

LIARD RIVER HOTSPRINGS PARK

Park Use Observations and Natural History Observations

(Autumn, 1974 and Winter-Spring-Summer, 1975)

by

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Autumn, 1975

SECTION I  
NATURAL HISTORY OBSERVATIONS

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#### A. PREVIOUSLY UNREPORTED HOT SPRINGS

During the course of my work in the park, one additional hot spring complex was discovered. Like all other park thermal springs, this one is located near the base of the hillside plateau north of the park. These are the most eastern known hot springs and located as they are towards the Large Cold Pond, would seldom be visited by man. Further location details are noted on Figure 1 which shows the approximate size and shape of the pools and their associated drainage stream. These waters eventually drain to the Large Cold Pond fen complex.

The most western spring within this complex is in a comparatively advanced seral stage. Mimulus and Scirpus, along with many different mosses characterize the largely emergent vegetation (Plates 1 and 2). The springs and immediate drainage of the remaining portion of the hot spring complex was considered to have a unique vegetation type. Mimulus, Chara and lime encrusted aquatic mosses characterized this association (Plates 3 and 4). Temporary reference names ("TR49" and TR50" based on their vegetation plot numbers) were assigned these hot springs.

Separate water analysis was done for the "TR49" and "TR50" hot springs and the results are reported elsewhere. The results show approximate similarity in chemical composition. More specifically, "TR50" has somewhat higher specific conductivity, total alkalinity and total  $\text{CaCO}_3$  hardness. Slightly greater concentration of dissolved calcium, magnesium, sodium, potassium, and chloride are found but the dissolved sulfate is slightly lower than in "TR49".

Some temperature measurements were taken from early May to July, 1975 (Table 1). Temperature remained constant for "TR49" at a mean temperature of  $19.7^\circ\text{C}$ . The "TR50" data may suggest a slight temperature increase for the same time period. The mean temperature for this pool was  $17.7^\circ\text{C}$ .

This isolated hot spring complex may receive increased ungulate usage in early spring. Deer tracks and droppings were noted adjacent to the spring, in the last half of April.

Small fish believed to be Lake Chub were observed in the drainage streams.

APPROXIMATE LOCATION IN PARK:

- 1. FROM UPPER LEFT CORNER OF AERIAL PHOTOGRAPH B.C. 5477:181 - RIGHT 96mm, DOWN 110mm.
- 2. FROM PARK TOPOGRAPHIC MAP DRAWING NO. 11-79 SHEET NO. 6 OF 12, FILE NO. 2-4-6-1: ADJACENT TO POSITION 1+00, 107.5 mm. FROM BASELINE 2M.

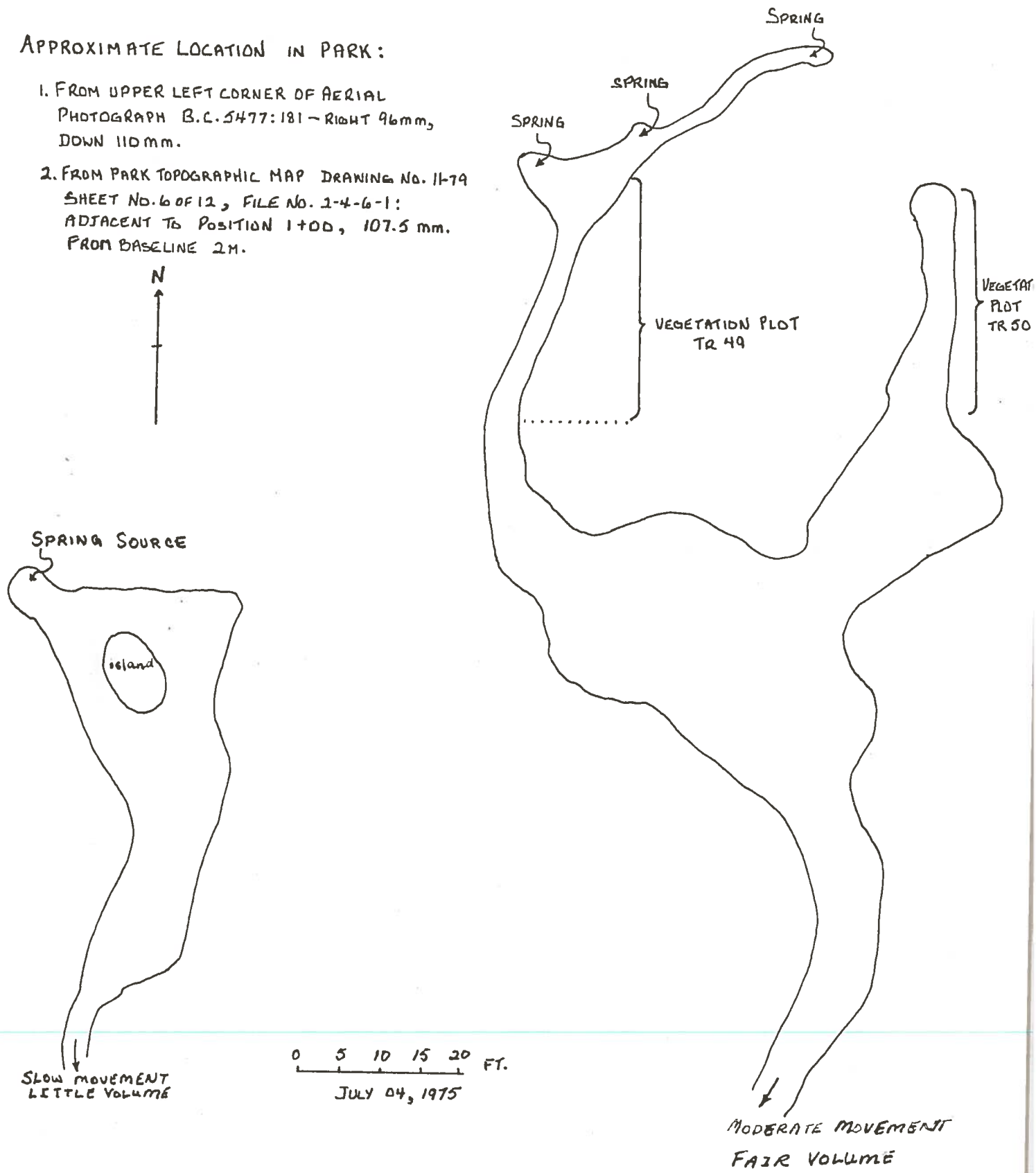


Figure 1: Sketch Map of Previously Unrecorded Hot Springs



Plate 1. Source of the most western spring of the thermal complex.



