity by the beaver occurred along most willow thickets and scrub areas.

Little brown bats were observed flying around Gladys Lake on occasion, while feeding on insect life.

Red squirrels found suitable habitat in most of the dense stands of white spruce.

Colonies of hoary marmots were also distributed in the ecoreserve. Major congregations existed in Marmot Valley and Ungulate Valley. A minor colony existed in Ursus Cirque. Colony locations were plotted on Wildlife Data map.

4.10 Birds

Distribution of bird life was slightly different in the valley containing Gladys Lake than in adjacent areas as almost no fish feeding birds centered their activities here. At Coldfish lake because of less turbidity and perhaps greater availability of fish, mergansers, loons and belted kingfishers were frequently observed. At Gladys Lake they were never observed during the study period.

Raptorial birds were rather limited in their variety. Only the Golden eagle, Bald eagle and kestrel were observed in the ecoreserve. Nests of Golden eagles were discovered in the ecoreserve. It is presumed that the kestrel and bald eagle would be nesting there as well although nest sites were never located.

The dwarf birch - willow thickets harboured by far the greatest number of passerine birds. Nesting activity was especially noticeable in Connector Creek Valley, Kettle Hole Pass and on the fringes of Gladys Lake.

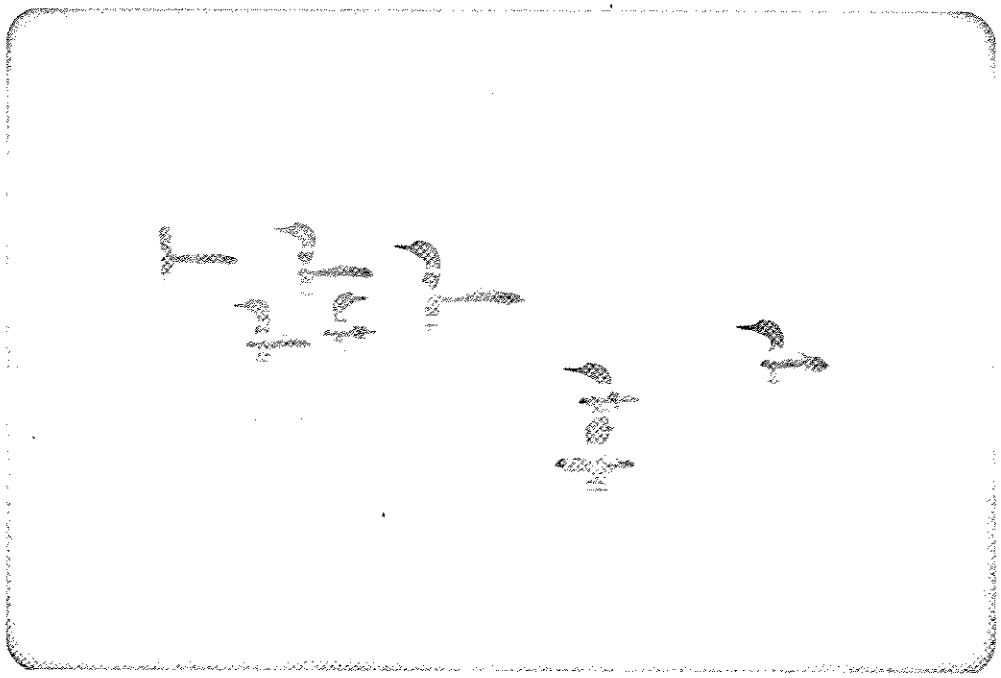

Fig. 13

Common loons on Coldfish Lake. These birds were rarely observed on Gladys Lake.

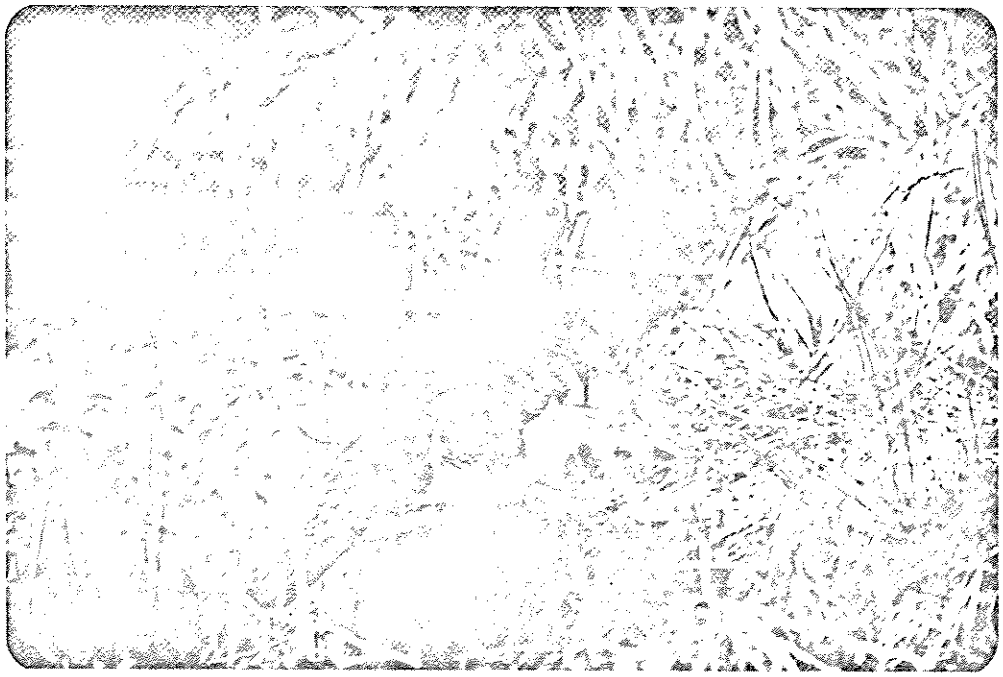

Fig. 14

Willow ptarmigan typically observed in swamp areas above 4500' during summer.

4.11 Bird Lists

In the following list, birds sighted in the Ecological Reserve have their location listed as Ecoreserve. They may or may not have been sighted in the Spatsizi Wilderness Park.

Birds sighted only in the Park have their specific location listed, e.g. Fire Flats.

Species with an asterisk(*) were sighted by Dr. Bristol Foster during a one-day helicopter reconnaissance from Gladys Lake through the Spatsizi Valley to Fire Flats, then to Tuaton Lake, Tomias Mountain and back to Gladys Lake.

SPECIES	LOCATION	OCCURRENCE
Common Loon	Ecoreserve	Common
Red-necked Grebe	Ecoreserve	Infrequent
Pintail	"	"
Green-winged Teal	"	"
Blue-winged Teal	"	"
Redhead	"	"
Ring-necked Duck	"	"
Lesser Scaup	"	Common
Common Goldeneye	"	"
Harlequin	"	Infrequent
Surf Scoter	"	"
White-winged Scoter	"	"
Common Merganser	"	"
Red-breasted Merganser	"	"
Golden Eagle	"	Common
Bald Eagle	"	"
Sparrow Hawk	"	"
*Peregrine Falcon	Black Fox Creek	Infrequent
(pair of Peregrines sighted by Howard Paish)		
Spruce Grouse	Ecoreserve	Common
White-tailed Ptarmigan	"	"
Willow Ptarmigan	"	"
Blue Grouse	"	Infrequent
Ruffed Grouse	"	"
Rock Ptarmigan	Potentilla Ridge	"
American Golden Plover	Wolverine Ridge	Common
Spotted Sandpiper	Ecoreserve	"
*Long-billed Dowitcher	Fire Flats	Infrequent
*Sanderling	"	"
Lesser Yellowlegs	Ecoreserve	"
Western Sandpiper	"	"
California Gull	"	"
Herring Gull	"	"

32 - 6 = 26

SPECIES	LOCATION	OCCURRENCE
*Mew Gull	Laslui Lake	Infrequent
*Arctic Tern	Tuaton Lake	"
Great Horned Owl	Cache Creek	"
(Feathers found. Sightings reported by local Indians)		
Shafted Flicker	Ecoreserve	Common
Black-backed three-toed Woodpecker	"	Infrequent
Yellow-bellied Sapsucker	"	"
Say's Phoebe	"	Common
Olive-sided Flycatcher	"	Infrequent
Western Wood Pewee	"	Common
Hammond's Flycatcher	"	Infrequent
Least Flycatcher	"	"
Yellow-bellied Flycatcher	"	"
Eastern Phoebe	"	"
*Horned Lark	Tomias Mountain	"
Tree Swallow	Ecoreserve	Common
Belted Kingfisher	"	"
Gray Jay	"	"
Common Raven	"	Infrequent
Mountain Chickadee	"	Common
Dipper (Water Ouzel)	"	Infrequent
Robin	"	Common
Wheatear	Wheatear Ridge	Infrequent
Hermit Thrush	Ecoreserve	"
Gray-cheeked Thrush	"	"
Swainson's Thrush	"	"
Ruby-crowned Kinglet	"	Common
Golden-crowned Kinglet	"	Infrequent
*Water Pipit	Fire Flats	"
Cedar Waxwing	Ecoreserve	"
Warbling Vireo	"	"
Solitary Vireo	"	"
Wilson's Warbler	"	Common
Yellowthroat	"	"
Blackpoll Warbler	"	Infrequent
Orange-crowned Warbler	"	"
Black-and-white Warbler	"	"
Yellow-throated Warbler	"	"
Rusty Blackbird	"	"
Western Tanager	"	"
White-winged Crossbill	"	"
*Smith's Longspur	Fire Flats	"
Slate-colored Junco	Ecoreserve	Common
White-crowned Sparrow	"	"
Tree Sparrow	"	"
Gray-crowned Rosy Finch	"	"
Savannah Sparrow	"	"
Lincoln's Sparrow	"	"
Le Conte's Sparrow	"	"
Lapland Longspur	"	Infrequent

42 - 7 = 35

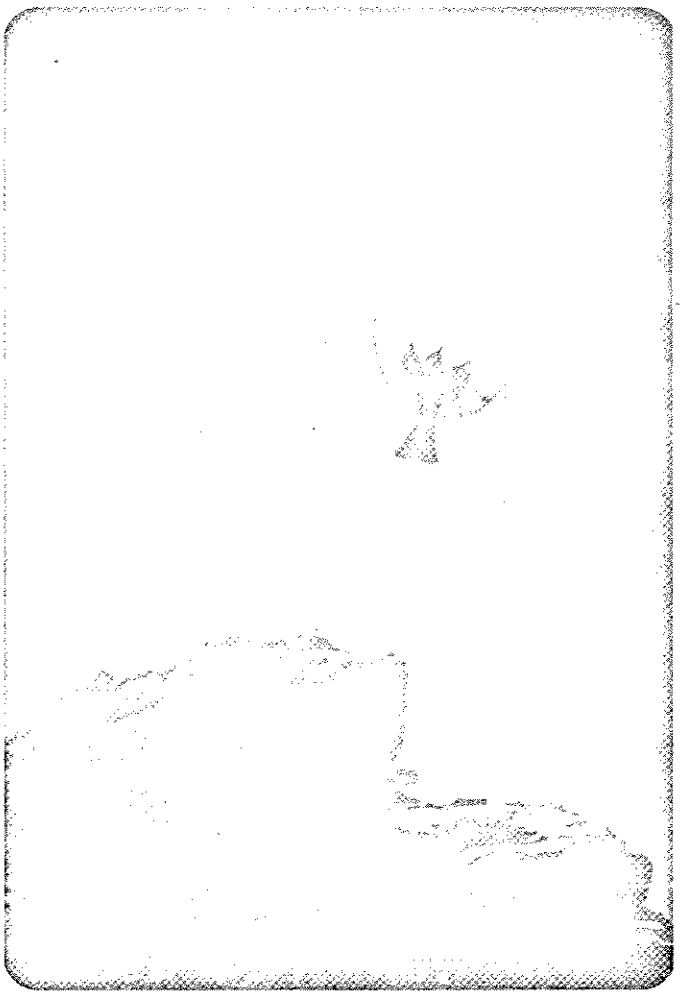

Fig. 15

Say's Phoebe near nest on (Ochre Cliffs) rock face. Three pairs of these birds nested here.

The following birds were sighted by Rosemary Fox during her hikes in the Klahowya Lake area of the Park. Asterisks(**) indicate species not mentioned in the preceding list.

SPECIES	LOCATION	OCCURRENCE
Common Loon	Klahowya Lake	Seen twice
**Arctic Loon	" "	Seen once
**Canada Geese	Stikine Valley	Flock of a dozen
Green-winged Teal	Klahowya Lake	A few
Blue-winged Teal	" "	-
White-winged Scoter	" "	Several
Surf Scoter	Klahowya Creek	Two females
Golden Eagle	-	Seen several times
Spruce Grouse	-	-
Ptarmigan	-	-
Spotted Sandpiper	-	Common
**Solitary Sandpiper	-	Couple of times
**Wandering Tattler	Upper Ross	One seen
**Northern Phalarope	Stikine Valley	One seen
Herring Gull	Klahowya Lake	-
**Bonaparte Gull	" "	Saw six once
Hummingbird	" "	Saw several times
Horned Lark	Tuaton Mountain	-
Gray Jay	-	-
Raven	Klahowya Lake	Seen once
Dipper	-	-
Robin	-	-
Hermit Thrush	-	-
Water Pipit	-	-
Waxwing	Klahowya Lake	-
Rusty Blackbird	Stikine Valley	-
**Pine Grosbeak	Klahowya Lake	-
Gray-crowned Rosy Finch	Higher elevations	Couple of times
Tree Sparrow	-	Common
**Golden-crowned Sparrow	-	Common
**Snow Bunting	Higher elevations	Several times

SPECIES OF BIRDS OBSERVED IN THE SPATSIZI AREA

JULY 8 TO AUGUST 12, 1959

C. Guiget

Common Loon
Mallard
Pintail
Green-winged Teal
Barrow's Goldeneye
Harlequin Duck
Surf Scoter
Sharp-shinned Hawk
Golden Eagle
Marsh Hawk
Peregrine Falcon
American Kestrel
Blue Grouse
Spruce Grouse
Willow Ptarmigan
Rock Ptarmigan
White-tailed Ptarmigan
Semipalmated Plover
American Golden Plover
Western Sandpiper
Least Sandpiper
Solitary Sandpiper
Lesser Yellowlegs
Herring Gull
Mourning Dove
Pygmy Owl
Short-eared Owl
Rufous Hummingbird
Say's Phoebe
Olive-sided Flycatcher
Horned Lark
Tree Swallow
Gray Jay
Steller's Jay
Common Raven
Boreal Chickadee
Red-breasted Nuthatch
American Robin
Townsend's Solitaire
Water Pipit
Northern Shrike
Gray-crowned Rosy Finch
Pine Siskin
Dark-eyed Junco
Tree Sparrow
Chipping Sparrow
White-crowned Sparrow
Golden-crowned Sparrow
Lincoln's Sparrow
Lapland Longspur

4.12 Fish

This assessment of the fishing is based on personal angling results and reports of fishing quality of other fishermen contacted during the study. Fishing in the ecoreserve area was very poor with streams and lakes subject to heavy siltation and extreme fluctuation of water levels. Small rainbow trout (Salmo gairdneri) were caught in Avalanche Creek and in Gladys Lake. These did not seem too numerous as indicated by general lack of fish-preying birds and mammals. Fishing on Gladys Lake was attempted with both spinners and fly for approximately 3 hours to no avail other than a 6 inch Rainbow trout.