Plate 2. Mimulus and Scirpus are prominent members of the emergent vegetation characterizing the westernmost spring.





Plate 3. These thermal streams were frequented by deer in the early spring.

Plate 4. Mimulus, Chara, and lime-encrusted aquatic mosses are typical for this association. (photo late - May photo).



Hot Spring Water Temperatures

<u>Date, 1975</u>	<u>Time, hr</u>	<u>Temperature, °C.</u>		
		<u>Air</u>	<u>Water Surface</u>	
			<u>"TR49"</u>	<u>"TR50"</u>
May 06	0900	6.0	19.7	17.2
13	0930	9.0	19.8	17.5
27	1000	14.1	19.8	17.8
June 03	1225	10.0	19.5	17.9
July 08	0700	14.0	19.8	18.2
Mean Temperature			<u>19.72</u>	<u>17.72</u>

Table 1.1.

B. WATER CHEMISTRY REPORT

Surface water samples were taken July 19 and analysed July 31, 1975. Unless otherwise noted, all hot spring samples were taken at the point where the springs entered the pool.

The Fern Creek sample was taken from this creek where it intersects the trail to Beta Hot Pool. The Large Cold Pond sample was taken from the water adjacent to the small peninsula.

Results of these tests are given in Table 2. True color is given in relative units and specific conductance in microohms per centimeter. With the exception of plt values, all other units are in milligrams per liter. Tests on pen<sup>h</sup>ol<sup>h</sup>thalein alkalinity and dissolved nitrate were not performed due to sample transit delays.

Water Chemistry Analysis

	Alpha Dam	Alpha	Beta Outlet	Gamma	Delta	Epsilon	Chi	Psi	"TR49"	"TR50"	Fern Creek	"Large Cold Pond"
pH	7.5	7.1	7.8	7.4	7.2	7.2	7.2	7.5	7.4	7.4	8.1	7.8
True Color	15	15	15	15	15	15	15	15	15	5	15	10
Specific Conductivity	1200	1290	1160	1050	1050	1140	1010	864	1100	1130	715	1260
Total Alkalinity	168	154	183	173	202	184	241	224	211	225	250	186
Total CaCO <sub>3</sub> Hardness	654	703	633	563	568	618	555	471	601	620	395	749
Dissolved Calcium	209	224	199	176	177	194	182	153	192	198	131	254
Dissolved Magnesium	32.0	35.0	33.0	30.0	30.5	32.5	24.5	21.5	29.5	30.5	16.4	28
Dissolved Sodium	14.1	16.0	13.5	11.5	11.1	12.8	8.9	7.0	11.3	11.9	4.1	7.2
Dissolved Potassium	9.0	10.2	8.5	7.5	7.2	8.3	5.7	4.6	7.0	7.2	2.8	3.5
Dissolved Sulfate	491	581	466	406	381	451	321	245	401	391	148	571
Dissolved Chloride	15.3	17.8	14.0	11.5	11.1	13.1	9.3	6.6	12.0	12.4	3.4	6.3
Dissolved Fluoride	2.76	2.91	2.58	2.34	2.43	2.56	2.05	1.73	2.26	2.23	1.43	0.82
Reactive Silica	43.2	48.4	40.8	36.6	36.0	40.6	26.7	23.6	29.3	29.5	151	29.4

Table 2

### C. WINTER WEATHER OBSERVATIONS

A detailed examination of the microclimatic weather patterns existing in the park will be presented in my final report. However, it may be of some present interest to record some details of air temperature and snowfall. These data were derived from the "control station" LCP and are believed to approximate the regional weather pattern. These data are given in Table 3.

Minimum air temperatures near or below 0°F were recorded from late November to early April. Only one week was recorded in which the maximum air temperature remained below the zero point. This week had a maximum temperature of -10°F.

The first permanent snowfall was recorded in late November. The permanent snow cover lasted until early to mid April for a snow duration approaching five months. This snow duration approximated the time at which the minimum air temperature was 0°F or lower. Total snowfall was light and was in excess of only twenty-five inches (chinooks precluded an accurate snowfall measurement.)

Mild chinooks were a conspicuous phenomenon in the early winter. These resulted in observable snow melt on all occasions.

Other observations are not given on this table. Winds were generally light with most days having an estimated wind speed of less than five miles per hour. Several winter days had an estimated wind speed exceeding ten miles per hour but these were comparatively rare. Days were usually sunny with little cloud cover evident during the colder weather. An unremembered source book had stated that northern British Columbia records the maximum number of hours of sunshine for the province during the winter months. This is apparently accomplished despite the north's reduced winter daylight hours.

Selected Data from Meteorological Station LCP

Week	Air Temperature, °F.			Snowfall, In.	Remarks
	Max.	Min.	Range		
1974 Nov. 13	34.2	9.0	25.2	-	Rain
20	51.6	0.2	51.4	-	Chinook; Rain
27	10.8	-14.9	25.7	1.15	First permanent snowfall
Dec. 04	23.2	-4.8	28.0	tr.	
11	44.5	-16.0	60.5	0.00	Chinook
18	16.0	-26.1	42.1	3.05	
24	42.0	-15.8	57.8	tr.	} Chinook
31	45.2	-9.8	55.0	1.20	
1975 Jan. 07	41.4	-34.0	75.4	0.60	
14	-10.0	-50.0	40.0	1.80	
21	40.4	-23.6	64.0	tr.	Chinook
28	30.9	0.0	30.9	10.40	
Feb. 04	16.4	-44.0	60.4	tr.	
11	7.9	-33.8	41.7	0.00	
18	43.0	-46.0	89.0	0.40	
25	48.4	1.4	47.0	0.00	
Mar. 04	40.8	-9.8	50.6	1.20	
11	33.1	-25.0	58.1	0.00	
18	39.4	-	-	0.00	
25	36.0	-9.0	45.0	0.25	
Apr. 01	45.3	-5.8	51.1	5.00	
08	49.8	-8.5	58.3	0.00	
15	65.3	14.2	51.1	-	Snowmelt 50% complete; Rain

Table 3

#### D. WINTER SNOW AND ICE OBSERVATIONS

The first snowfall that did not subsequently melt (i.e. the first permanent snowfall) was recorded in late November. Snow existed to the edge of the water at Alpha Hot Pool, Epsilon Hot Pool, Beta Hot Pool, Psi Hot Pool and for most of the Warm Pondered Swamp region. The newly reported hot pools ("TR49" and "TR50") also remained snow free but the drainage stream, which may be 60 or 70 cm. below the ground level in certain spots would often have a snow bridge forming over the stream. These snow bridges appeared to form from wind blown snow crystallizing into position. Snow bridges in the area examined covered only three to four meters of the stream and alternated with an approximately equivalent length of open water.

Snow melt was well underway by mid-April. Slope, aspect, proximity to thermal waters, and shading effects were factors governing the rate of snow melt. Most observed areas had only small remnants of the former snow cover by April 22, 1975. One week later only former snowshoe trails, the shady side of logs, and sheltered or forested areas on Mt. Ole had significant snow patch remnants. More detailed snowmelt observations are presented in Table 4.

Winter ice free areas included Alpha Hot Pool, Beta Hot Pool, Epsilon Hot Pool, Psi Hot Pool and most of the Warm Pondered Swamp region. The shallow, slow moving water in the small cove on the northeastern side of the Warm Pondered Swamp eventually froze to the bottom. This freezing extended into the swamp to a maximum extent of approximately seven meters. Only the shallow periphery was so affected and less than five per cent of the total Warm Pondered Swamp was ice covered.

The pond adjacent to the parking lot (and on the opposite side of the boardwalk from the Warm Pondered Swamp) showed a slow but continual ice coverage throughout the winter. Ice eventually covered the shallower areas close to the boardwalk and spruce island leaving only the deeper waters ice free. Approximately sixty per cent of this pond was ice covered at the maximum extent of the freezing.

Areas completely frozen over included the Large Cold Pond and the pond adjacent to the highway. The Large Cold Pond was completely frozen over by October 30, 1974. By April 29, 1975 snowmelt over the ice was complete but the pond still remained ice covered. On this same date the highway pond was ice free. The thermal water flowing into the highway pond would account for these observed differences.

Hoarfrost is a conspicuous winter phenomenon in the areas of comparatively high relative humidity that are associated with the thermal pools.

Some winter aspects of the park are provided in Plates 5 to 12.





Plate 5. Bathing facilities removed from Beta Hot Pool.

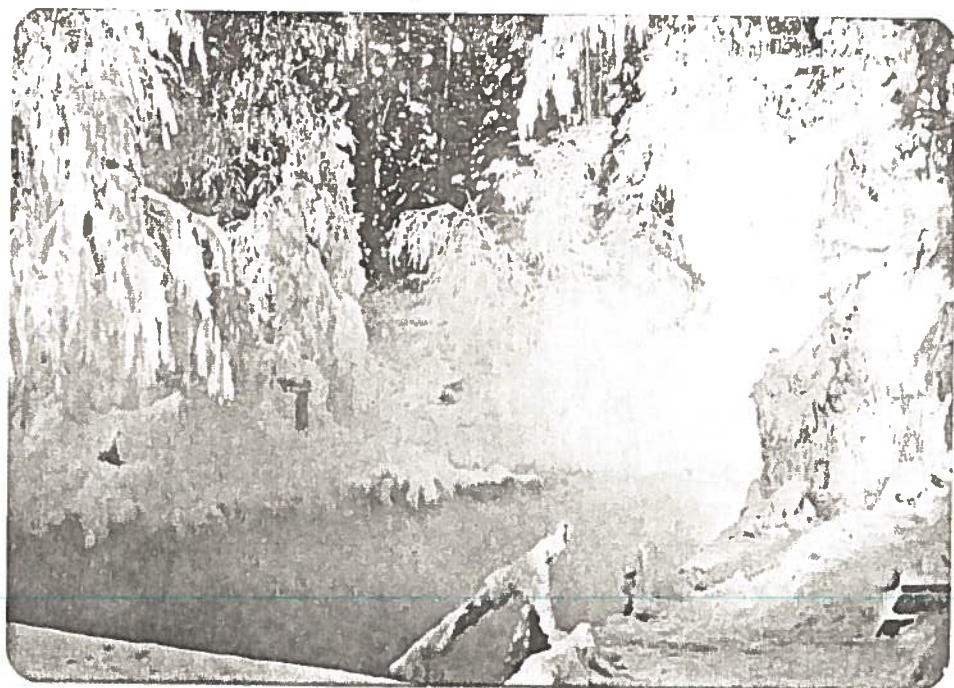


Plate 6. Trees adjacent to Alpha Hot Pool are often covered with rime. Trees in the background lack this coating. (February).

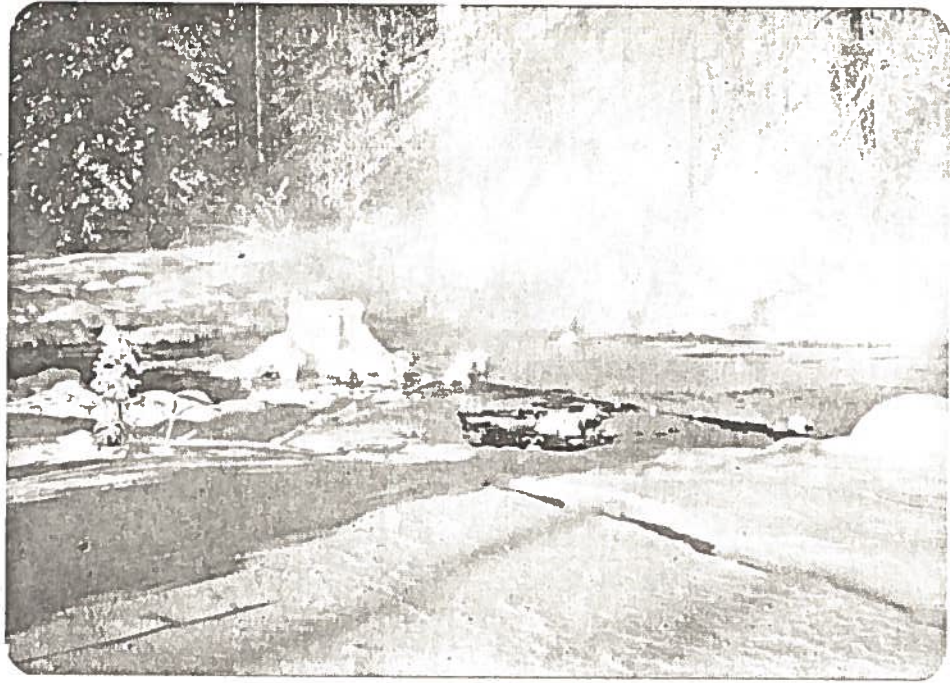


Plate 7. Epsilon Hot Pool remained snow and ice free throughout the winter. (February).



Plate 8. The stream draining the Warm Pounded Swamp remained ice free. (February). A dipper was often seen at this location.