By contrast Mink Creek and Coldfish Lake were a highly productive stream and lake. Rainbow trout ranged in weight on the average from 1 - 3 1/2 lbs. while Arctic grayling (Thymallus arcticus) averaged from 1 - 2 lbs. Populations of Burbot (Lota lota) are known to exist in Coldfish Lake as well as Lake Trout (Salvelinus namayoush). The Lake trout are angled in the eastern portion of the lake close to the Mink Creek outflow.

Stomach analysis of the Rainbow trout and Arctic grayling yielded fresh water snails, an assortment of air borne flies and mosquitoes and a light green fresh water shrimp. Representatives of the families Coregonidae (Whitefishes), Catostomidae (Suckers) and Cyprinidae (Minnows) were not found but their presence is likely.

4.13 Game Enforcement in Gladys Lake Area

The Ecological Reserve and Wilderness Park are in a remote, wilderness situation. No roads, towns or power lines as yet blemish its boundaries. No radiophone communication exists to the ecoreserve and communication into the Park area exists only to Coldfish Lake

and Hyland Post. The Stewart-Cassiar Highway goes past Eddontenajon Lake which is approximately 20 minutes fixed-wing flying time from Gladys Lake. The net result being that access to the area is difficult. When the British Columbia Railway completes its Dease Lake extension along the western boundary this will then be the closest access to the ecoreserve other than aerial flight.

Current hunting pressures come from the hunting camp at Coldfish Lake (run by Howard Paish) which caters mostly to non-resident hunters and from resident hunters themselves. Gladys Lake was closed to hunting this past 1975 season and will remain closed as long as the Ecological Reserve exists. The ecoreserve attempts to set aside the area from any habitat disturbance and hunting pressure is the factor which seems to have reduced the numbers of animals that would be normally found in the ecoreserve. The ecoreserve represents only a fraction of the total area encompassed in the wilderness Park which will not be closed to hunting but will receive much closer management of this recreational impact.

The need for better 'game' law enforcement in the Gladys Lake region is a problem that has been generally applicable to the rest of British Columbia - too large an area with too few individuals and funds to properly patrol it. In a letter to the Sierra Club May 26, 1975 - Dr. J. Hatter, Director, Fish and Wildlife Branch states, "We would like to go there (Spatsizi) more often, and should, but are limited to about one patrol per year."

Problems arose concerning notice of the hunting closure of the ecoreserve during our study. Uninformed resident hunters

flew into the ecoreserve area with the intent of hunting and in some cases did so regardless of the closure. Boundaries laid out for the hunting closure were not well defined. When organizations such as air charter companies tried to get information about the closure, confusion often resulted.

Better regulation enforcement could be better effected in this area by:

1. A clearly defined boundary of the ecoreserve boundary making clear the fact that the area is closed to hunting.
2. More funds allotted to enforcement and research personnel of the Fish and Wildlife Branch to establish numbers, locations of critical ranges and migration routes of ungulates present and to enforce the proper reasonable harvest of these animals. In the case of Stone sheep and mountain goat this is especially critical.
3. Inform air charter companies and the general public well in advance as to hunting closures and regulation changes.
4. Monitor and meet flights out of Spatsizi wherever possible to aid in management.
5. Carry out fisheries inventory and set catch limits that will ensure survival of the resident fish populations in the face of increased fishing pressures from guiding operations with smoke-house facilities. This method of catch preservation allows limits of fish to be taken right from the day of arrival in the Park and indeed some resident guides often offer this courtesy to their clients by advertisement in other areas of B. C.

5.0 Conclusions

1. The ecoreserve boundary protects sufficient habitat for mountain goats to a degree that the present population should be able to maintain and even increase its numbers. This is concluded on the basis that emigration will not occur on a significant level, that hunting will not occur within the ecoreserve, and natural predation will not be a limiting factor to population growth.

2. Major numbers of mountain goats seemed to have vanished as a result of hunting pressure within the boundaries of the ecoreserve. Of particular note is the absence of a large band which used to frequent Guardian (Lick) Mountain.

3. Not enough is understood about seasonal movement patterns of mountain goat populations but bands of mountain sheep appear to have wide range movement during summer months. This could be more fully understood by an intensive study of this animal in the reserve area.

4. The current estimated population of mountain goat within the ecoreserve boundaries is 20 individuals.

5. The present ecoreserve boundaries are not adequate to properly protect populations of Stone sheep. No significant ram bands exist within the ecoreserve. These will perhaps develop with time. Owing to the emigration tendency of the Stone sheep rams, these individuals would be vulnerable to hunting pressure during hunting season along the present boundaries on heights of land. A more natural boundary is needed for alpine animal protection.

6. A valuable maternity area for Stone sheep and Osborn caribou has been omitted from ecoreserve status by the exclusion of the Cullivan Creek area. The boundaries should have preferably embraced range in this area for ram summering territory as well as lamb-ewe maternity zones.

7. The estimated population of Stone sheep within the ecoreserve boundaries as of August 1975 is 40 individuals based on summer sightings.

8. Caribou populations within the ecoreserve boundaries are low, estimated at less than 30 individuals. Little, optimum habitat is set aside within the Ecological Reserve boundaries although this is more adequately protected by the wilderness Park.

9. More information should be gathered on movement trends of Osborn caribou before protective zones are finalized. The northern borders of the wilderness Park are unacceptable at present as they exclude important wintering areas for Osborn caribou along the Stikine River valley bottom.

10. The Preliminary Assessment of Ungulate Land Capability on Proposed Spatsizi Wilderness Area conducted by the Environmental Land Use Secretariat appears accurate on the scale it was assessed at. More intensive research would better refine these lines. Not enough is understood of ungulate movement patterns to more precisely define these zones based on present data alone.

6.0 Types of Wildlife Research that could be done in Ecological Reserve

1. Because of the nature of Marmot Valley (a relatively enclosed unit) a good opportunity exists to study the population of Hoary Marmots that exist here. Individuals could be readily identified and predation upon individuals could be studied. Several natural vantage points permit observations without a lot of disturbance to the colonies.

2. An in-depth look at the nature of the mineral licks existing in the area: Assessing what animals use the licks relating to season, weather, frequency, etc.

3. An inquiry into the status of the mule deer in this region would be of interest. e.g. band at Highland Post, individuals on the Klappan River lead a marginal existence.

4. A lake survey of Gladys Lake and Coldfish Lake to find out fish species and their distribution. An inquiry into the high productivity of the mouth of Mink Creek in relation to Gladys Lake and the rest of Coldfish Lake.

5. Investigation of the factors which make Gladys Lake an excellent winter range. Related to moose, sheep, caribou, etc.

6. Ongoing bird reports from researchers.

7. Caribou summer and winter movement trends throughout the Park system with adjacent Tatlatui Park included.

8. Study of Mtn. sheep and Mtn. goat populations and the rate and means by which they repopulate the Gladys Lake area.

9. The effect of predators upon the natural prey populations of the Reserve.

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APPENDIX I

Brief Outline of Plant Community Types - J. Pojar

I. Subalpine Zone - above the continuous forest, dominated by tall shrubs and scattered trees

A) forest communities

(1) lodgepole pine forest (not much actually within ecoreserve)
(2) deciduous scrub forest (brule vegetation)
- includes #2, 3, 12 of following pages
(3) white spruce closed forest (#4 & 5)
(4) white spruce - willow - birch open forest/scrub (#6 & 7)
(5) subalpine fir forest (#8, 9, 10)

B) shrub communities

(6) alluvial willow thickets (#13, 16)
(7) willow - dwarf birch scrub (#14, 15)
(8) common juniper - bearberry - grass (#17)

C) herb communities

(9) fern - lichen - moss talus and rubble slopes (#18)
(10) bluegrass - sedge - sage - cinquefoil steppe grassland (#19)
(11) fescue bunchgrass - forb subalpine grassland (#20, 21)
(12) cow parsnip meadows (#22)

D) wetlands

(13) white spruce - willow - sedge - moss swamps (#11)
(14) sedge fens (#23)

II. Alpine Zone - at lower elev., mosaic of low shrubs - heath - krummholz; at higher elev., alpine tundra and rock, snow, ice

(1) subalpine fir krummholz (#1)
(2) dwarf birch scrub (#2)
(3) alpine willow thickets (#3)
(4) alpine heath (#4 & 5)
(5) bunchgrass - sedge - lichen alpine tundra (#6 & 7)
(6) sheep and goat "saddles" (#8)
(7) dwarf willow - grass - sedge - cushion plant - lichen alpine tundra (#9 & 10)
(8) alpine seepage, flush, snowbed, and streambank vegetation (#11)
(9) alpine scree, talus, and ledge vegetation (#12)
(10) alpine fellfield (#13)

Habitat Features and Characteristic Species of the Plant Community Types

A. Subalpine Zone

Forest Communities

1) Pinus contorta - Betula glandulosa - cryptogams
- lodgepole pine forest, usually on valley floor outwash and alluvium, or south-facing lower slopes
- open forest with moderately developed shrub layer, and well developed ground cover of mosses and lichens (especially Cladoniae)
- seral; fire history; spruce and, to a lesser extent, subalpine fir coming up underneath
- submesic, (Mesic); podzolic soils, coarse-textured, rapidly drained

Pinus contorta, Picea glauca, Betula glandulosa, Salix glauca, Empetrum nigrum, Vaccinium vitis-idaea, V. caespitosum, Linnaea borealis, Festuca altaica, Lupinus arcticus, Mertensia paniculata, Pleurozium schreberi, Dicranum fuscescens, Peltigera aphthosa, P. malacea, Cladonia spp., Cladina spp., Polytrichum juniperinum.

Forest Communities

2) Populus tremuloides - Arnica cordifolia - Festuca altaica
- aspen forest and scrub on south slopes of valley bottom moraines and eskers, or steep, generally south-facing, colluvial, lower mountain slopes
- open forest to fairly dense scrub; shrub layer poorly to moderately developed; herb layer well developed; moss layer* sparse
- includes "pygmy forest" on steep, colluvial slopes; stunted, gnarled, young aspens with pole-size trunks (ave. ht. 4 m, dbh 5 cm, most probably < 50 yrs. old)
- seral; fire history; spruce slowly coming up underneath in some stands
- moderate to heavy snow cover, but early melt-off
- submesic, subxeric; soils generally shallow, with dark surface horizons (chernozem - like to(?) lithic brunisols)

Populus tremuloides, Salix scouleriana, Shepherdia canadensis, Rosa acicularis, Viburnum edule, Salix glauca, Festuca altaica, Poa interior, Arnica cordifolia, Delphinium glaucum, Arctostaphylos uva-ursi, Juniperus communis, Linnaea borealis.

Forest Communities

3) Populus balsamifera - Salix scouleriana - Epilobium angustifolium
- poplar "pygmy forest" on steep, colluvial, generally south-facing lower slopes
- often occurs with aspen "pygmy forest", but there are few mixed stands
- dense forest/scrub of stunted, gnarled, young poplars, with a poor shrub layer, but very well developed, lush herb layer, dominated by broad-leaved forbs; moss layer poor to lacking

* the moss layer refers to the ground cover of mosses, liverworts, and lichens

- seral; fire history; moderate to heavy snow cover, but early melt-off
- mesic; soils shallow, colluvial regosols - lithic brunisols; some downslope seepage apparent

Populus balsamifera, Salix scouleriana, Epilobium angustifolium, Thalictrum occidentale, Heracleum lanatum, Delphinium glaucum, Aquilegia formosa, Bromus ciliatus.

Forest Communities

4) Picea glauca - Equisetum arvense - moss
- spruce forest on stabilized alluvial terraces along major streams and on deltaic fans of smaller mountain creeks
- closed forest of moderate density and relatively good growth; shrub and herb layer sparse to moderate; moss layer very well developed, carpet-like
- subhygric-hygric; soils gleyed alluvial regosols, developed on medium to fine, recently deposited alluvium; heavy snow cover

Picea glauca, Salix barclayi, S. planifolia, Ribes triste, Equisetum arvense, E. pratense, E. scirpoides, Petasites frigidus, Hylocomium splendens, Peltigera aphthosa, Mnium sp., Drepanocladus uncinatus.

Forest Communities

5) Picea glauca - Arnica cordifolia - Cornus canadensis - moss
- spruce forest best developed on gradual north and east-facing lower slopes, as along the southwest shore of Coldfish Lake
- closed forest, stocking relatively dense; shrub layer sparse; herb layer sparse to moderate; moss layer very well developed, carpet-like
- mesic to (subhygric); soils deep, podzolic, developed on till; soil cool, moist,(+)permafrost?

Picea glauca, Abies lasiocarpa occasional, Arnica cordifolia, Mertensia paniculata, Cornus canadensis, Pyrola secunda, Linnaea borealis, Hylocomium splendens, Pleurozium schreberi, Peltigera spp.
- heavy snow cover

Forest Community

6) Picea glauca - Salix glauca - Betula glandulosa
- spruce - willow - birch open forest is the commonest forested community type within the proposal
- occurs on the valley bottoms and lower mountain slopes generally, with best development on south slopes
- open forest, trees widely spaced; shrub layer of dense thickets of willow and dwarf birch; herb layer sparse to moderate; moss layer well developed, includes numerous species of lichens
- mesic, submesic, subhygric; soils humo-ferric podzols or dystric brunisols, usually developed on glacial till; soil cool, moist; subsoil frozen till mid-summer
- snow cover heavy to moderate

Picea glauca, Salix glauca, Betula glandulosa, Festuca altaica, Lupinus arcticus, Mertensia paniculata,

Vaccinium caespitosum, V. vitis-idaea, Pedicularis labradorica, Epilobium angustifolium, Pleurozium schreberi, Hylocomium splendens, Dicranum fuscescens, Polytrichum juniperinum, Cladonia spp., Cladina spp., Peltigera spp., Cetraria spp., Stereocaulon tomentosum.

Forest Community

7) Picea glauca - Betula glandulosa - Empetrum nigrum
- spruce - birch open forest, common (but less so than (6) on lower north and east slopes
- open forest, trees widely spaced (but denser than in (6); shrub layer of dense thickets of dwarf birch; herb layer sparse; moss layer very well developed
- mesic subhygric; soils humo-ferric podzols, developed on glacial till and colluvium; soil cold, moist; (+)permafrost, or subsoil frozen till mid-summer
- heavy snow cover

Picea glauca, Betula glandulosa, Ledum groenlandicum, Empetrum nigrum, Vaccinium vitis-idaea, Linnaea borealis, Lupinus arcticus, Artemisia arctica, Pedicularis labradorica, Festuca altaica, Hylocomium splendens, Pleurozium schreberi, Ptilium crista-castrensis, Cladonia spp., Cladina spp., Peltigera spp., Nephroma arcticum.

Forest Community

8) Abies lasiocarpa - moss
- subalpine forest of mid-slopes, with best development on north and east slopes (e.g., lower Flower Ridge)
- closed forest, trees relatively dense; shrub layer sparse; herb layer sparse; moss layer very well developed
- mesic, (subhygric); soils relatively deep, podzolic, developed on glacial till; soil cold, moist; heavy snow accumulation

Abies lasiocarpa (frequently layering), Ribes glandulosum, Artemisia arctica, Vaccinium vitis-idaea, Mertensia paniculata, Stellaria calycantha, Pyrola secunda, Moneses uniflora, Cornus canadensis, Linnaea borealis, Hylocomium splendens, Dicranum fuscescens, Pleurozium schreberi, leafy liverwort, Polytrichum sp., Cladonia spp., Nephroma arcticum, Dactylina arctica, Peltigera spp., Cladina mitis.