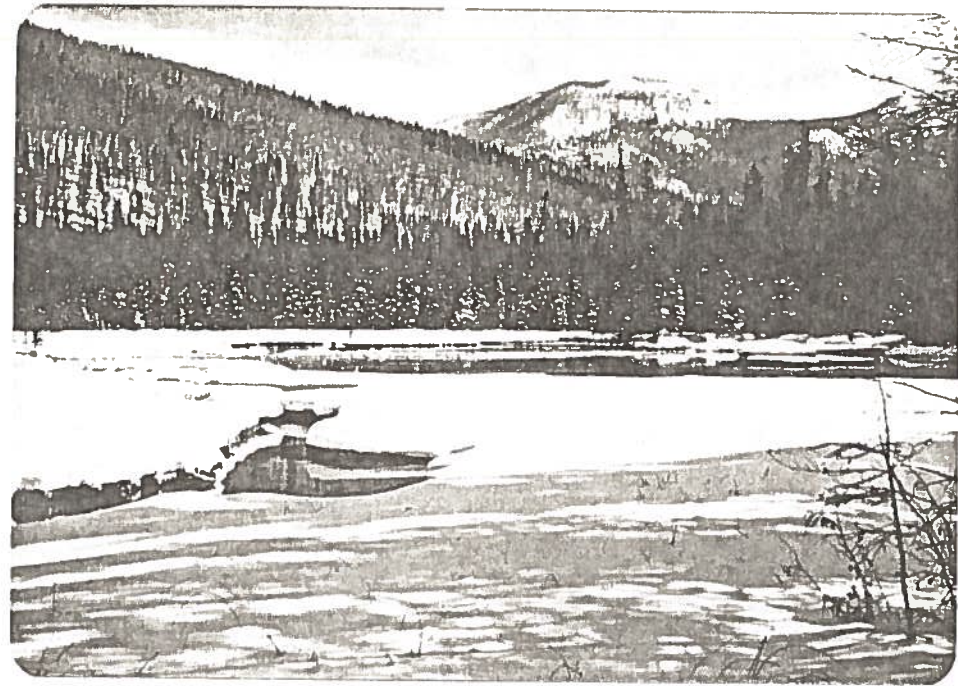


Plate 9. The pond located adjacent to the parking lot became progressively covered with ice. A considerable amount of open water remained and permitted Mallards to over-winter. (late March photo)



Plate 10. The Hanging Garden often had more snow than shown in this late March photo.



Plate 11. Snow lies to the edge of the stream draining Alpha Hot Pool. (February)

Plate 12. Larch adjacent to the boardwalk were often coated with rime. (February)



Snow Melt Observations, Spring, 1975Estimated Percentage Snow Cover

Area	April: <u>8</u>	<u>9</u>	<u>10</u>	<u>15</u>	<u>22</u>	<u>29</u>
Dogbane plot by trail between hot pools	15			0		
White spruce - moss plot above dogbane		95	50	5		
Ostrich fern glade (beneath Birch)				10		
Rich mixed forest on trail to fern glade				40		
Rich mixed forest by Alpha Hot Pool drainage stream				70		
Moose churned fen by Epsilon Hot Pool				70		
Black spruce forest by the large cold pond				70	2	0
Ostrich fern glade (in the open)				75	20	0
Forest trail to the large cold pond				85	3	0
Ostrich fern plot by Psi Hot Pool				95		

Table 4

E. BOTANICAL REPORT

Twenty additional vegetation plots were completed in the brief 1975 field season bringing the total number to sixty-three. The total number of species recorded in each study plot stratum is given in Tables 5 to 7. One additional tentative association type was recognized and four vegetation plots were completed on this type.

Yellow Monkey-flower - Common Stonewort Association Type

This aquatic association was restricted to flowing thermal mineral waters. A and B strata were lacking and the C stratum was dominated by Mimulus guttatus. Cicuta douglasii was also present. Chara vulgaris was conspicuous in the D stratum but currently unidentified aquatic bryophytes dominated this layer (Plate 4).

Thirteen additional soil pits were completed. Since my return from the field, all soil samples from the last two field seasons have been sieved, weighed, coded and sent to a lab for chemical analysis.

A detailed description of plant associations and soils will be provided at a later date (in the form of my thesis).

Plant specimens collected that were not reported by A.E. Porsild (1961. The Vascular Flora of Liard Hotsprings, B.C. With Notes on Some Bryophytes. Nat. Mus. Canada, Bull. 171: 131-197.) are the following:

<u>Corydalis aurea</u> Willd.	golden corydalis
<u>Corydalis sempervirens</u> (L.) Pers.	pink corydalis
<u>Erysimum cheiranthoides</u> L.	wormseed mustard
<u>Lappula Myosotis</u> Moench	stinkweed
<u>Potentilla norvegica</u> L.	Norwegian cinquefoil
<u>Vaccinium uliginosum</u> L.	bog blueberry

These species are in addition to species previously reported (Reid, T. 1974. Field Research Initiated at Liard River Hotsprings Park, Summer, 1974. mimeo.)

FOREST

ASSOCIATIONS

Plot	White spruce - Hylocomium			Rich Mixed Forest			Black spruce - Pleuronium				Larch - Spruce - Bog Birch				
	15	44	47	05	09	43	04	45	46	48	01	17	61	62	63
A <sub>1</sub>	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0
A <sub>2</sub>	1	1	1	2	0	3	0	0	1	1	0	0	0	0	0
A <sub>3</sub>	2	1	1	2	2	3	2	2	2	3	0	0	0	0	0
B <sub>1</sub>	1	1	1	1	5	2	2	1	3	1	2	1	1	2	2
B <sub>2</sub>	3	2	3	4	7	6	2	2	2	1	14	6	7	9	10
C	14	7	7	20	16	15	12	13	12	18	40	29	28	40	37
D <sub>h</sub>	14	9	11	7	3	3	5	3	6	3	14	11	13	14	18
D <sub>w</sub>	16	16	14	18	14	20	10	10	8	20	9	0	0	0	6
E <sub>a</sub>	5	8	8	5	8	5	5	6	5	4	7	7	8	3	6
E <sub>b</sub>	6	0	0	6	11	7	4	6	7	7	5	3	6	5	5
E <sub>c</sub>	0	0	0	0	1	4	0	0	1	6	0	3	0	1	0

Table 5.