Forest Community

9) Abies lasiocarpa - Betula glandulosa - Empetrum nigrum
- open subalpine forest of steep, moist, north and east mid-slopes (e.g., northeast flank of Ovis Ridge)
- trees widely spaced, poorly growing; shrub layer dense; herb layer moderately developed; moss layer well developed
- subhygric, (hygric); soils gleyed podzols; soil cold, wet
- heavy snow accumulation

Abies lasiocarpa, Betula glandulosa, Salix glauca, Sedum groenlandicum, Empetrum nigrum, Vaccinium vitis-idaea, Nephroma arcticum, Dactylina arctica, Lobaria linita, Cladonia spp.

Forest Community

10) Abies lasiocarpa - Cassiope mertensiana - Rubus pedatus
- forest clumps in the tree clump-heath complex of the subalpine parkland; local within the proposal, best developed in Castor Valley above Ursus Creek; on some upper valley bottoms and midslopes of the higher valleys
- trees in dense clumps, often stunted; shrub layer sparse under forest, very well developed where trees are stunted; herb layer well developed, dominated by woody mats of heathers; moss layer well developed
- mesic; soils podzolic or minipodzolic
- very heavy snow accumulation

Abies lasiocarpa, Cassiope mertensiana, Vaccinium membranaceum, Empetrum nigrum, Rubus pedatus, Cornus canadensis, Linnaea borealis, Lycopodium annotinum, L. Alpinum Vaccinium caespitosum, Rhytidiopsis robusta, Dicranum fuscescens, Cladina mitis, alpestris, Cladonia spp.

Swamps, Bogs

11) (Picea glauca) - Salix barclayi - Betula glandulosa - Carex aquatilis
- subalpine swamps and seepage areas; valley bottoms, depressions in moraine fields, bases of slopes, lake margins
- trees often lacking; if present, widely scattered and usually of poor growth; shrub layer of willows and dwarf birch dense to moderate; herb layer moderately developed, hummocky; moss layer well developed
- hygric, subhydric; soils organic, or gleyed podzolic

Picea glauca, Salix barclayi, glauca, barrattiana, Betula glandulosa, Ledum groenlandicum, Carex aquatilis, disperma, vaginata, capillaris, media, Rubus acaulis, R. chamaemorus, Petasites frigidus, P. sagittatus, Epilobium palustre, Empetrum nigrum, Arctostaphylos rubra, Pedicularis sudetica, Tomenthypnum nitens, Campylium stellatum, Aulacomnium palustre, Sphagnum spp., Peltigera spp.

Shrub Community

12) Salix scouleriana
- tall willow scrub of lower mountain and moraine slopes; best developed on southerly exposures, often accompanying aspen/poplar pygmy forests
- dense thickets dominated by clumps of the tall shrub/small tree, Salix scouleriana; herb layer well developed; moss layer sparse
- seral, fire history; moderate to heavy snow cover, but early melt-off
- mesic, submesic; soils lithic brunisols, developed over colluvium or till

Salix scouleriana, S. glauca, Viburnum edule, Potentilla fruticosa, Lupinus arcticus, Arnica cordifolia, Epilobium angustifolium, Linnaea borealis, Festuca altaica, Pleurozium schreberi, Peltigera canina, P. spuria.

Shrub Community

13) Salix glauca - S. barclayi - S. planifolia
- willow thickets, in the valley bottoms on alluvial fans, meander plains, lakesides; a common and widespread community type
- shrub layer well developed, usually with some tall shrubs; herb layer moderately developed, diverse; moss layer moderately developed
- subhygric, hygric; soils gleyed regosols, gleysolic A-C (Rendzina warp soil) developed over coarse alluvium
- moderate snow cover

Salix glauca, barclayi, planifolia, barrattiana, Betula glandulosa, Potentilla fruticosa, Petasites frigidus, Polygonum viviparum, Delphinium glaucum, Polemonium acutiflorum, Pedicularis sudetica, Senecio lugens, Luzula parviflora, Carex maclaviana, Phleum alpinum, Poa palustris, Sanguisorba stipulata, Tomenthypnum nitens, Aulacomnium palustre, Hylocomium splendens, Peltigera aphthosa, Cladonia gracilis, Lobaria linita, Polytrichum strictum.

Shrub Community

14) Salix glauca - Betula glandulosa - Festuca altaica
- widespread community type on well-drained valley bottoms, lower slopes, and moraine fields; general except on steep, north slopes
- shrub layer well developed, dense, usually 1-2 m. high; herb layer sparse to moderate; moss layer moderately to well developed, with many lichens
- mesic, submesic; soils minipodzolic, developed on well drained colluvium, till, or alluvium
- moderate snow cover

Salix glauca, Betula glandulosa, Lupinus arcticus, Epilobium angustifolium, Vaccinium caespitosum, Mertensia paniculata, Festuca altaica, Pleurozium schreberi, Cladina spp., Cladonia spp., Peltigera spp., Stereocaulon sp.

Shrub Community

15) Betula glandulosa - Artemisia arctica - Hylocomium splendens
- dwarf birch thickets; widespread, especially on north-facing mid- and upper slopes
- shrub layer extremely well developed, usually 0.5 - 1.5 m. tall, dominated by dwarf birch; herb layer sparse; moss layer usually well developed
- mesic - (subhygric); soils shallow, coarse, minipodzols over moderately drained colluvium and till
- moderate - heavy snow cover

Betula glandulosa, Salix glauca, Empetrum nigrum, Linnaea borealis, Vaccinium vitis-idaea, Artemisia arctica, Stellaria monantha, Calamagrostis canadensis, Festuca altaica, Mertensia paniculata, Hylocomium splendens, Dicranum fuscescens, Cladonia spp., Peltigera aphthosa, Nephroma arcticum, Pleurozium schreberi.

Shrub Community

16) Salix (alaxensis, planifolia) - Epilobium latifolium - Drepanocladus uncinatus
- riparian willow thickets and other early successional stages on recently deposited alluvium
- on active meander floodplains of low gradient streams at lower elevations (e.g., Connector Creek), and ascending in narrow strips along steep mountain creeks
- several successional stages depending on the age and stability of substrate: the most advanced stages have dense thickets or even tree-size stands of willows, with a moderately developed herb layer, and sparse to moderate moss layer; earlier stages have low or seedling shrubs with well-moderately developed herb layer, and sparse moss layer
- hygric; soils alluvial regosols, gleyed regosols; alluvial deposits heterogeneous in size and texture

Salix alaxensis and planifolia (tall shrubs/small trees), S. barclayi, S. glauca, Potentilla fruticosa, Epilobium latifolium, Parnassia kotzebuei, Equisetum arvense, E. variegatum, Artemisia tilesii, Astragalus alpinus, Juncus balticus, Arctagrostis latifolia, Deschampsia caespitosa, Carex aurea, Drepanocladus uncinatus, Stereocaulon tomentosum, Cladonia pyxidata, C. gracilis, Aulacomnium palustre, Mnium sp.

Note: Salix alaxensis is almost invariably heavily browsed

Shrub Community

17) Juniperus communis - Arctostaphylos uva-ursi - grass association
- fairly common on steep, south-facing colluvial slopes, rocky ridges, stabilized talus slopes, etc.; lower to mid-slope
- well developed prostrate shrub/herb stratum dominated by the above two species and various grasses; moss layer sparse, with typically xerophytic cryptogams
- xeric, subxeric; soils shallow (lithic brunisols?) over colluvium
- light, discontinuous snow cover, or largely snow free

Juniperus communis, Arctostaphylos uva-ursi, Rosa acicularis, Potentilla fruticosa, Festuca altaica, F. saximontana, Poa glauca, Koeleria cristata, Agropyron caninum, Trisetum spicatum, Saxifraga tricuspidata, Erigeron compositus, Oxytropis campestris, Anemone multifida, Antennaria rosea, A. umbrinella, Peltigera canina, Cladonia pyxidata, Cornicularia aculeata, Cetraria spp., Polytrichum sp., ?Tortula ruralis.

Herb Community

18) Dryopteris fragrans - lichen - moss
- an early successional association, uncommon on partially stabilized, south-facing talus and rubble slopes below 4800 ft. (1460 m.)
- much exposed rock; herb layer sparse; moss layer moderately to very well developed, with clumps of mosses and fruticose lichens, and numerous crustose lichens
- xeric; little or no soil (organic matter accumulates on ledges and flat boulders and in crevices)

Dryopteris fragrans, Saxifraga tricuspidata, Festuca saximontana, Cladina alpestris, Stereocaulon spp., Cetraria nivalis, Rhizocarpon spp., Rhacomitrium canescens.

Herb Community

19) Poa glauca - Carex supina - Artemisia spp. - Potentilla spp.
- boreal steppe grassland, rare on very steep, south-facing, colluvial slopes between 4800 - 5500 ft. (1460 - 1675 m.), usually below 5200 ft. (1585 m.); within the Ecological Reserve area, occurs only on south faces of Ghost and Guardian Mountains, and the southwest face of Ochre Cliffs
- herb layer moderately to well developed; moss layer sparse, with xerophytic cryptogams
- xeric; soils very shallow, chernozem-like
- largely snow free; important sheep and goat winter range

Poa glauca, Carex supina, C. anthoxanthea, C. petasata, Festuca altaica, F. saximontana, Koeleria cristata, Agropyron caninum, Trisetum spicatum, Artemisia borealis, A. michauxiana, Potentilla pennsylvanica, P. hookeriana, P. nivea, Oxytropis campestris, Saxifraga tricuspidata, Cerastium beeringianum, Androsace septentrionalis.

Herb Community

20) Festuca altaica subalpine grassland
- widely distributed, usually below 5300 ft.(1615 m.); on south faces of moraines and eskers and alluvial terraces, at the bottom of rapidly drained frost pockets in moraine fields, on south-facing, lower and mid-mountain slopes; usually patchy, within the Ecological Reserve area extensive only in Kettlehole Pass
- conspicuously dominated by Festuca altaica, the fescue bunchgrass of these northern pastures; the well developed herb layer contains numerous species of other grasses and forbs as well; moss layer sparse (usually) to moderate, coverage greater with more xeric conditions
- mesic, submesic, occasionally subxeric; soils chernozem-like to eutric brunisols; well drained; shallow or, if deep, fine-textured
- usually light, discontinuous snow cover, or largely snow free on steep, south-facing sites; moderate, continuous snow cover on sites in the broad upper valleys and frost pockets

Festuca altaica, Phleum alpinum, Agropyron trachycaulum, Trisetum spicatum, Luzula parviflora, Carex maclaviana, Poa glauca, Potentilla diversifolia, Myosotis alpestris, Fragaria virginiana, Aconitum delphinifolium, Achillea millefolium, Delphinium glaucum, Rumex acetosa, Draba aurea, Gentiana propinqua, Epilobium angustifolium, Stellaria monantha, Solidago multiradiata, Peltigera canina, ?Abietinella abietina, Cetraria cucullata, C. islandica, Cladina mitis, Cladonia spp.

Herb Community

21) Festuca altaica - Luzula parviflora - Carex podocarpa - Aconitum delphinifolium - Sanguisorba sitchensis - Rumex acetosa
- lush grass-forb subalpine meadows; uncommon; in sites moister than those of (20); best development on gentle lower slopes along broad ridges or the sides of wide valleys (e.g., Flower Ridge, vicinity of Bates Camp)

- herb layer very well developed, lush mixture of grasses and broad-leaved forbs, moss layer sparse to lacking
- (mesic), subhygric, (hygric); soils ? humic gleysols, ? gleyed eutric brunisols; deep, poorly drained
- snow cover moderate to deep, continuous

Festuca altaica, Luzula parviflora, Phleum alpinum, Carex podocarpa, Aconitum delphinifolium, Sanguisorba sitchensis, Rumex acetosa, Polemonium acutiflorum, Myosotis alpestris, Epilobium angustifolium, Potentilla diversifolia, Thalictrum occidentale, Veronica wormskjoldii, Tomenthypnum nitens, Mnium sp., Peltigera aphthosa, Agoseris aurantiaca, Valeriana dioica, V. sitchensis.

Herb Community

22) Heracleum lanatum seepage meadows
- cow parsnip meadows are local on steeply to moderately sloping alluvial fans of mountain creeks, and on sloping seepage areas, generally with southern exposures
- herb layer lush, extremely well developed, dominated by cow parsnip and other broad-leaved forbs; moss layer sparse or lacking
- hygric; soils gleyed regosols or rego humic gleysols; developed on coarse alluvium or colluvium
- snow cover moderate to deep

Heracleum lanatum, Senecio triangularis, Valeriana sitchensis, Epilobium angustifolium, Delphinium glaucum, Thalictrum occidentale, Luzula parviflora, Poa pratensis, Bromus sp., Calamagrostis canadensis, Phleum alpinum, Drepanocladus uncinatus, Mnium sp., Bryum sp., Tomenthypnum nitens.

Herb Community

23) Carex (rostrata, aquatilis, saxatilis) - Drepanocladus uncinatus
- sedge fens; relatively uncommon, in poorly drained depressions in moraine fields; filling in kettlehole lakes, oxbows, backwaters, and beaver sloughs
- herb layer moderate to dense; moss layer sparse to moderate; open water often present
- hydric, subhydric; soils organic, humic gleysols, rego humic gleysols

Carex rostrata, C. aquatilis, C. limosa, C. saxatilis, Hippuris vulgaris, Potentilla palustris, Epilobium palustre, Calamagrostis canadensis, Arctagrostis latifolia, Drepanocladus uncinatus.

B. Alpine Zone

1) Abies lasiocarpa krummholz
- krummholz or "shintangle" on windswept upper slopes and ridges

2) Betula glandulosa thickets
- common on steep or gradual upper slopes, usually between 5500 - 6000 ft. (1675 - 1830 m.)
- dense shrub layer of low (usually< 0.5 m. tall) dwarf birch; herb layer moderately developed; moss layer very well developed
- mesic - (subhygric); soils shallow, coarse
- moderate, continuous snow cover

Betula glandulosa, Salix pulchra, S. glauca, Empetrum nigrum, Vaccinium vitis-idaea, Artemisia arctica, Senecio lugens, Stellaria monantha, S. longipes, Calamagrostis canadensis, Petasites frigidus, Poa arctica, Hylocomium splendens, Polytrichum juniperinum, P. strictum, Peltigera aphthosa, P. membranacea, Stereocaulon tomentosum, Nephroma arcticum, Lobaria linita, Dactylina arctica, Cetraria cucullata, nivalis, islandica, Cladina alpestris, rangiferina.

3) Salix barrattiana thickets
- common on poorly drained, level, alpine valley bottoms, or (usually) gently sloping alluvial fans, or within meander plains of low gradient alpine streams
- dense shrub layer (usually ca. 1 m. tall); sparse - moderate herb layer; moderately developed moss layer.
- hygric; soils humic gleysolics (black muck) Warp Anmoor, on fine to moderately coarse alluvium (generally finer than that of the subalpine alluvial willow thickets)
- heavy, continuous snow accumulation

Salix barrattiana; occasionally, S. glauca, pulchra, alaxensis, Carex podocarpa, Luzula parviflora, Poa alpina, Anemone parviflora, richardsonii, Polemonium acutiflorum, Senecio lugens, triangularis, Veronica wormskjoldii, Pedicularis sudetica, Rubus acaulis, Selaginella selaginoides, Hylocomium splendens, Mnium sp., Hypnum sp., Tomenthypnum nitens, Peltigera aphthosa, malacea, membranacea.

Note: Salix barrattiana showed little or no evidence of browsing, perhaps because of its oily-glandular stipules

4) Cassiope tetragona - Salix reticulata - Dryas integrifolia
- alpine heath; widespread on steep to moderate upper slopes, with best development on north and east slopes with snow accumulation
- dwarf shrub/herb layer moderately to well developed; moss layer well developed
- mesic, subhygric; soils alpine semipodzols or lithic humisols; seepage and solifluction common; ice lenses may be present in subsoil; soil cold, moist
- moderate to deep, continuous, long-lasting snow cover

Cassiope tetragona, Dryas integrifolia, Salix reticulata, (polaris, arctica), Vaccinium uliginosum, vitis-idaea, Empetrum nigrum, Artemisia arctica, Anemone parviflora, Polygonum viviparum, Pedicularis capitata, Pyrola grandiflora, Draba longipes, Poa arctica, Carex podocarpa, Oxyria digyna, Hylocomium splendens, Dicranum fuscescens, ? Rhytidium rugosum, Dactylina arctica, Lobaria linita, Cetraria nivalis, cucullata, Lecidea spp., Stereocaulon tomentosum.

5) Cassiope mertensiana - (Phyllodoce empetriformis) - Sibbaldia procumbens - Lycopodium alpinum - Barbilophozia sp.
- alpine (or subalpine) heath; uncommon and local on lee slopes with deep snow accumulation; generally at or just above treeline, among tree islands and krummholz
- dwarf shrub/herb layer well developed; moss layer moderately to well developed
- mesic, subhygric; soils alpine iron humus podzols, alpine sod podzols, or semipodzols; seepage common, solifluction uncommon; soil cool, moist
- deep to very deep, continuous, long-lasting snow cover

Cassiope mertensiana, Phyllodoce empetriformis, Empetrum nigrum, Artemisia arctica, Luetkea pectinata, Sibbaldia procumbens, Hieracium gracile, Juncus drummondii, Luzula parviflora, Solorina crocea, Cetraria islandica, Peltigera membranacea, ? Barbilophozia sp., Dicranum fuscescens, ? Rhytidiopsis robusta.

6) Festuca altaica - lichen (Cladonia spp., Cetraria spp.)
- alpine tundra; fairly common on steep, south-facing upper slopes or exposed crests in the moraine fields of high, broad valleys (e.g., Kettlehole Pass, Danihue Pass, Sanctuary Pass)
- herb layer moderate to abundant dominated by grasses and sedges; moss layer well developed, dominated by lichens
- submesic, subxeric; soils alpine eutric brunisols or chernozem-like colluvial lithosols
- largely snow-free or with light, discontinuous snow cover

Festuca altaica, Hierochloe alpina, Carex microchaeta, Luzula spicata, Poa arctica, Artemisia arctica, Lupinus arcticus, Aconitum delphinifolium, Gentiana glauca, Pedicularis langsdorfii, Antennaria monocephala, Polytrichum sp., Cladina alpestris, Cladonia pleurota, pyxidata, uncialis, Cetraria cuculla, islandica, nivalis, richardsonii, Stereocaulon tomentosum, Cornicularia aculeata, Thamnolia sp.

7) Kobresia myosuroides - lichen
- alpine tundra; rare, only on most exposed, windswept, generally south- or west-facing, convex ridgecrests (e.g., Kobresia Ridge, Ghost Pass, rimrocks of Lupus Ridge)
- herb layer moderately developed, dominated by Kobresia myosuroides; moss layer moderately developed, lichen-dominated
- submesic, subxeric; soils shallow, colluvial regosols (ranker, rendzina)
- snow-free

Kobresia myosuroides, Hierochloe alpina, Carex microchaeta, C. albo-nigra, Festuca brachyphylla, Luzula spicata, Antennaria alpina, Draba nivalis, Salix polaris, Campanula lasiocarpa, Cetraria cucullata, nivalis, Cornicularia aculeata, Thamnolia sp., Physcia muscigena, Lecidea spp., Alectoria pubescens, ochroleuca, Parmelia ? taractica, Polytrichum sp., Rhacomitrium canescens.

8) Poa - Carex - Hierochloe alpina - Potentilla sheep/goat "saddles"
- heterogeneous, zoo-climax alpine tundra, on +/- flat, strongly convex ridge projections or cliff-tops or cave mouths where sheep and goats feed and rest; usually on south or west exposures; vegetation well manured lush and dark green; such sites frequent but very small and local
- herb layer very well developed, usually a thick sward of grasses, sedges, and forbs; moss layer sparse or essentially lacking
- mesic, submesic; soils alpine brunisols or chernozem-like lithosols, rich in nitrogen
- largely snow-free

Poa arctica, alpine, rupicola, Carex supina, albo-nigra microchaeta, Festuca altaica, brachyphylla, Hierochloe alpina, Trisetum spicatum, Agropyron caninum, Potentilla nivea, diversifolia, uniflora, Taraxacum ceratophorum, Antennaria monocephala, Artemisia borealis, arctica, tilesii, Polytrichum sp., Lecidea spp., Cetraria spp.

9) Salix (polaris, reticulata) - Hierochloe alpina - Carex podocarpa - Potentilla hyparctica - lichen
- dwarf willow - grass - sedge - lichen alpine tundra; very common and widespread throughout the area on broad ridges; alpine domes, and in patches on narrow, serrated ridges; usually between 6500 - 7000 ft. (1920 - 2135 m.), descending to 6000 ft. (1830 m.) in some large cirques
- dwarf shrub/herb layer moderate; moss layer moderate to sparse
- mesic, (subhygric); soils shallow, lithic brunisols and humisols
- usually windswept; light, discontinuous to moderate snow cover; soils usually deep freezing; patterned ground frequent

Salix polaris, reticulata, Silene acaulis, Potentilla uniflora, hyparctica, Draba nivalis, Saxifraga nivalis, Polygonum viviparum, Antennaria monocephala, Carex microchaeta, Hierochloe alpina, Poa arctica, Luzula spicata, confusa, tundricola, Polytrichum sp., ? Rhytidium rugosum, Cetraria cucullata, nivalis, islandica, Alectoria pubescens, ochroleuca, Thamnolia sp., Sphaerophorus fragilis, Lecidea spp., Solorina crocea, Stereocaulon tomentosum.

10) Dryas integrifolia - Oxytropis nigrescens - Silene acaulis - lichen
- "cushion plant" alpine tundra, common on exposed, windswept ridgecrests (generally sharply convex) of every aspect
- herb layer sparse to moderate; moss layer sparse; much bare surface area (gravelly scree and rubble)
- submesic, subxeric; soils shallow regosols (ranker, rendzina)
- windswept; snow cover light and discontinuous, or lacking; soils deep freezing; solifluction, stone striping common

Dryas integrifolia, Oxytropis nigrescens, Silene acaulis, Potentilla uniflora, Campanula uniflora, Saxifrage tricuspidata, Oxytropis campestris, Festuca brachyphylla, Kobresia myosuroides, Carex microchaeta, nardina, Draba nivalis, Lupinus arcticus, Cornicularia aculeata, Alectoria pubescens, Cetraria nivalis, cucullata, islandica, Thamnolia sp., Polytrichum sp., ? Tortula.

11) Salix (reticulata, polaris) - Carex spp. - Ranunculus spp. - moss
- alpine seepage, flush, snowbed and streambank vegetation; common and abundant along upper valley bottoms, in snowy cirques, at the bases of slopes, in poorly drained pockets on the high plateaux, and rimming flushes and melting snowbanks; usually not found on southern slopes
- dwarf shrub/herb layer moderately to well developed; moss layer usually very well developed; vegetation surface usually hummocky
- hygric; soils cryic or lithic gleysols and organics; discontinuous permafrost present
- moderate to deep, continuous, late snow cover

Salix reticulata, polaris, Carex podocarpa, scirpoidea, Poa alpina, Ranunculus eschscholtzii, nivalis, pygmaeus, (sulphureus) Saxifraga lyallii, punctata, Corydalis pauciflora, Montia sarmentosa, Oxyria digyna, Petasites frigidus, Caltha leptosepala, Parnassia fimbriata, Epilobium alpinum, Draba longipes, Equisetum variegatum, Senecio lugens, Aulacomnium palustre, Tomenthypnum nitens, Philonotis fontana, Bryum miniatum, Hylocomium splendens.

12) vegetation of moist alpine scree, wet ledges, runnels, crevices, soil pockets in talus slopes, gullies, avalanche chutes, etc.
- such habits general at high elevations throughout the area
- vegetation cover sparse, usually 75% (+) bare rock or rubble
- mesic, subhygric; soils, if present, shallow regosols (rawmark)
- deep, late snow cover

Saxifraga caespitosa, cernua, adscendens, oppositifolia, rivularis, nivalis, punctata, Potentilla uniflora, hyparctica, Erigeron humilis, Draba incerta, alpina, Stellaria monantha, Cerastium beeringianum, Crepis nana, Cardamine bellidifolia, Anemone parviflora, Antennaria monocephala, Taraxacum ceratophorum, lyratum, Ranunculus gelidus, pygmaeus, Silene acaulis, Umbilicaria cylindrica, virginis, Cetraria islandica var.?, C. tilesii, Dactylina arctica, ramulosa, Stereocaulon spp., Parmelia omphalodes.

13) lichen - broken rock alpine fellfield
- common community type of mountain tops, highest ridges, etc. usually above (6800) - 7000 ft. [(2075) - 2135 m.] to altitudinal limit of vegetation
- consists of a large proportion of boulders with lichens, mosses, and occasional, widely scattered cushion plants and other vascular plants
- extensive accumulations of frost-shattered rocks (felsenmeer or mountain-top detritus) on horizontal and gently sloping terrain
- rawmark soils; organic matter removed by wind
- windswept, snow-free or with pockets of accumulation
- patterned ground (boulder garlands, polygons) and gelifraction (frost cracking, splitting, or riving) typical phenomena here

Umbilicaria spp., Cetraria cucullata, nivalis, islandica (A & B) Cornicularia aculeata, normoerica, Parmelia stygia, omphalodes, taractica, Physcia muscigena, Stereocaulon spp., Alectoria pubescens, miniscula, ochroleuca, Dactylina arctica, ramulosa, Lecidea spp., Rhizocarpon spp., Rhacomitrium canescens, Polytrichum sp., Cardamine bellidifolia, Silene acaulis, Saxifraga caespitosa, tricuspidata,

- striking mosaic pattern of vegetation in these areas directly related to snow accumulation pattern
Saxifraga oppositifolia, Potentilla hyparctica, Carex microchaeta, Poa leptocoma, Festuca brachyphylla, Luzula arcuata.

APPENDIX II

PRELIMINARY LIST OF VASCULAR PLANTS FROM SPATSIZI PLATEAU WILDERNESS PARK

The following list mainly comprises species collected by J. Pojar in Spatsizi Plateau Wilderness Park during the summer of 1975. Most of this collection is from the Gladys Lake Ecological Reserve and close surroundings, in the heart of the Park. The list includes additional species mentioned by Szczawinski (1959) and Welsh and Rigby (1971), and a few collections made on the Plateau in 1973 and 1975 by V. J. Krajina. It does not include collections by Welsh et al. from outside Park boundaries. Thus, quite a number of species from the area to the south (Thutade Lake and vicinity) are excluded. Many of the excluded species are to be expected in the southern part of the Park, which needs thorough collection.

It should also be mentioned that the majority of the collections are from above 1200 metres. Many additional lower elevation species are to be expected in the park flora, especially from the major valley bottomlands and lower slopes.

Nomenclature for the most part follows that of Welsh (1974). Hultén (1968) and a number of more specialized treatments were consulted to a lesser extent. The first set of the Pojar collection has been deposited in the Herbarium of the British Columbia Provincial Museum, Victoria, and a second, incomplete set in the Herbarium of the University of British Columbia, Vancouver.

G. G. and G. W. Douglas assisted in identification of *Compositae*, C.-C. Chuang in *Draba*, and T. C. Brayshaw in *Salix*.

	COLLECTION SITE
OPHIOGLOSSACEAE	
Botrychium lunaria (L.) Swartz var. *lunaria*	92, 117, 165
POLYPODIACEAE	
Cryptogramma crispa (L.) R.Br. var. *acrostichoides* (R.Br.) C.B. Clarke	156
Cystopteris fragilis (L.) Bernh.	22
Dryopteris fragrans (L.) Schott.	26
Polystichum lonchitis (L.) Roth	156
EQUISETACEAE	
Equisetum arvense L.	93, 204
" *pratense* Ehrh.	175, 204
" *scirpoides* Michx.	68, 115, 145
" *sylvaticum* L.	115
" *variegatum* Schleich.	72
LYCOPODIACEAE	
Lycopodium alpinum L.	21
" *annotinum* L.	137
" *clavatum* L.	173
" *complanatum* L.	103
" *selago* L.	69
SELAGINELLACEAE	
Selaginella selaginoides (L.) Link	201
" *sibirica* (Milde) Hieron.	156
CUPRESSACEAE	
Juniperus communis L. var. *montana* Ait.	76
PINACEA	
Abies lasiocarpa (Hook.) Nutt.	113
Picea glauca (Moench) Voss	1, 93, 114
Picea ? glauca x *engelmannii*	162
Pinus contorta Dougl. var. *latifolia* Engelm.	196

	COLLECTION SITE
SPARGANIACEAE	
Sparganium minimum Fries	210
POTAMOGETONACEAE	
Potamogeton filiformis Pers.	217
JUNCACEAE	
Juncus arcticus Willd. var. *alaskanus* (Hult.) Welsh	91
" *biglumis* L.	118, 145
" *castaneus* J.E. Smith	91, 141
" *drummondii* E. Meyer	121
" *filiformis* L.	141
" *mertensianus* Bong.	233
" *triglumis* L. var. *albescens* Lange	91, 118, 145
Luzula arcuata (Wahl.) Wahl. var. *unalaschkensis* Buch.	85, 176
" *campestris* (L.) DC. var. *frigida* Buch.	119
" *confusa* Lindeb.	144
" *nivalis* (Laest.) Beurl.	149
" *parviflora* (Ehrh.) Desv.	98, 115
" *spicata* (L.) DC.	83, 101
" *tundricola* Gorodk.	111, 149, 176
" *wahlenbergii* Rupr.	145
CYPERACEAE	
Carex albo-nigra Mack.	61, 97, 123, 154, 168
" *anthoxanthea* Presl	32, 61
" *aquatilis* Wahl.	87, 90, 146, 151, 201, 217
" *atrata* L.	73, 94, 117, 129, 130
" *aurea* Nutt.	151, 217
" *brunnescens* (Pers.) Poir. ssp. *alaskana* Kalela	132
" *canescens* L.	115, 210, 217
" *capillaris* L.	129, 144
" *concinna* R.Br.	184
" *eleusinoides* Turcz.	218
" *deflexa* Hornem.	92
" *dioica* L. ssp. *gynocrates* (Wormskj.) Hult.	230
" *disperma* Dewey	93, 116, 217
" *garberi* Fern. ssp. *bifaria* (Fern.) Hult.	217
" *lachenalii* Schkuhr	87, 108, 145, 197, 207
" *leptalea* Wahl.	142, 217
" *limosa* L.	217
" *loliacea* L.	142
" *maclaviana* d'Urville	89, 92, 112
" *magellanica* Lam.	210