NON-FOREST ASSOCIATIONS

Plot	Devil's Club	Dogbane					Ostrich Fern					Yellow rose-sedge					Aster-graminoid					Violet-sundew				
		13	14	55	56	57	02	12	16	39	42	06	07	58	59	60	31	32	33	40	41	34	35	36	37	38
B <sub>1</sub>	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
B <sub>2</sub>	3	1	2	7	1	3	0	1	1	1	0	2	3	1	3	3	1	0	0	1	0	0	0	0	0	0
C	19	20	23	21	15	14	6	22	14	17	3	17	24	21	23	21	5	6	10	8	9	11	11	9	10	13
D <sub>h</sub>	2	6	1	8	7	4	7	3	2	3	0	9	7	5	6	5	0	0	0	0	0	0	0	0	0	0
D <sub>dw</sub>	5	0	7	10	2	1	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D <sub>t</sub>	0	6	0	7	6	2	0	0	0	0	0	0	0	0	0	0	5	2	5	6	6	5	6	5	5	3
E <sub>a</sub>	0	0	0	2	0	1	0	0	0	0	0	0	0	0	1	0	4	0	0	8	0	0	0	0	0	0

Table 6



AQUATIC ASSOCIATIONS

Plot	Cattail	Stonewort- Pondweed	Stonewort- Bladderwort	Monkey flower- Fleabane			Monkey flower- Stonewort			
	10	24-30	18-23	08	53	54	49	50	51	52
B <sub>2</sub>	1	0	0	0	0	0	0	0	0	0
C	20	2	2	5	7	8	8	10	2	8
D <sub>h</sub>	9	0	0	4	4	7	0	4	0	0
D <sub>ag</sub>	0	0	0	3	3	2	3	2	3	5
D <sub>dw</sub>	0	0	0	6	7	0	8	4	9	7

Table 7

In a separate project, some aspects of the vegetational history of northern British Columbia, northern Alberta, Northwest Territories, and the Yukon were considered. As some of these aspects are directly relevant to Liard River Hotsprings Park, the report is included as Appendix G.

#### F. OSTRICH FERN GROWTH

Ostrich fern was first seen to appear above the ground on April 8, 1975 by the side of Fern Creek in the Ostrich Fern Glade. Fiddleheads were seen around the weather station by April 24. One interesting feature of growth in this area is that growth was initiated at the creek and then proceeded inwards to the glade proper (Plate 14). Growth was rapid and appeared completed by the last half of June. Spores were being shed on July 5 on Plot TR39.

Some growth measurements were taken (Table 8). The values given represent the mean height of ten different semi-randomly selected specimens within a vegetation plot. A range of fern heights within a study plot was selected at each measurement period. (No attempt was made to re-measure the same individual plants at subsequent measurement periods.) These data serve to underline the rapidity of growth. A comparison of the June and July data suggests that growth was essentially completed by June 23.

These data were analyzed to provide information on the rate of growth per day. A conservative growth estimate was considered desirable so the lowest mean height value (of June 23 or July 13) was considered to be the mean height reached by the ferns on the study plot at the end of their growth. Growth was assumed to have ended by June 23. This procedure was considered desirable on the basis of sample variation and resulted in modified values for TR16 and TR 39. The increase in height between June 4 and the (perhaps adjusted) June 23 value was calculated. This was transformed into a mean growth per day for this June period. Values ranged from approximately 0.6 to 3.8 cm. growth/day for this time period, with the less mature plants having the most rapid growth (Figure 2.)

The rapidity of this growth is illustrated in Plates 13 and 14. In a three week interval, the plants have emerged and have grown taller than the height of the weather station.



Plate 13. Ostrich fern is not visible around the weather station.  
(May 13, 1975)

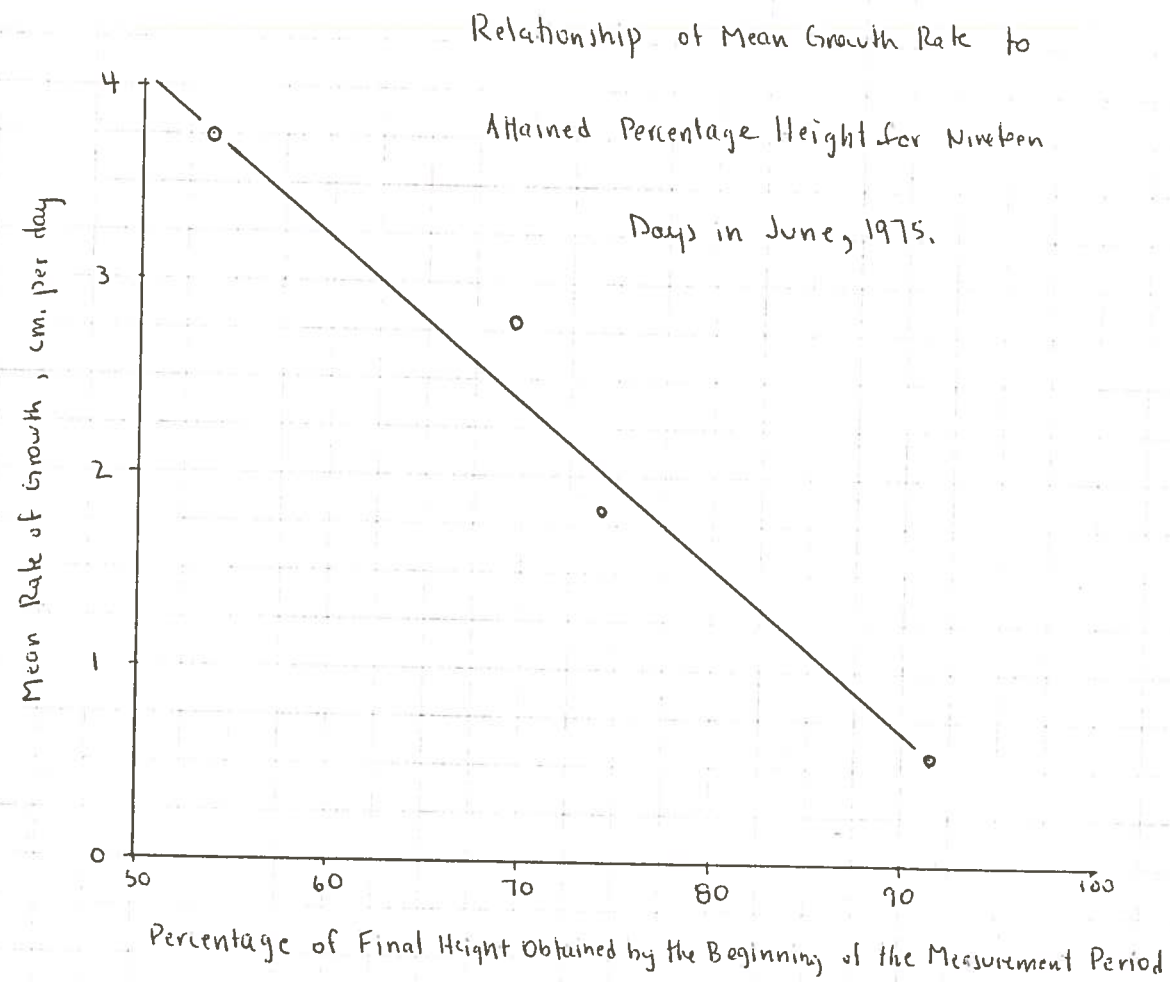


Plate 14. Three weeks later, the ferns dwarf the weather station.  
(June 3, 1975)