	COLLECTION SITE
CYPERACEAE (Continued)	
Carex media R.Br.	73, 94
" *microchaeta* Holm	101, 105, 106, 109, 122, 176
" *nardina* Fries	24, 167, 232
" *obtusata* Lilj.	186
" *petasata* Dewey	117, 154
" *phaeocephala* Piper	164, 229
" *podocarpa* R.Br.	105, 109, 117, 130
" *praticola* Rydb.	92
" *pyrenaica* Wahl.	177, 216
" *rossii* Boott	184
" *rostrata* Stokes	218
" *saxatilis* L. ssp. *laxa* (Trautv.) Kalela	206, 215, 218
" *scirpoidea* Michx.	129
" *supina* Willd. ssp. *spaniocarpa* (Steud.) Hult.	48, 111
" *tenuiflora* Wahl.	217
" *vaginata* Tausch.	138
Eriophorum angustifolium Honck.	146
" *brachyantherum* Trautv. and Mey.	118
" *callitrix* Cham.	146
" *vaginatum* L.	210
Kobresia myosuroides (Vill.) Fiori and Paol.	83, 106, 123, 143
Scirpus caespitosus L.	60
GRAMINEAE	
?Agropyron boreale (Turcz.) Drobov	Krajina (1975)
Agropyron caninum (L.) Beauv. var. *andinum* (Scribn. and Smith) Pease and Moore	92, 156
" " " " var. *hornemannii* (Koch) Pease and Moore	32, 102, 117, 157
" " " " var. *latiglume* (Scribn. and Smith) Pease and Moore	61, 111, 128, 166
Agrostis scabra Willd.	91, 154
Alopecurus aequalis Sobol.	218
Arctagrostis latifolia (R.Br.) Griseb.	93, 151
Bromus richardsonii Link	97, 192, 213
Calamagrostis canadensis (Michx.) Beauv.	124, 189, 219
" *lapponica* (Wahl.) Hartm.	76, 111, 144, 198
" *purpurascens* R.Br.	107, 143
Danthonia intermedia Vasey	157, 165
Deschampsia caespitosa (L.) Beauv.	151
Festuca altaica Trin.	185
" *brachyphylla* Schult.	84, 111, 123
" *rubra* L.	Szczawinski (1959)
" *saximontana* Rydb.	76, 112
Hierochloë alpina (Swartz) Roem. and Schult.	26, 42
" *odorata* (L.) Beauv.	72, 89
Koeleria nitida Nutt.	32, 92
Phleum alpinum L.	112

	COLLECTION SITE
GRAMINEAE (Continued)	
Poa alpina L.	61, 141
" *arctica* R.Br.	83, 87, 111, 144, 145, 157,
" *cusickii* Vasey var. *epilis* (Scribn.) C.L. Hitchc.	98, 130 183
" *glauca* Vahl	32, 127, 165
" *interior* Rydb.	102
" *leptocoma* Trin.	42, 174
" *pratensis* L.	61, 112, 117, 153
" *rupicola* Nash	61, 111, 123, 205
Stipa occidentalis Thurb. var. *minor* (Vasey) C.L. Hitchc.	229
Trisetum spicatum (L.) Richter	72, 130
LILIACEAE	
Fritillaria camschatcensis (L.) Ker-Gawl	89
Lloydia serotina (L.) Wats.	42, 70
Tofieldia pusilla (Michx.) Pers.	94, 144, 145
Veratrum viride Ait.	201
ORCHIDACEAE	
Corallorhiza trifida Chat.	41
Habenaria dilatata (Pursh) Hook.	90
Listera cordata (L.) R.Br.	220
SALICACEAE	
Populus balsamifera L.	19
" *tremuloides* Michx.	102
Salix alaxensis (Anderss.) Coville var. *alaxensis*	13, 126
" " " " var. *longistylis* (Rydb.) Schneid	38
Salix arctica Pallas	21, 46
" *barclayi* Anderss.	1, 27, 90, 138
" *barrattiana* Hook.	16, 90, 145
" *brachycarpa* Nutt. ssp. *brachycarpa*	202
" *commutata* Bebb	88
" *glauca* L.	16 a & b, 27, 219
" *myrtillifolia* Anderss.	93, 94, 193, 221
" *planifolia* Pursh ssp. *planifolia*	67, 74
" *polaris* Wahl.	42, 127
" *pulchra* Cham.	148
" *raupii* Argus	74
" *reticulata* L.	122
" *scouleriana* Barratt	75
BETULACEAE	
Betula glandulosa Michx.	1

	COLLECTION SITE
SANTALACEAE	
Geocaulon lividum (Richards.) Fern.	102
POLYGONACEAE	
Koenigia islandica L.	145, 197
Oxyria digyna (L.) Hill	16
Polygonum douglasii Greene	156
" *viviparum* L.	73
Rumex acetosa L. ssp. *alpestris* (Scop.) A. Löve	43, 89
CHENOPODIACEAE	
Chenopodium capitatum (L.) Asch.	229
PORTULACACEAE	
Claytonia sarmentosa C.A. Mey	3, 44
CARYOPHYLLACEAE	
Arenaria dawsonensis Britt.	151
" *lateriflora* L.	97, 154
" *obtusiloba* (Rydb.) Fern.	98
" *rubella* (Wahl.) J.E. Smith	32, 143
" *sajanensis* Willd.	161, 197
Cerastium arvense L.	48
" *beeringianum* Cham. and Schlecht.	32, 72, 123, 157, 166
Lychnis apetala L.	65, 123
Sagina saginoides (L.) Britt.	197
Silene acaulis L.	33
Stellaria calycantha (Ledeb.) Bong.	99, 131, 145
" *laeta* Richards.	Szczawinski (1959)
" *longipes* Goldie	92, 148
" *monantha* Hult.	14, 16, 42, 48, 51, 127
RANUNCULACEAE	
Aconitum delphinifolium DC.	34, 92
Anemone multifida Poir	25, 128
" *narcissiflora* L. var. *monantha* Schlecht.	Welsh & Rigby (1971)
" *parviflora* Michx.	4, 42
" *richardsonii* Hook.	39, 204
Aquilegia brevistyla Hook.	99
" *formosa* Fisch.	97
Caltha leptosepala DC.	13, 90

	COLLECTION SITE
RANUNCULACEAE (Continued)	
Delphinium glaucum Wats.	40
Ranunculus eschscholtzii Schlecht.	12, 21, 44, 68
" *gelidus* Kar. & Kir.	36, 43
" *hyperboreus* Rottb.	141, 218
" *lapponicus* L.	93, 145
" *nivalis* L.	12, 44, 207
" *occidentalis* Nutt.	89, 121
" *pygmaeus* Wahl.	62
" *sulphureus* Soland.	145, Krajina (1973)
Thalictrum alpinum L.	4, 77
" *occidentale* Gray	171, 182
PAPAVERACEAE	
Papaver alboroseum Hult.	Welsh & Rigby (1971)
" *radicatum* Rottb. (=*P.kluanense* D. Löve)	35, 70, 84, 203, 209
FUMARIACEAE	
Corydalis pauciflora (Steph.) Pers.	12, 44
CRUCIFERAE	
Arabis divaricarpa A. Nels	25, 139, 191
" *drummondii* Gray	1, 49, 130
" *holboellii* Hornem.	92
" *lemmonii* S.Wats.	25
" *lyallii* Wats.	99
" *lyrata* L.	16, 112, 124, 139
Barbarea orthoceras Ledeb.	151
Cardamine bellidifolia L.	63, 86
" *oligosperma* Nutt.	153, 215
" *pratensis* L.	153
Draba alpina L.	36, 53, 66
" *aurea* Vahl	20, 32, 186
" *borealis* DC.	92
" *cinerea* Adams	61
" *fladnizensis* Wulf.	35, 123, 187
" *incerta* Payson	11, 33
" *lactea* Adams	66, 123
" *lanceolata* Royle (=*D. cana* Rydb.)	32, 61, 117
" *lonchocarpa* Rydb. var. *thompsonii* (C.L. Hitchc.) Rollins	187
" *longipes* Raup	12, 44, 122, 127
" *nemorosa* L.	183
" *nivalis* Lilj.	35, 62, 63, 66, 106, 143, 183
Eutrema edwardsii R.Br.	86, 123, 145 187
Thlaspi arvense L.	Welsh & Rigby (1971)

	COLLECTION SITE
CRASSULACEAE	
Sedum divergens Wats.	37, 156
" *lanceolatum* Torr.	100, 107, 156
SAXIFRAGACEAE	
Chrysosplenium tetrandrum (Lund) Fries	109, 153
Mitella nuda L.	134
" *pentandra* Hook.	156
Parnassia fimbriata Konig	129
" *kotzebuei* Cham. & Schlecht.	16, 72
" *palustris* L.	199
Ribes glandulosum Grauer	131
" *hudsonianum* Richards.	27, 93
" *oxyacanthoides* L.	47
" *triste* Pallas	76, 204
Saxifraga adscendens L.	62, 120,187
" *caespitosa* L.	53, 64, 120
" *cernua* L.	42, 65, 66, 100
" *exilis* Steph.	Krajina (1973)
" *ferruginea* Graham	159
" *flagellaris* Willd.	70, 84
" *lyallii* Engler	99, 118
" *nivalis* L.	11, 23, 53
" *oppositifolia* L.	15, 22
" *punctata* L.	66, 81, 99, 145
" *rivularis* L.	66, 80, 120, 129
" *serpyllifolia* Pursh	82, 147
" *tricuspidata* Rottb.	16, 76, 84, 111
ROSACEAE	
Amelanchier alnifolia (Nutt.) Nutt.	47, 107
Dryas integrifolia Vahl.	9, 21
Dryas octopetala L. var. *kamtschatica* (Juz.) Hult.	Welsh & Rigby (1971)
Fragaria virginiana Duchesne var. *glauca* Wats.	92
Geum macrophyllum Willd.	73
Luetkea pectinata (Pursh) Kuntze	158
Potentilla arguta Pursh	47
" *diversifolia* Lehm.	1, 89, 229
" *fruticosa* L.	47
" *hookeriana* Lehm.	32, 183
" *hyparctica* Malte	25, 29, 42
" *nivea* L.	24, 32
" " " var. *tomentosa* Nilsson-Ehle	61
" *norvegica* L. spp. *monspeliensis* (L.) Aschers & Graebn.	73
" *palustris* (L.) Scop.	217
" *pennsylvanica* (L.)	32, 92, 229

	COLLECTION SITE
ROSACEAE (Continued)	
Potentilla uniflora Ledeb.	25
" *villosa* Pallas	25
Rosa acicularis Lindl.	47, 107
Rubus arcticus L.	2
" *chamaemorus* L.	93
" *idaeus* L.	76
" *pedatus* J.E. Smith	131
Sanguisorba stipulata Raf.	156
Sibbaldia procumbens L.	50
Sorbus scopulina Greene	156
LEGUMINOSAE	
Astragalus alpinus L.	16, 127
Hedysarum alpinum L.	144
Lupinus arcticus Wats.	1
" *nootkatensis* Donn	88
Oxytropis campestris (L.) DC.	25, 72, 144
" *huddelsonii* Porsild	33, 209
" *nigrescens* (Pallas) Fisch.	10, 33, 84, 123
GERANIACEAE	
Geranium erianthum DC.	Welsh & Rigby (1971)
- also photographed in 1975 by Mrs. R. Fox, in vicinity of Buckinghorse Lake.	
Geranium richardsonii Fisch. & Trautv.	49, 97
EMPETRACEAE	
Empetrum nigrum L.	74
VIOLACEAE	
Viola adunca Smith	89
" *langsdorfii* (Reg.) Fisch.	121
" *palustris* L.	217
ELEAGNACEAE	
Shepherdia canadensis (L.) Nutt.	102

	COLLECTION SITE
ONAGRACEAE	
Epilobium alpinum L. var. *alpinum*	99, 170
" " " var. *nutans* (Hornem.) Hook	99
" *angustifolium* L.	112
" *davuricum* Fisch.	145
" *latifolium* L.	72, 151
" *luteum* Pursh.	214
" *palustre* L. var. *lapponicum* Wahl.	93, 152, 218
HALORAGACEAE	
Hippuris vulgaris L.	218
UMBELLIFERAE	
Heracleum lanatum Michx.	99
Osmorhiza depauperata Phil.	156
" *purpurea* (Coult. & Rose) Suksd.	99
CORNACEAE	
Cornus canadensis L.	140
PYROLACEAE	
Moneses uniflora L.	95, 140
Pyrola asarifolia Michx.	97, 107
" *grandiflora* Radius	26, 80, 109
" *minor* L.	95
" *secunda* L.	140, 185, 204
ERICACEAE	
Arctostaphylos rubra (Rehd. & Wilson) Fern.	74, 144
" *uva-ursi* (L.) Spreng.	103
Cassiope mertensiana (Bong.) D.Don	46, 125
" *tetragona* (L.) D.Don	9, 45
Kalmia microphylla (Hook.) Heller	55, 138
Ledum decumbens (Ait.) Lodd.	231
" *groenlandicum* Oeder	54
Phyllodoce empetriformis (J.E. Smith) D.Don	46
" *glanduliflora* (Hook.) Coville	Welsh & Rigby (1971)
Oxycoccus microcarpus Turcz.	93
Vaccinium caespitosum Michx.	2, 74
" *membranaceum* Dougl.	172
" *uliginosum* L.	45, 74
" *vitis-idaea* L. ssp. *minus* (Lodd.) Hult.	76

	COLLECTION SITE
PRIMULACEAE	
Androsace septentrionalis L.	32
Douglasia gormanii Constance	Krajina (1975)
Trientalis arctica Fisch.	77
GENTIANACEAE	
Gentiana glauca Pallas	52
" " " f. *chlorantha* Jordal	130
" *prostrata* Haenke	34
Gentianella amarella (L.) Borner	Welsh & Rigby (1971)
" *propinqua* (Richards.) Gillet	116
POLEMONIACEAE	
Polemonium acutiflorum Willd.	54
" *pulcherrimum* Hook.	89
BORAGINACEAE	
Hackelia deflexa (Wahl.) Opiz	192
Mertensia paniculata (Ait.) D.Don	112
Myosotis alpestris F.W. Schmidt	16, 61
SCROPHULARIACEAE	
Castilleja parviflora Bong.	121, 190
" *unalaschcensis* (Cham. & Schlecht.) Malte	112
Mimulus guttatus DC.	170
Pedicularis capitata Adams	69
" *labradorica* Wirsing	74
" *langsdorfii* Fisch.	9
" *sudetica* Willd.	2, 42, 160
Penstemon procerus Dougl.	32
Veronica americana Schwein.	170
" *serpyllifolia* L. var. *humifusa* (Dickson) Vahl	Welsh & Rigby (1971)
" *wormskjoldii* Roem. & Schult.	73, 89, 99, 121
RUBIACEAE	
Galium boreale L.	155
" *trifidum* L.	218
" *triflorum* Michx.	156

	COLLECTION SITE
CAPRIFOLIACEAE	
Linnaea borealis L.	107
Viburnum edule (Michx.) Raf.	107
VALERIANACEAE	
Valeriana dioica L.	73
" *sitchensis* Bong.	88, 130
CAMPANULACEAE	
Campanula lasiocarpa Cham.	81, 85, 92, 100
" *uniflora* L.	84
COMPOSITAE	
Achillea millefolium L. ssp. *borealis* (Bong.) Breitung	112
" " " ssp. *lanulosa* (Nutt.) Piper	Welsh & Rigby (1971)
Agoseris aurantiaca (Hook.) Greene	89, 97, 98
" *glauca* (Pursh) Raf.	121, 191
Antennaria alpina (L.) Gaertn.	81, 123, 143
" *monocephala* DC.	9, 42
" *pulcherrima* Rydb.	151, 201
" *rosea* Greene	32, 92, 112
" *umbrinella* Rydb.	139
Arnica alpina (L.) Olin ssp. *attenuata* (Greene) Maguire var. *linearis* Hult.	156, 157, 165
" " " " var. *tomentosa* (Macoun) Cronq.	111, 164
" *chamissonis* Less. ssp. *chamissonis* var. *interior* Maguire	Szczawinski (1959)
" *cordifolia* Hook.	99
" *latifolia* Bong.	190
" *lessingii* Greene	80, 118, 145
Artemisia arctica Less.	98, 183
" *campestris* L. var. *borealis* (Pall.) M.E.Peck	32, 48, 166
" *michauxiana* Bess.	48, 166
" *tilesii* Ledeb.	99, 128, 154, 183, 229
Cirsium edule Nutt.	192
" *foliosum* (Hook.) DC.	169
Crepis nana Richards. var. *nana*	100, 127
" " " var. *lyratifolia* (Turcz.) Hult.	64, 100
Erigeron acris L. var. *debilis* Gray	61, 99, 100, 118, 218
" " " var. *elatus* (Hook.) Cronq.	151
" *compositus* Pursh var. *glabratus* Macoun	25, 32
" *grandiflorus* Hook.	65, 147, 188
" *humilis* Graham	36, 62, 74, 81, 99, 100, 187
" *lonchophyllus* Hook.	Welsh & Rigby (1971)
" *peregrinus* (Pursh) Greene ssp. *callianthemus* (Greene) Cronq.	208
" *purpuratus* Greene	63, 123

	COLLECTION SITE
COMPOSITAE (Continued)	
Hieracium graeile Hook.	119, 158, 190
Petasites frigidus (L.) Fries var. *frigidus*	16, 204
" " " " var. *nivalis* (Greene)Cronq.	Szczawinski (1959)
" *palmatus* Ait.	195
" *sagittatus* (Banks) Gray	93
Senecio lugens Richards.	13, 54
" *pauciflorus* Pursh	71, 92
" *sheldonensis* Porsild	155
" *triangularis* Hook.	99
Solidago multiradiata Ait.	92
Taraxacum ceratophorum (Ledeb.) DC.	61, 81, 111, 205
" *eriophorum* Rydb.	Welsh & Rigby (1971)
" *lyratum* (Ledeb.) DC.	85, 205

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GLADYS LAKE ECOLOGICAL RESERVE PROPOSAL
COLLECTING SITES, 1975 *

* June 25, 1975 *

(1) Vicinity U.B.C. cabin, Gladys Lake
alt. 4200 feet (1280 m)
Picea glauca - *Salix glauca* - *Betula glandulosa* association

(2) Along trail from cabin up Landslide Creek
alt. 4500 feet (1370 m)
Salix glauca - *Betula glandulosa* - *Festuca altaica* scrub

(3) Foot of N slope of Oreamnos Ridge
alt. 4600 feet (1400 m)
seepage site; in moss beneath willows, growing with *Anemone richardsonii* and *Equisetum scirpoides*

(4) Foot of N slope of Oreamnos Ridge
alt. 4600 feet (1400 m)
turfy *Festuca altaica* subalpine grassland

(5) Foot of N slope of Ovis Ridge
alt. 4700 feet (1430 m)
in moss on floor of *Abies lasiocarpa* - (*Picea glauca*) subalpine forest on N-facing slopes

(6) Kettlehole Pass
alt. 5500 feet (1675 m)
in clumps of moss within *Festuca altaica* subalpine grassland

(7) Kettlehole Pass
alt. 5500 feet (1675 m)
mossy edge of clump of stunted *Abies lasiocarpa*

(8) Kettlehole Pass
alt. 5500 feet (1675 m)
on leading twigs and upper trunks of stunted *Abies lasiocarpa*

(9) Solifluction Ridge, NE slopes
alt. 6000 feet (1850 m)
Cassiope tetragona - *Dryas integrifolia* - *Salix reticulata* alpine heath

(10) Solifluction Ridge, NE slopes
alt. 6000 feet (1850 m)
solifluction lobes and frost boils within alpine heath

(11) steep, SE-facing slopes of Solifluction Ridge, overlooking Phoebe Creek
alt. 5800 feet (1770 m)
fine, moist soil and scree on edge of avalanche chute

* for herbarium purposes, the latitude and longitude of all the collecting sites may be taken as that of Gladys Lake, viz. 57° 35' N; 128° 47' W (except for #'s 87-91)

(12) Kettlehole Pass
alt. 5500 feet (1675 m)
patches of turfy subalpine seepage within Festuca altaica grassland

(13) Kettlehole Pass
alt. 5200 feet (1585 m)
bank of small tributary of Kettlehole Creek

(14) along Landslide Creek, near mouth of Kettlehole Creek
alt. 4600 feet (1400 m)
sandy-gravelly floodplain flats

(15) Solifluction Ridge, NE slopes
alt. 5800 feet (1770 m)
fine moist soil in solifluction lobe

(16) mouth of Oreamnos Creek
alt. 4600 feet (1400 m)
sandy-gravelly alluvial fan with thickets of Salix barrattiana and S. barclayi

* June 26, 1975 *

(17) Ghost Pass, between Ghost and Guardian Mountains
alt. 6500 feet (1980 m)
in dwarf willow-grass-sedge-lichen alpine tundra, and among moss polsters on shallow soil over talus blocks

(18) Ghost Pass, between Ghost and Guardian Mountains
alt. 6300 feet (1920 m)
alpine scree and talus slope

(19) Forget-Me-Not Ridge, S face of Ghost Mountain
alt. 4800 feet (1460 m)
pygmy poplar grove, on very steep colluvial slope

(20) Forget-Me-Not Ridge, S face of Ghost Mountain
alt. 4500 feet (1370 m)
pygmy aspen grove, on very steep colluvial slope

(21) steep NE-facing side of gulch leading up to Ghost Pass
alt. 6000 feet (1850 m)
Cassiope - Dryas - Salix alpine heath

(22) steep NE-facing side of gulch leading up to Ghost Pass
alt. 5800 feet (1770 m)
wet crevices, niches, and ledges in cliffs

(23) Forget-Me-Not Ridge, S face of Ghost Mountain
alt. 4800 feet (1460 m)
thin soil over rock outcropping beside a game trail in Juniperus communis - Arctostaphylos uva-ursi - grass association

(24) Forget-Me-Not Ridge, S face of Ghost Mountain
alt. 5200 feet (1590 m)
fine, shallow soil over rock outcrops and ledges along ridge crest

alt. 5000 feet (1525 m)
gravelly ridges and outcrops within subalpine Festuca altaica grassland

(26) S slopes of Guardian Mountain
alt. 5000 feet (1525 m)
large, partially stabilized talus slope

(27) vicinity of U.B.C. cabin, Gladys Lake
alt. 4200 feet (1280 m)
swampy alluvial willow thickets near mouth of Landslide Creek

* June 28, 1975 *

(29) Danihue Pass, between the valleys of Eaglenest Creek and Coldfish Lake
alt. 5500 feet (1675 m)
on soil and among grasses and moss, Festuca altaica - lichen alpine tundra

(30) Danihue Pass, between the valleys of Eaglenest Creek and Coldfish Lake
alt. 5500 feet (1675 m)
on rocks, and binding sand, gravel, and small pebbles; fjeldmark alpine tundra along moraine crest

* June 30, 1975 *

(28) vicinity of Rainbow Cabin, near SE end of Coldfish Lake
alt. 3900 feet (1190 m)
on NE face of huge (5 x 5 m) boulder; in lodgepole pine forest

* July 1, 1975 *

(31) Wheatear Ridge, Spatsizi Plateau
alt. 6800 feet (2075 m)
dwarf willow - grass - sedge - lichen alpine tundra, on broad, windswept ridge

(32) Oxytropis Ridge, NE of Rainbow Cabin
alt. 5000 feet (1525 m)
Poa glauca - Carex supina - Artemisia spp. boreal steppe grassland, on steep, S-facing hillsides

(33) Oxytropis Ridge, NE of Rainbow Cabin
alt. 6000-6800 feet (1850-2075 m)
Cassiope - Dryas - Salix alpine heath

(34) Oxytropis Ridge, NE of Rainbow Cabin
alt. 5200 feet (1585 m)
subalpine Festuca altaica grassland, on steep, S-facing slopes

(35) Oxytropis Ridge, NE of Rainbow Cabin
alt. 6500 feet (1980 m)
dwarf willow - grass - sedge - lichen alpine tundra, just below the ridge crest

(36) Wheatear Ridge, Spatsizi Plateau
alt. 6850 feet (2090 m)
moist scree and fine gravel in windswept saddle on rim of broad cirque

(37) Kettlehole Pass
alt. 5200 feet (1585 m)
sand and gravel, dry alluvial fan from creek draining S face of Nation Peak

(38) vicinity of U.B.C. cabin, near mouth of Landslide Creek
alt. 4200 feet (1280 m)
streambank willow thickets

* July 3, 1975 *

(39) vicinity of U.B.C. cabin, near outlet of Gladys Lake
alt. 4100 feet (1250 m)
white spruce - willow swamp bordering the lake

(40) old trail along E side of Gladys Lake
alt. 4200 feet (1280 m)
Festuca altaica subalpine grassland on S faces of moraines

(41) along game trail on NE side of Salix Creek, below the W entrance to Sanctuary Pass
alt. 4500 feet (1370 m)
subhygric Picea glauca - Salix glauca forest type; growing in moss over humus

(42) Sanctuary Ridge
alt. 6800 feet (2075 m)
dwarf willow - grass - sedge - lichen alpine tundra

(43) Sanctuary Ridge, SE-facing slopes above the E entrance to Sanctuary Pass
alt. 5600 feet (1710 m)
subalpine Festuca altaica grassland

(44) Sanctuary Pass
alt. 5400 feet (1650 m)
mossy, alpine seepage and streambank vegetation, along and at the mouth of a small creek draining the snowfields of Sanctuary Ridge

(45) Sanctuary Ridge, E-facing slope just below the ridge crest
alt. 6400 feet (1950 m)
Empetrum nigrum - Salix reticulata - Vaccinium uliginosum alpine heath

(46) Sanctuary Ridge, SE-facing slopes above the E entrance to Sanctuary Pass
Alt. 5500 feet (1675 m)
Cassiope mertensiana - Empetrum nigrum - Phyllodoce empetriformis subalpine heath

(47) SW-facing lower slopes of Ochre Cliffs, Sanctuary Ridge
alt. 4500 feet (1370 m)
pygmy aspen - (poplar) - Salix scouleriana forest, over steep, stabilized talus slope

(48) Ochre Cliffs, above confluence of Salix and Connector Creeks
alt. 5300 feet (1615 m)
Poa glauca - Carex supina - Artemisia spp. boreal steppe grassland, on very steep S- and SW-facing colluvial slopes

alt. 5000 feet (1525 m)
mesic Festuca altaica subalpine grassland

(50) Sanctuary Pass, on the valley floor
alt. 5500 feet (1675 m)
snowpatch vegetation in lee of ridges

(51) Sanctuary Pass, on the valley floor
alt. 5300 feet (1615 m)
crevices in large, isolated boulder

(52) Sanctuary Pass
alt. 5500 feet (1675 m)
Festuca altaica - lichen alpine tundra

(53) summit crest of Sanctuary Ridge
alt. 7300 feet (2225 m)
alpine scree; crevices in boulder fell field

*July 4, 1975 *

(54) vicinity of U.B.C. cabin, Gladys Lake
alt. 4200 feet (1280 m)
Picea glauca - Salix glauca - Betula glandulosa association

(55) Kettlehole Pass
alt. 5300 feet (1615 m)
alpine willow - sedge - moss low moor

(56) Sanctuary Ridge, near the summit
alt. 7200 feet (2165 m)
alpine fell field

*July 6, 1975 *

(57) Eyrie Ridge, Marmot Mountain
alt. 6100 feet (1860 m)
solifluction stripes below ridge crest

* July 5, 1975 *

(58) summit ridge of Cornicularia Peak
alt. 7600 feet (2315 m)
broken rock/lichen tundra

(59) summit ridge of Ghost Mountain
alt. 7700 feet (2350 m)
broken rock/lichen tundra

(60) Kettlehole Pass
alt. 5300 feet (1615 m)
peaty, raised rim of small, shallow kettlehole pond

(61) Forget-Me-Not Ridge, S face Ghost Mountain
alt. 5600 feet (1710 m)
lush, well-manured grass - forb sward on a sheep/goat "saddle"
(resting and feeding area)

(62) Ghost Mountain, S face
alt. 6800 feet (2075 m)
fine moist scree beneath cliffs

(63) Umbilicaria Ridge
alt. 7200 feet (2200 m)
moist, shaded crevices between large blocks of talus, just beneath the ridge crest

(64) Ghost Mountain, S face
alt. 7300 feet (2225 m)
talus slope below summit cliffs

(65) Forget-Me-Not Ridge
alt. 5800 feet (1770 m)
dry, exposed, grassy ridge above a sheep lick

(66) Ghost Mountain, S face
alt. 7300 feet (2225 m)
wet ledges, drip faces, crevices, and mossy runnels; base of summit cliffs

* July 6, 1975 *

(67) Marmot Valley
alt. 6000 feet (1850 m)
alpine willow thickets in large, snowy cirque at head of Marmot Creek

(68) Marmot Valley
alt. 5800 feet (1770 m)
mossy alpine seepage areas along upper Marmot Creek

(69) Solifluction Ridge, NE slope
alt. 5700 feet (1740 m)
Cassiope - Dryas - Salix alpine heath

(70) Solifluction Ridge, along the ridge crest
alt. 6800 feet (2075 m)
dwarf willow - grass - sedge - lichen alpine tundra

(71) Kettlehole Pass
alt. 5000 feet (1525 m)
mesic Festuca altaica subalpine grassland

* July 7, 1975 *

(72) Landslide Creek, vicinity of U.B.C. cabin
alt. 4200 feet (1280 m)
creekbank mud and silt over sand and gravel

* July 8, 1975 *

(73) vicinity of U.B.C. cabin
alt. 4200 feet (1280 m)
Salix glauca - Betula glandulosa - Festuca altaica association

(74) vicinity of U.B.C. cabin
alt. 4200 feet (1280 m)
peaty shores of Gladys Lake, and adjacent willow swamp

(75) lower slopes of Landslide Ridge, S face of Ghost Mountain
alt. 4500 feet (1370 m)
willow (Salix scouleriana, S. glauca) thickets and aspen groves on S-facing slopes

(76) landslide at base of Landslide Ridge
alt. 4600 feet (1400 m)
large boulders and talus blocks at toe of the slide

(77) S bank of Landslide Creek, just above its canyon and opposite the landslide
alt. 4400 feet (1340 m)
creekbank willow (Salix barclayi, S. glauca) swamp

* July 9, 1975 *

(78) Fossil Flats, SW of Gladys Lake
alt. 7200 feet (2195 m)
alpine fell field along the gentle ridge crest

(79) Ovis Ridge
alt. 6700 feet (2045 m)
wet cliffs and ledges on N face beneath the hoodoos

(80) NE slope of Ovis Ridge
alt. 6000 feet (1830 m)
Cassiope - Vaccinium - Betula alpine heath

(81) W end of Ovis Ridge, as it rises to Fossil Flats
alt. 6900 (2100 m)
moist scree, talus, and wet ledges beneath the rimrock of Fossil Flats

(82) col between Fossil Flats and Rangifer Ridge
alt. 7100 feet
fine, dry ridgecrest gravel

(83) Ovis Ridge
alt. 6500 feet (1980 m)
sheep/goat "saddle" (feeding and resting place) along the ridge crest