Mean Height of Ostrich Fern, *Matteuccia struthiopteris* (L.) Todaro

Location	Plot Number	Mean Height, cm.		
		June 04	June 23	July 13
Adjacent to Psi Hot Pool	TR39	98.3	134.7	133.3
West of Beta Tula dome, on trail to Epsilon Hot Pool	TR16	118.8	133.4	130.1
Ostrich Fern glade	TR42	83.2	154.6	158.5
Ostrich Fern glade	TRO2	122.6	176.2	179.2

Table 8



	TR 39 *	TR 16 *	TR 42	TR 02
June 23 height, cm.	133.3	130.1	154.6	176.2
June 4 height, cm.	98.3	118.8	83.2	122.6
Growth for 19 days, cm.	35.0	11.3	71.4	53.6
Mean growth per day, cm.	1.84	0.59	3.75	2.82
% of June 23 height attained by June 4	73.8	91.2	53.7	69.6

Note: see text for assumptions made on final height of Plots TR 16 and TR 39.

Fig. 2

G. AMPHIBIAN REPORT

The only amphibian known to occur within the park is the Northwestern (Boreal) Toad (Bufo boreas boreas Baird and Girrard). All tadpoles observed were assumed to be of this species. The dark coloration of these tadpoles, plus their habits of swarming and of swimming in a narrow band suggested that this assumption was not unreasonable for these are characteristics of this stage of the Northwestern Toad.

However, this assumption is not without some uncertainties. Other species may subsequently be found in the park. Information from Carl (1959) suggests the following possibilities:

1. The Swamp Tree-frog (Pseudacris nigrita septentrionalis, Boulenger) is known to occur in the Peace River District.
2. The Western Spotted Frog (Rana pretiosa pretiosa Baird & Girard) is known from the Cassiar and Peace River Districts.
3. The Northern Wood Frog (Rana sylvatica cantabringensis Baird) is found in "northern wooded" British Columbia and is common in the Peace River District.

One attempt was made to locate other amphibians. A hunt commencing June 14, 1975 at 2350 hrs. was terminated on June 15 at 0300. The pond by the highway was examined as well as the pond that feeds this highway pond. Numerous amphibians were observed but they were all the Northwestern Toad. Three specimens were collected but they turned out to be less prominently marked individuals of the same species so they were released.

The one search was characterized by both a comparatively small amount of time involved and a limited examination of only two small areas within the park. It is considered possible that other amphibians may eventually be discovered.

Some spring, 1975 toad observations were recorded. Daily trips were made past the Warm Pounded Swamp area and croaking is not believed to have started prior to the date on which it was first recorded. Since only one trip per week was made to the Epsilon Hot Pool area, croaking may have been initiated previous to the date on which it was initially recorded. Daily air

temperature ranges (°F) are given in brackets beside each observation date. These temperatures were recorded in the service area and would be modified at the hot pool water-air interface.

Warm Poneded Swamp Area (most observations made at or near the stream flowing from Alpha Hot pool)

- Feb. 16 (-7.5 to 18.7) sporadic croaking (heard from the edge of the water).
- 17 (2.5 to 34.8) a) sporadic croaking (heard from edge of the water)  
b) maximum estimated tadpole size: 2 cm.
- 18 (22.8 to 42.2) croaking (could be heard from boardwalk)
- Mar. 11 (05.0 to 33.1) croaking was not heard (from boardwalk)
- 12 (23.7 to 37.4) croaking could be heard (from the boardwalk)
- 14 (6.0 to 35.8) croaking was not heard (from the boardwalk)
- Apr. 01 (6.8 to 40.8) sporadic croaking
- 09 (28.4 to 57.7) maximum estimated tadpole size / 5 cm.  
The largest had their hind legs developed.  
The smallest observed were estimated at 1.5 cm.

Epsilon Hot Pool Area

- Feb. 18 (22.8 to 42.2) croaking not heard
- Mar. 07 ( ----- ) croaking not heard
- 11 (-5.0 to 33.1) sporadic croaking
- 18 ( ----- ) sporadic croaking
- Apr. 01 (6.8 to 40.8) almost continuous croaking
- 08 (24.2 to 50.2) fourteen adults observed spawning

Psi Hot Pool Area

- Mar. 14 (6.0 to 35.8) a) croaking could be heard (from trail above hot pool.)  
b) estimated maximum tadpole size / 1.5 cm.

Of particular interest is the Warm Poneded Swamp tadpole observation of February 17. This occurred one day after croaking was initially recorded. This may suggest the interesting possibility that the warmer and more protected waters of the Alpha Hot Pool drainage stream may be the site of very early spawning activities. This suggestion is partially reinforced by the initial toad observations all occurring within an estimated 15 meters of the junction of this stream with the warm ponded swamp complex.



The March observations for this area provide an interesting illustration of the well known effects of temperature upon these animals.

Reference

Carl, G. Clifford (1959) The Amphibians of British Columbia  
Third Edition. British Columbia Provincial  
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H. MAMMAL REPORT

A.L. Rand collected from the "Lower Liard Crossing Camp" on August 4-14 and 20-24, 1943. It would appear that this location is within the present park boundary. His 1944 publication contains much information significant to northern British Columbia parks. The general work of Cowan and Guiguet (1965) was consulted for range maps, and their summary of known occurrences and specimen collection localities. Pavlick (1974) listed many species known to occur within the park and was especially helpful with his mink observation. I regret that I was unable to obtain a copy of Sheldon (1932) for his elk observations, or Baker (1951) for his work in the region. Conversations with local residents, notably the local trapper of two years standing, Mr. R. Puttonen - provided much additional information.

Cowan and Guiguet (1965) place the Liard River Hotsprings Park within their "Boreal Forest Biotic Area". They state (p.24) "The small mammals peculiar to this biota are the tundra red-back vole (Lethrionomys rutilus dawsoni), the Arctic heather-vole (Phenacomys ungara mackenzii), the varying hare (Lepus americanus macfarlani), and the chipmunk (Eutamias minimus caniceps)."  
The chipmunk and the rare Arctic heather-vole are not currently known to occur within the park.