* July 10, 1975 *

(84) Potentilla Ridge, between Danihue Pass and the headwaters of Cullivan Creek
alt. 6500 feet (1980 m)
dwarf willow - grass - sedge - lichen alpine tundra

(85) Spatsizi (Red Goat) Mountain
alt. 6500 feet (1980 m)
rocky, jagged ridgecrest

(86) NW slope of Potentilla Ridge
alt. 6000 feet (1830 m)
mossy bank of alpine rivulet, fed by seepage

(87) Fire Flats, near the headwaters of Kluayetz Creek
57° 12' N; 128° 33' W
alt. 4000 feet (1220 m)
subalpine sedge fen

(88) Fire Flats
alt. 4100 feet (1250 m)
(subhygric) white spruce - willow - lupine - cow parsnip association, on alluvial fan at base of mountainside

(89) Fire Flats
alt. 4000 feet (1220 m)
(subhygric) subalpine Festuca altaica - forb meadow

(90) Fire Flats
alt. 4000 feet (1220 m)
subalpine willow - sedge swamp

(91) head of Tuaton Lake, at debouchment of Stikine River
57° 16' N; 128° 05' W
alt. 4200 feet (1280 m)
alluvial willow thickets and lake edge gravel bars and mud flats

* July 13, 1975 *

(92) N end of Gladys Lake, E of Connector Creek
alt. 4100 feet (1250 m)
Festuca altaica subalpine grassland

(93) @ 6.3 km NE of Gladys Lake, along E side of Connector Creek
alt. 3900 feet (1190 m)
white spruce - willow - sedge - moss swamp (low moor), bordering a beaver pond

(94) along the trail between Gladys and Coldfish Lakes, @ 5 km NE of Gladys
alt. 3950 feet (1205 m)
willow - sedge swamp

(95) along the trail between Gladys and Coldfish Lake, @ 3.2 km NE of Gladys
alt. 4100 feet (1250 m)
white spruce - moss forest type

(96) along the trail between Gladys and Coldfish Lakes, @ 5 km NE of Gladys
alt. 4000 feet (1220 m)
aspen forest along esker crest

* July 14, 1975 *

(97) Columbine Ridge, SW-most ridge of Ghost Mountain.
alt. 4800 feet (1465 m)
pygmy poplar forest on steep S-facing slopes above Landslide Creek

(98) Columbine Ridge
alt. 5700 feet (1740 m)
Festuca altaica subalpine grassland on S-facing slope

(99) gorge between Landslide and Forget-Me-Not Ridges, S face of Ghost Mountain
alt. 5000 feet (1525 m)
streambank ledges, boulders, and rubble

(100) Landslide Ridge
alt. 5800 feet (1770 m)
scree slopes below cliffs

(101) Columbine Ridge
alt. 6000 feet (1830 m)
Festuca altaica - lichen alpine tundra

* July 15, 1975 *

(102) just N of U.B.C. cabin, across Landslide Creek
alt. 4200 feet (1280 m)
aspen forest on S-facing slope of esker

(103) along W side of Connector Creek, @ 0.2 km NE of U.B.C. cabin
alt. 4200 feet (1280 m)
Picea glauca - Salix glauca - Betula glandulosa - Festuca altaica - lichen association

* July 16, 1975 *

(104) Ptarmigan Ridge, Guardian Mountain
alt. 5000 feet (1525 m)
dead leading branches and twigs of stunted Abies lasiocarpa

(105) Ptarmigan Ridge
alt. 6000 feet (1830 m)
Festuca altaica - lichen alpine tundra

(106) Ghost Pass, between Ghost and Guardian Mountains
alt. 6400 feet (1950 m)
Kobresia - lichen alpine tundra, on exposed hillock

(107) SE face of Ptarmigan Ridge
alt. 4200 feet (1280 m)
pygmy aspen forest on steep, S-facing, stabilized talus slope

(108) NE face of Raptor Ridge, Guardian Mountain
alt. 6400 feet (1950 m)
alpine seepage area (snow flush)

(109) NE face of Raptor Ridge
alt. 6000 feet (1830 m)
lush grass - forb sward, sheep/goat "saddle"

(110) Ghost Pass
alt. 6200 feet (1890 m)
alpine seepage and creekbank vegetation, bordering rivulets fed by melting snowbanks

(111) Ptarmigan Ridge, SE face
alt. 5800 feet (1770 m)
goat/sheep "saddle"

* July 18, 1975 *

(112) vicinity of U.B.C. cabin, Gladys Lake
alt. 4200 feet (1280 m)
Salix glauca - Betula glandulosa - Festuca altaica association

(113) @ 0.6 km NE of U.B.C. cabin, along the trail up Landslide Creek
alt. 4400 feet (1340 m)
Abies lasiocarpa - Betula glandulosa - Empetrum nigrum association

(114) @ 0.4 km NE of U.B.C. cabin
alt. 4300 feet (1300 m)
white spruce - willow - dwarf birch association

(115) @ 0.4 km NE of U.B.C. cabin
alt. 4300 feet (1300 m)
(hygric) white spruce - willow - sedge - moss swamp

(116) @ 0.6 km NE of U.B.C. cabin, along the trail up Landslide Creek
alt. 4300 feet (1300 m)
Salix glauca, scouleriana - Betula glandulosa - Festuca altaica association

(117) E entrance to Kettlehole Pass
alt. 4800 feet (1460 m)
(mesic) Festuca altaica subalpine grassland

(118) Kettlehole Pass
alt. 5100 feet (1560 m)
peaty margins and islands of turf around and in a gravelly-muddy seepage area

* July 19, 1975 *

(119) Kettlehole Pass
alt. 5400 feet (1645 m)
Festuca altaica subalpine grassland, on steep S-facing moraine slopes

(120) NE slopes, Solifluction Ridge
alt. 6500 feet (1980 m)
ridgecrest scree and broken rock

(121) Kettlehole Pass
alt. 5400 feet (1645 m)
mesic - subhygric, lush Festuca altaica - forb subalpine meadows

(122) NE face, Solifluction Ridge
alt. 5800 feet (1770 m)
Cassiope - Dryas - Salix reticulata alpine heath

(123) Solifluction Ridge
alt. 6700 feet (2045 m)
dwarf willow - grass - sedge - lichen alpine tundra on the broad ridgecrest

(124) Marmot Valley
alt. 5400 feet (1645 m)
dwarf birch scrub on E-facing valley sides

(125) NE slopes, Solifluction Ridge
alt. 5500 feet (1675 m)
Cassiope mertensiana - Phyllodoce empetriformis - Lycopodium alpinum
subalpine heath

(126) Marmot Valley
alt. 5500 feet (1675 m)
streamside Salix barrattiana thickets

(127) Marmot Valley, E side
alt. 6000 feet (1830 m)
scree slope beneath cliffs

* July 20, 1975 *

(128) E slopes of Spermophilus Saddle, above Marmot Valley
alt. 5500 feet (1675 m)
sandy, gravelly banks of gully cut by snowmelt stream

(129) E slopes of Spermophilus Saddle, above Marmot Valley
alt. 5600 feet (1710 m)
mossy alpine seepage area, near a sheep lick

(130) vicinity of Bates Camp, Kettlehole Pass
alt. 5200 feet (1585 m)
mesic Festuca altaica subalpine grassland

(131) vicinity of Bates Camp, Kettlehole Pass
alt. 5200 feet (1585 m)
clumps of Abies lasiocarpa

(132) Kettlehole Pass
alt. 5300 feet (1615 m)
Festuca altaica - lichen alpine tundra on kame crest

(133) Kettlehole Pass, near mouth of Marmot Creek
alt. 5200 feet (1585 m)
Salix barrattiana alluvial willow thicket

* July 22, 1975 *

(134) vicinity of old Gladys Lake Camp, SE corner of lake
alt. 4100 feet (1250 m)
willow - sedge swamp

(135) lower SW slopes of Sanctuary Ridge, above Gladys Lake Camp
alt. 4400 feet (1340 m)
aspen forest on steep colluvial slopes

(136) @ 1 km N of U.B.C. cabin
alt. 4300 feet (1310 m)
white spruce - moss forest type

(137) vicinity of head of Mink Creek, @ 9 km NE of Gladys Lake
alt. 4000 feet (1220 m)
Pinus contorta - Betula glandulosa - moss - lichen association

(138) vicinity of head of Mink Creek, @ 9 km NE of Gladys Lake
alt. 4100 feet (1250 m)
white spruce - dwarf birch - willow - sedge swamp

(139) along the trail between Gladys Lake and Mink Creek, 2 km NE of the lake
alt. 4200 feet (1280 m)
Festuca altaica subalpine grassland

(140) along the trail to Mink Creek, 5.5 km NE of Gladys Lake
alt. 4000 feet (1220 m)
Picea glauca - Salix glauca - Betula glandulosa association

(141) along the trail to Mink Creek, 4.5 km NE of Gladys Lake
alt. 4100 feet (1250 m)
Picea glauca - Salix glauca seepage - swamp

(142) along the trail to Mink Creek, 7 km NE of Gladys Lake
alt. 4000 feet (1220 m)
mossy, muddy banks of rivulet crossing the trail

* July 25, 1975 *

(143) Maternity Mountain; between the 2 forks of upper Cullivan Creek
alt. 5800 feet (1770 m)
Kobresia - lichen alpine tundra on exposed, windswept ridge

(144) Maternity Mountain
alt. 5600 feet (1710 m)
subhygric alpine heath, above the sheep lick

(145) Maternity Mountain
alt. 5800 feet (1770 m)
alpine seepage area

(146) Maternity Mountain
alt. 5600 feet (1710 m)
alpine Carex - Eriophorum fen

(147) Maternity Mountain
alt. 5600 feet (1710 m)
dry, gravelly solifluction ridge above sheep lick

(148) Maternity Mountain
alt. 5800 feet (1770 m)
dwarf willow - grass - sedge - lichen alpine tundra and dwarf birch and willow thickets

(149) Maternity Mountain
alt. 6100 feet (1860 m)
dwarf willow - grass - sedge - lichen alpine tundra

(150) @ 0.6 km NE of U.B.C. cabin, across Landslide Creek
alt. 4200 feet (1280 m)
Picea glauca - Betula glandulosa association

* July 26, 1975 *

(151) 3 km downstream of Gladys Lake, along Connector Creek
alt. 4100 feet (1250 m)
gravelly-sandy-muddy alluvial sites on the active floodplain

(152) 3 km downstream of Gladys Lake, along Connector Creek
alt. 4100 feet (1250 m)
willow - sedge swamp (low moor)

(153) 3 km downstream of Gladys Lake, along Connector Creek
alt. 4100 feet (1250 m)
alluvial willow thicket

* July 27, 1975 *

(154) S slopes of Alces Ridge, opposite Mount Will
alt. 4800 feet (1465 m)
Juniperus communis - Arctostaphylos uva-ursi - grass association
on stabilized talus slope

(155) along Castor Creek, at the foot of Stark Cirque, Mount Will
alt. 4500 feet (1375 m)
rubbly creekbank

(156) S slopes of Alces Ridge, opposite Mount Will
alt. 5000 feet (1515 m)
rocky - gravelly ravine, edged with clumps of stunted Abies lasiocarpa

(157) S slopes of Alces Ridge, opposite Mount Will
alt. 5500 feet (1675 m)
steep, grassy ridges below sheep and goat cliffs

(158) SE-facing slopes leading up to lip of Ursus Cirque
alt. 6000 feet (1830 m)
Cassiope mertensiana - Phyllodoce empetriformis - Empetrum nigrum
subalpine heath

(159) S slopes of Alces Ridge, opposite Mount Will
alt. 6000 feet (1830 m)
fine, moist scree on steep sides of rocky, snow-choked gully

(160) Ursus Cirque
alt. 6200 feet (1890 m)
dwarf willow - sedge alpine seepage area

(161) Ursus Cirque, just below Ursus Pass
alt. 6700 feet (2045 m)
fine, moist scree below rimrocks

* July 28, 1975 *

(162) 2 km SW of U.B.C. cabin, foot of Rangifer Ridge, above Gladys Lake
alt. 4300 feet (1315 m)
Picea glauca - Betula glandulosa association on NE slopes

(163) vicinity of U.B.C. cabin, just across Landslide Creek
alt. 4200 feet (1280 m)
alluvial Picea glauca - moss forest type

* July 29, 1975 *

(164) beneath NW face of Ochre Cliffs, W end of Sanctuary Ridge
alt. 5500 feet (1675 m)
gravelly saddle fanning out from base of the cliffs

(165) SW face of Ochre Cliffs
alt. 5700 feet (1735 m)
Festuca altaica subalpine grassland, along side of sheep/goat "saddle"

(166) SW face of Ochre Cliffs
alt. 5300 feet (1615 m)
Poa glauca - Carex supina - Artemisia spp. boreal steppe grassland on very steep, S-facing colluvial slopes

(167) SW face of Ochre Cliffs
alt. 5800 feet (1770 m)
ledges along steep-rocky avalanche chute

(168) NW face of Ochre Cliffs
alt. 5600 feet (1710 m)
Kobresia - lichen alpine tundra on exposed, wind-swept sheep/goat "saddle"

* July 30, 1975 *

(169) Salix Creek, at foot of slope leading up to Sanctuary Pass; @ 4 km SE of Gladys Lake
alt. 4500 feet (1370 m)
mesic subalpine grass-forb meadow

(170) Salix Creek, at foot of slope leading up to Sanctuary Pass; @ 4 km SE of Gladys Lake
alt. 4500 feet (1370 m)
mossy seepage and moss-covered rocks along rivulet

(171) mouth of Cow Parsnip Creek, @ 7.5 km SE of Gladys Lake
alt. 4800 feet (1465 m)
hygric cow parsnip meadow on alluvial fan

(172) NE end of Haemotoma Ridge, above Salix Creek
alt. 5200 feet (1585 m)
edge of Abies lasiocarpa clump in subalpine parkland

(173) NE end of Haemotoma Ridge, above Salix Creek
alt. 5500 feet (1675 m)
alpine heath

(174) Flower Ridge, which ascends S from Gladys Lake between Mère and Austere glaciers
alt. 7200 feet (2195 m)
moist scree along the ridge crest

(175) valley of Salix Creek, 3 km SE of Gladys Lake
alt. 4400 feet (1320 m)
white spruce-moss alluvial forest type

(176) Haemotoma Ridge
alt. 6500 feet (1980 m)
dwarf willow - grass - sedge - lichen alpine tundra

(177) Haemotoma Ridge
alt. 6000 feet (1830 m)
soil pockets in snow accumulation areas with boulder field

(178) Flower Ridge, gradual N-facing slope
alt. 5000 feet (1525 m)
Abies lasiocarpa - moss subalpine forest type

(179) Haemotoma Ridge
alt. 6800 feet (2075 m)
alpine fell field

(180) NW base of Ochre Cliffs
alt. 4300 feet (1310 m)
Salix scouleriana "forest" on steep, colluvial slopes

(181) Flower Ridge
alt. 6900 feet (2100 m)
Kobresia - lichen alpine tundra on the ridge crest

* August 1, 1975 *

(182) lower slopes, Forget-Me-Not Ridge, S face Ghost Mountain
alt. 4800 feet (1465 m)
pygmy poplar forest

(183) midslope, Forget-Me-Not Ridge
alt. 5600 feet (1710 m)
sheep/goat "saddle"

(184) lower slopes, Forget-Me-Not Ridge
alt. 5000 feet (1525 m)
Juniperus communis - Arctostaphylos uva-ursi - grass association

(185) lower slopes, Forget-Me-Not Ridge
alt. 4700 feet (1430 m)
pygmy aspen forest