The following annotated list gives all animals known to occur within a twenty mile radius of the park. Most of these animals are known to occur within the park. A status listed as "hypothetical" usually means that that mammal has not been documented within the park although it is known to occur within the area. Exceptions to this generalization (eg. Pygmy Shrew, Arctic Heather-vole) are noted in the following list.

Order InsectivoraFamily Soricidae

Cinereus Shrew Sorex cinereus cinereus Kerr

The nocturnal habits precluded any sightings. Rand (1944) considered this species to be "by far the commonest shrew" on his Alaska Highway trip and collected eight at the Lower Liard River Crossing in August, 1943.

Wandering (Dusky) Shrew Sorex vagrans obscurus (Merriam)

Cowan and Guiguet (1965) cite occurrence at "hot springs near junction of Trout and Liard Rivers". This is probably in reference to the two collected by Rand at Lower Liard Crossing. He considered the species "not common" along the Alaska Highway. This is in striking contrast to Soper (1964) when he stated "is captured with nearly twice the frequency of the cinereous shrew with which it is commonly associated."

Navigator (Water) Shrew Sorex palustris navigator (Baird)

Rand (1944) stated "none was seen by the writer, but from local accounts it evidently occurs sparingly in the Lower Liard Crossing area at least." During the course of my field work a quick glimpse of a small animal entering or leaving the water was obtained on three occasions. It is not known whether any of these observations represent the Navigator Shrew for the Meadow Vole may have been the animal in question.

Pygmy Shrew Microsorex hoyi intervectus Jackson

This species is hypothetical for the park. Rand collected this species only at Iron Creek. Other known collections at Fort St. John and Telegraph Creek suggest that a trapping program may reveal the presence of this species within the park.

#### Order Chiroptera

##### Family Vespertilionidae

Little Brown Myotis Myotis lucifugus lucifugus (LeConte)

Small bats were commonly observed during summer twilight as they flew over the service area and campground. They were observed more often over and around the Warm Pondered Swamp region as well as at Beta Hot Pool. No sightings were made at Alpha Hot Pool. Rand suggested that more than one species may be present. The Keen Myotis - Myotis keeni keeni (Merriam) has been collected at Telegraph Creek, the rare Long-legged Myotis - Myotis volans longicrus (True) - at Atlin, and the Silver-haired Bat - Lasionycteris noctivagans (Le Conte) at Charlie Lake.

#### Order Lagomorpha

##### Family Leporidae

Snowshoe (Varying) Hare Lepus Americana macfarlani Merriam

This is one of the small mammals peculiar to the Boreal

Forest Biotic Area. One hare was occasionally observed in the service area during the summer evenings of 1974. These observations were the only visual observations. Tracks in the snow within the park were observed on only three occasions during the following winter. Mr. R. Puttonen stated that a number of hares were located in the former U.S. Army construction camp near the base of Mt. Ole. On two occasions winter hikes to this area failed to support his statement for no tracks were observed. A local resident living on the south side of the Liard River attempted to snare this species. I believe that two animals were snared in several weeks and the attempt was eventually abandoned.

Early spring track observations at Liard River Flight Strip No. 4 (adjacent to mile 5075) showed well marked trails. Indirect evidence of greater hare populations in other areas are suggested by good Canada Lynx trapping catches in the Coal River and Fort Nelson areas. Mr. R. Puttonen's catches of lynx were quite poor for the same time period.

In summary, there is some evidence to suggest that the scarcity of hares may be a local phenomenon. Rand cites a trapper (probably Thomas Mould) stating that the local "rabbit" cycle lags Fort Nelson by two years.

#### Order Rodentia

##### Family Sciuridae

Marmot (Woodchuck) Marmota monax ochracea Swarth

In north-central British Columbia, this animal is found on the north side of the Liard River. Rand collected one specimen from Liard River Crossing.

One visual sighting was made in the summer of 1974 as the adult animal made a log crossing over the stream that enters Gamma Hot Pool. One animal was occasionally heard during this summer when I walked directly from Epsilon Hot Pool to Gamma Hot Pool. One shrill "alarm" call was heard June 17, 1975 as I walked through the ostrich fern association on the trail immediately adjacent to Epsilon Hot Pool. The same alarm call was sounded one week later in this same location but this time I was able to observe at least one young marmot running from the trail into the fern. One

immature marmot remained on the trail long enough to be photographed (Plate 15).

Hoary Marmot (Whistler) Marmota caligata oxytona Hollister

This animal is not likely to be found within the park. Conversations with Mr. Puttonen suggest this animal is not uncommon in suitable terrain in the Rocky Mountains. Rand reported these animals are apparently found north of Lower Liard Crossing, and Cowan and Guiguet list a Fort Halkett collection.

Least Chipmunk Eutamias minimus (Bachman)

The ssp. caniceps Osgood has been considered by Cowan and Guiguet to be one of the small mammals typical of the Boreal Forest Biotic Area. Their distribution map suggests that in the vicinity of the park, the Liard River is the dividing line between ssp. borealis (Allen) to the north and ssp. caniceps Osgood to the south. Their listed caniceps collection sites include the junction of Ivans Creek and Liard River, and 10 mi. S 21 mi. E of Muncho Lake.

Rand (1944) considered caniceps to be common at Muncho Lake where two were collected in 1946. He stated the ssp. as being "absent from the heavily wooded country about Lower Liard crossing" although a sight record was obtained 8 mi. N.W. of this location.

Little documentation for borealis occurring in the immediate park vicinity is available. When Rand was discussing caniceps, he stated "...occasional specimens were seen, and one was taken at Muncho Pass, that are more brownish than the others, and individually would be referred to as borealis. But in naming the populations they should be referred to as caniceps, though with a tendency toward borealis."

No Least Chipmunk sightings were made and the species must be regarded as being hypothetical for the park.

Red Squirrel Tamiasciurus hudsonicus (Erxleben)

This animal is common throughout the park. Midden heaps may be an important mound-building mechanism for certain areas. Observations of two squirrels in a prolonged chasing ritual on April 15, 1975 and in another area of the park, a squirrel carrying



Plate 15. This immature marmot was photographed near Epsilon Hot Pool in late-June.



Plate 16. The ubiquitous red squirrel presents taxonomic uncertainties in the area near the park.

dried grass-like materials on May 23 appear to compare well with the Cowan and Guiguet mating and parturition dates of "late April" and "May or early June" respectively.