(186) midslopes, Forget-Me-Not Ridge
alt. 5900 feet (1800 m)
Poa glauca - Carex supina - Artemisia spp. association

(187) S face of Ghost Mountain
alt. 6600 feet (2015 m)
wet ledges and moist scree at foot of summit cliffs

(188) upper Forget-Me-Not Ridge
alt. 6200 feet (1890 m)
Kobresia - lichen alpine tundra on windswept ridge crest

* August 2, 1975 *

(189) S end of Gladys Lake, delta of Connector Creek
alt. 4100 feet (1250 m)
alluvial willow swamps

* August 3, 1975 *

(190) SW slopes of Fissile Ridge, overlooking valley of Salix Creek
alt. 5400 feet (1645 m)
Cassiope mertensiana - Phyllodoce empetriformis - Luetkea pectinata subalpine heath

(191) along Salix Creek, vicinity of mouth of Cow Parsnip Creek
alt. 4800 feet (1465 m)
mesic Festuca altaica subalpine grassland

(192) above Salix Creek, slopes leading up to W entrance of Sanctuary Pass
alt. 4700 feet (1435 m)
hygric cow parsnip meadows in seepage areas

(193) above Salix Creek, slopes leading up to W entrance of Sanctuary Pass
alt. 4600 feet (1400 m)
white spruce - willow swampy seepage area

(194) W entrance to Sanctuary Pass
alt. 5400 feet (1645 m)
mosaic of Betula glandulosa scrub and Festuca altaica - lichen alpine tundra

* August 4, 1975 *

(195) vicinity of mouth of Connector Creek, at Coldfish Lake
alt. 4100 feet (1250 m)
white spruce - willow - dwarf birch - sedge swamp

(196) vicinity of head of Mink Creek, outlet of Coldfish Lake
alt. 3900 feet (1190 m)
lodgepole pine forest

* August 6, 1975 *

(197) Danihue Pass
alt. 5500 feet (1675 m)
muddy areas where trail crosses alpine rivulets

* August 8, 1975 *

(198) Spatsizi Plateau, above headwaters of Black Fox Creek
alt. 6100 feet (1860 m)
dwarf willow - grass - sedge - lichen alpine tundra

* August 9, 1975 *

(199) vicinity of mouth of Black Fox Creek
alt. 3900 feet (1190 m)
alluvial willow thickets

(200) lower Airplane Valley, above mouth of Black Fox Creek
alt. 4100 feet (1250 m)
white spruce - subalpine fir - moss forest type

* August 11, 1975 *

(201) Marmot Valley
alt. 5400 feet (1650 m)
Salix reticulata - sedge - moss alpine seepage

(202) Kettlehole Pass
alt. 5300 feet (1620 m.)
willow clump in subalpine grassland

(203) Solifluction Ridge
alt. 6700 feet (2045 m)
dwarf willow - grass - sedge - lichen alpine tundra

* August 14, 1975 *

(204) along Landslide Creek @ 0.3 km NW of U.B.C. cabin
alt. 4200 feet (1280 m)
alluvial white spruce - moss forest type

* August 15, 1975 *

(205) Wolverine Ridge; rimrocks at head of S fork of Marion Creek, Spatsizi Plateau
alt. 6600 feet (2010 m)
gravelly scree along cliff edge

(206) Lupus Ridge; E-W ridge between 2 forks of upper Marion Creek, Spatsizi Plateau
alt. 6500 feet (1980 m)
sedge marsh on edge of shallow alpine pond

(207) Lupus Ridge; E-W ridge between 2 forks of upper Marion Creek, Spatsizi Plateau
alt. 6500 feet (1980 m)
alpine seepage area

(208) Purple Daisy Ridge, above Cache Creek Camp, Spatsizi Plateau
alt. 5600 feet (1710 m)
mesic Festuca altaica subalpine grassland

* August 16, 1975 *

(209) Wheatear Ridge
alt. 6800 feet (2075 m)
fjeldmark vegetation on gravelly, windswept ridge

(210) along old Indian trail up Kliweguh Creek, @ 4 km NW of Cache Creek Camp
alt. 5000 feet (1525 m)
small subalpine pool

(211) Wheatear Ridge
alt. 6700 feet (2045 m)
in crevices between boulders in alpine fell field

(212) Wolverine Ridge
alt. 6600 feet (2010 m)
dwarf willow - grass - sedge - lichen alpine tundra

* August 19, 1975 *

(213) slopes leading up to W entrance to Sanctuary Pass
alt. 5000 feet (1525 m)
mesic Festuca altaica subalpine grassland

(214) slopes leading up to W entrance to Sanctuary Pass
alt. 5000 feet (1525 m)
lush subalpine meadow in seepage area

(215) Sanctuary Pass
alt. 5400 feet (1645 m)
sedge - forb - moss alpine fen

(216) Sanctuary Pass
alt. 5600 feet (1710 m)
snow bed area surrounded by Cassiope mertensiana - Sibbaldia procumbens - Lycopodium alpinum subalpine heath

* August 20, 1975 *

(217) between mouth of Connector Creek and head of Mink Creek
alt. 4100 feet (1250 m)
mucky pond margins and adjacent white spruce - willow - dwarf birch - sedge swamp (low moor)

(218) S end of Gladys Lake, near mouth of Alces Creek
alt. 4100 feet (1250 m)
sedge marsh and shallow-water deltaic mudflats

* August 22, 1975 *

(219) @ 4 km NE of U.B.C. cabin, between Connector Creek and lower slopes of Ghost Mountain
alt. 4100 feet (1250 m)
willow - sedge - moss swamp (low moor)

(220) vicinity of U.B.C. cabin, just across Landslide Creek
alt. 4200 feet (1280 m)
white spruce - willow swamp

(221) @ 4 km NE of U.B.C. cabin, between Connector Creek and lower slopes of Ghost Mountain
alt. 4200 feet (1280 m)
Salix glauca - barclayi subhygric willow thicket

(222) @ 4 km NE of U.B.C. cabin, between Connector Creek and lower slopes of Ghost Mountain
alt. 4200 feet (1280 m)
white spruce - moss forest type

* August 25, 1975 *

(223) NE flank of Ovis Ridge
alt. 5900 feet (1800 m)
alpine heath

(224) crest of Ovis Ridge
alt. 6500 feet (1985 m)
rocky ridge, cliffs and talus

(225) NE flank of Ovis Ridge
alt. 5200 feet (1585 m)
Abies lasiocarpa - Betula glandulosa - Empetrum nigrum subalpine forest type

* August 26, 1975 *

(226) N face of Mount Will, beneath Stark Cirque
alt. 5000 feet (1525 m)
talus slope

(227) Mount Will
alt. 8000-8300 feet (2440-2530 m)
summit ridge and cliffs

* August 28, 1975 *

(228) SW-facing steep slopes below Ochre Cliffs, above old Gladys Lake Camp
alt. 4500 feet (1370 m)
Juniperus communis - Arctostaphylos uva-ursi - grass association

(229) Ochre Cliffs, directly above Gladys Lake Camp
alt. 5000 feet (1525 m)
sheep cave and grassy, well-manured berm at its mouth

(230) @ 4 km SE of Gladys Lake, on bench above and on NE side of Salix Creek
alt. 4600 feet (1400 m)
willow - sedge - moss swamp (low moor)

* August 29, 1975 *

(231) NE flank of Rangifer Ridge
alt. 5500 feet (1675 m)
alpine heath

(232) crest of Rangifer Ridge
alt. 7200 feet (2200 m)
cliff ledge

(233) Castor Creek valley, vicinity of MacMillan Camp
alt. 5200 feet (1585 m)
hygric subalpine seepage meadow, on alluvial fan

* August 31, 1975 *

(234) Castor Creek valley, vicinity of Castor Lake
alt. 4500 feet (1370 m)
caribou leg bone, in dwarf birch scrub

APPENDIX IV

Wildlife Sightings - Rosemary Fox

July 26 - August 16, 1975

4669 Drummond Drive
Vancouver, B. C. V6R 1E8
18 September 1975

Dr. Jim Pojar
Ecological Reserves Program
Dept. of Lands, Forests and Water Resources
Victoria, B. C. V8V 1X5

Dear Dr. Pojar:

Further to our telephone conversation the other day in which you asked for information on wildlife seen by us in the Klahowya Lake area this summer, I hope the following notes on what we saw may be of some use to you.

First of all I apologize for the poor quality of the map which I enclose. It was the best the xerox machine could do. By comparing it with, or copying it onto one of your own topographic maps it can hopefully be made to serve its purpose.

Our party of four flew in to Klahowya Lake on Saturday, July 26, and flew back to Smithers from Klahowya Lake on Sunday, August 17. We camped at Klahowya lake nine nights, those of July 26-30 inclusive, August 7 and 8, and August 14, 15 and 16. From July 31 - August 7 we backpacked around to the north side of Crescent Mountain via the valley of the Buckinghorse (route marked in blue on the map). From August 9-14 we backpacked over to the Stikine and back by the source of the Ross (route marked in red on the map). On the first (blue) circuit we spent one night at each campsite (numbered on the map), except for No. 3 where we spent three nights and had two full days to hike from there. On the second (red) trip we spent three nights at the first camp, which was in an alpine 'bowl' at about 5,500 feet on the west side of a pass between the Ross and the Stikine, and two nights at the second camp, and we hiked on the layover days. While we were at Klahowya Lake we hiked every day - around the lake, up the mountainsides to the north and south and along the valley floor towards the Ross. While we backpacked and camped as a foursome, we split up, usually in pairs, for day hikes. While the bird list enclosed with this letter is my own, the animal records include those seen by all of us - though I may have omitted a few caribou seen by the others.

With this kind of background on how and where we spent our time, the following are our records of animals seen:

CARIBOU. 15 while we were camped at Klahowya Lake: one lone bull

on Crescent Mountain which we saw several times, and two other sightings of single animals on Crescent Mountain, and two caribou on Crescent Mountain close to the Ross; 5 cows and a calf on the mountainside south of Klahowya, 2 caribou together in the same area on another day, and 2 bulls by the shore of the lake. One bull in Buckinghorse Creek valley at campsite 2. Two caribou in the mountains north of campsite 3 on the blue circuit. Two bulls in the alpine bowl on the north side of Crescent Mountain (campsite 5). On the second backpacking trip (red) we saw about half a dozen young bulls in the alpine bowl east of the Ross (campsite 1) and about 15 caribou in the vicinity of the pass between that bowl and the Stikine valley. These last were seen in ones, twos and threes and were all moving east along Tuaton mountain. They were seen in the course of three days and we had the impression that there was a migration on. Two more caribou were seen in the Stikine valley immediately below this pass (campsite 2) - singly but within a few minutes of each other. The approximate location of caribou sightings are marked with a C on the map. In addition to these sightings (total, about 40), we saw tracks just about wherever we went.

MOOSE. We saw 3 moose (all bulls) around Klahowya Lake, two bulls close to campsite 1 in the valley of Klahowya Creek, on the blue circuit, and 1 bull (sighted twice) in the valley to the north of campsite 3; one cow in what Tommy Walker calls Sloughgrass Pass between campsites 3 and 4. On our second circuit (red) we saw one cow and a calf on the south slope of Tuaton mountain. Total of 9. Moose sightings are marked with an M on the map. Moose tracks were also numerous.

GOAT. We saw 10 goats (4 and 6) in the mountains north of campsite 3 on the blue circuit, 5 goats (2 and 3) on the mountains enclosing the alpine bowl at campsite 1 on the red circuit (between the Ross and Stikine), and 3 goats at a great distance further down the Ross from this same campsite. They were visible as white dots only but since they moved they were presumably reliable sightings. We also saw one goat from the upper Ross valley on the mountain south of Klahowya Lake. Total: 19. Goat sightings are marked with a G on the map. In addition to these sightings, there was a salt lick close to campsite 4 on our blue circuit which was obviously much frequented by goats. We saw tracks of many goats on Crescent Mountain and at our first campsite on the red circuit (in the alpine bowl between the Ross and Stikine) we were camped beside a goat trail that was heavily tracked.

GRIZZLY BEAR. One bear was seen on the mountainside south of Klahowya Lake. On nearly every hike we took we saw bear droppings, many of them old, but some fresh. We saw tracks in Sloughgrass Pass north of Crescent Mountain, in the valley between Klahowya Lake and the Ross, in the upper Ross and in the upper Stikine between campsite 2 and the source of the Stikine.

HOARY MARMOT. Numerous in the alpine bowl on the north side of Crescent Mountain (campsite 5 on the blue circuit) and less numerous but present in the alpine bowl (campsite 1 on the red circuit) between the Ross and the Stikine. Also heard on a number of hikes in the high country.

ARCTIC GROUND SQUIRREL. Several seen.

CHIPMUNK. Several seen.

BEAVER. We saw 4 at one time on Klahowya Lake and individuals on several occasions. They seemed to be particularly active on the north side of the lake, where there were 2 lodges within sight of our camp (at least one of which was functioning) and numerous trails leading to willow, on which they seemed to feed. There was an active beaver dam in the upper Stikine valley (camp 2 on the red circuit) where one beaver was seen, and there were signs of beaver close to camp 3 on the blue circuit where aspens had been felled (not recently).

The above are the mammals which we saw and identified. In addition the following observations may be of interest.

WOLF. We saw none but encountered their tracks on nearly every hike both in the valleys and at the higher elevations.

OTTER. Tracks of what I assume to be Otter on the upper Stikine (campsite 2 on red circuit). I have photographs of them.

WOLVERINE. Large (size of small wolf) 5-toed tracks on Tuaton mountain. No particular pattern.

SHEEP. No evidence of them anywhere we went.

PORCUPINE. One encountered by our dog in scrub alpine fir on Crescent Mountain.

BIRDS

The following is a list of birds but I am afraid I did not keep very precise records as to numbers and locations. Better weather would doubtless have permitted a longer list.

COMMON LOON - seen twice on Klahowya Lake
ARCTIC LOON - once on Klahowya Lake
CANADA GOOSE - a flock of about a dozen in the Stikine valley
GREEN-WINGED TEAL - a few on Klahowya Lake
BLUE-WINGED TEAL (Klahowya Lake)
WHITE WINGED SCOTER - several on Klahowya Lake
SURF SCOTER - ? two females on Klahowya Creek
GOLDEN EAGLE - several times
GROUSE - ? Spruce Grouse
PTARMIGAN
SPOTTED SANDPIPER - common around Klahowya Lake & several seen elsewhere.
SOLITARY SANDPIPER - seen a couple of times
WANDERING TATTLER - one in upper Ross
NORTHERN PHALAROPE - one in Stikine valley (photographed)
HERRING GULL - Klahowya Lake
BONAPARTE GULL - half a dozen once, over Klahowya Lake
HUMMINGBIRD - several times at Klahowya Lake
HORNED LARK - Tuaton Mountain
CANADA JAY

RAVEN - once only, at Klahowya Lake
DIPPER
ROBIN
HERMIT THRUSH
WATER PIPIT
WAXWING (Klahowya Lake)
RUSTY BLACKBIRD - Stikine valley
PINE GROSBEAK - near Klahowya Lake
GRAY CROWNED ROSY FINCH - a couple of times at higher elevations
TREE SPARROW - common
GOLDEN CROWNED SPARROW - common
SNOW BUNTING - several times at higher elevations

PLANTS. As I said on the phone, I am afraid none of us knew very much about flowers and could only make rather general identifications. However, I did take photographs of many varieties and would be glad to let you see them if you are interested.

I hope the foregoing is of some help. Please get in touch if you would like any further information about the time we spent in that area.

Sincerely,

Rosemary J. Fox