The subspecific status of park animals remains uncertain. The Cowan and Guiguet range maps show columbiensis Howell for the park but the specimen collected by Rand at Lower Liard Crossing appeared similar to the paler colored preblei Howell. National museum material showed that a Muskwa River and the Lower Liard Crossing material were like preblei but the McDonald Creek, Muncho Lake and Steamboat Mountain specimens appeared to be columbiensis. The notable displacement (approximately 65 miles westward from their published range) of the Liard publei specimen may be partially explained by Rand's suggestion that "preblei may intrude westward into river valleys" although Cowan lists columbiensis at the Trout and Liard junction (Plate 16).

Northern Flying Squirrel Glaucomys sabrinus alpinus (Richardson)

I did not observe this nocturnal species. Rand collected one specimen on August 5, 1973 at Lower Liard Crossing.

#### Family Castoridae

American Beaver Castor canadensis sagittatus Benson

No existence was noted that would suggest that this species presently occurs within the park boundary. Rand (1944) made reference to the beaver meadows, dam, and lodge within the present park boundaries. He estimated the beaver house to be at least fifty years old at that time. The known tolerance of these animals to salt water conditions may suggest a similar tolerance to mineral waters. It is considered likely that beaver were once present within the present park boundaries.

Beaver are currently active in areas adjacent to the park. I have observed an active lodge and dam downstream on a backwater of the Liard River (approximately three miles from the park entrance). Mr. R. Puttonen and others have reported beaver at the junction of Mould Creek and the Liard River (approximately 1.5 miles from the park entrance). Rand has reported a trapper (presumably Mr. T. Mould) stating that beaver and marten are the main fur animals to the north of the present park.

35

Family Cricetidae

White-footed (Deer) Mouse Peromyscus maniculatus borealis Mearns

I frequently observed this species in mesophytic areas throughout the park. Although Rand considered this species "undoubtedly occurs more or less commonly over the whole wood area" of his study, he found that "The heaviest population was in the heavy grass and bush in the edge of the meadow and poplar forest at Lower Liard Crossing." He collected five specimens on August 6 and 22, 1943.

Bushy-tailed Wood (Pack) Rat Neotoma cinerea drummondi (Richardson)

This species is approaching its northern limit at the park. Cowan and Guiguet (1965) give the range as "north to Liard River" for the Rocky and Selkirk mountains. Rand (1944) gives trapper statements suggesting "scarce north of Lower Liard Crossing". He obtained one specimen from the Crossing.

Tundra Redback Vole Clethrionomys rutilus dawsoni (Merriam)

Cowan and Guiguet consider this to be one of the small mammals characteristic of the Boreal Forest Biotic Area. Rand collected two specimens at Lower Liard Crossing but considered the species uncommon.

Arctic Heather-vole Phenacomys ungava mackenzii Preble

This rare species is unique to the Boreal Forest Biotic Area (Cowan and Guiguet, 1965). Only three British Columbia collections are known (Atlin, Tupper Creek, and near Charlie Lake) so it is doubtful that the species will be found within the park.

Meadow Vole Microtus pennsylvanicus drummondi (Audubon & Bachman)

During the course of field work, fleeting glimpses of a small mammal entering or leaving the water were occasionally obtained. The presence or absence of runways at the observation point was not determined. The animals in question may have been of this species or the Navigator Shrew. Rand considered the species scarce at Lower Liard Crossing where three specimens were collected in early August, 1943.



Long-tailed Vole Microtus longicaudus vellerosus Allen

Cowan and Guiguet (1965) state that this species is represented at "hot springs near junction of Trout and Liard Rivers".

Muskrat Ondatra zibethica spatulata (Osgood)

The entire region is quite poor muskrat country. Rand (1944) stated "the only first hand information as to muskrat occurrence was old sign seen in an old beaver pond at Lower Liard Crossing." These animals were apparently historically present within the park. Trapper information (presumably Mr. T. Mould) suggested that north of the park there were only a few scattered individuals except for one lake in which they were very common.

Family Zapodidae

Meadow Jumping Mouse Zapus hudsonius hudsonius (Zimmermann)

Rand reported three collections and one sighting near Lower Liard Crossing. At least one of the collection sites is known to be within the present park boundary ("edge of an old beaver pond in Tropical Valley.")

Western Jumping Mouse Zapus princeps saltator Allen

Hypothetical. The known association of this species with z. hudsonius plus the widespread collection sites for the north-land suggest that this species may eventually be recorded for the park.

Family Erethizontidae

Porcupine Erethizon dorsatum nigrescens Allen

I did not observe any evidence of porcupine either within or adjacent to the Park. A dog at the Smith River Airport provided undesirable evidence of the presence of this animal at this location. Rand received a report of one animal seen at Liard Crossing on August 4, 1943 and he observed porcupine tracks and sign in the beaver meadow (op. cit., p.26 and 46).

Order Carnivora

Family Canidae

Coyote Canis latrans incolatus Hall

Visual twilight sightings were occasionally made by Lower Laird River Lodge staff during the late fall and early winter of 1974. All sightings were believed to be of the same animal. Rand (1944) cites a trapper report (presumably Mr. T. Mould) that "in 6 years tracks of only two have been seen" in the country north of the park.

Wolf Canis lupus columbianus Goldman

During summer, 1974 a call believed to originate from the base of the hillside plateau was reported to me by a member of the park maintenance staff. Tracks from one individual were noted in the snow within the park on two occasions in mid and late January of 1975 (Plate 17). One wolf was reported to be seen at the Lower Liard River Lodge gas pumps in early 1975. Wolves were heard from the park on two occasions in the winter. A late March record involved a minimum of four animals howling from the plateau hillside base. A local resident, Mrs. L. Renfroew reported a visual sighting made several years ago involving a large number of wolves (perhaps thirty or forty) seen on the south side of the Liard River in the vicinity of the bridge. Rand considered them common.

Red Fox Vulpes fubra abietorum Merriam

Tracks made from a single animal were occasionally noted in the snow both within and immediately adjacent to the park. Mr. R. Puttonen would occasionally report tracks within a ten mile radius of the park. Rand (1944) gave a trapper report (presumably Mr. T. Mould) as indicating this species as fairly common and population numbers varying with those of rabbits for the area to the north of the park.

Family Ursidae

American Black Bear Ursus americanus cinnamomum (Audubon & Bachman)

Visual 1974 sightings were confined to several observations at the dump south of the Liard River and one fall observation on the C.N. tower road. Frequent sightings of an animal within the park were obtained in July of 1975. Bear tracks and scats were observed on several previous occasions. Old prominent climbing



Plate 17. Wolf tracks are frequently noted within and adjacent to the park.

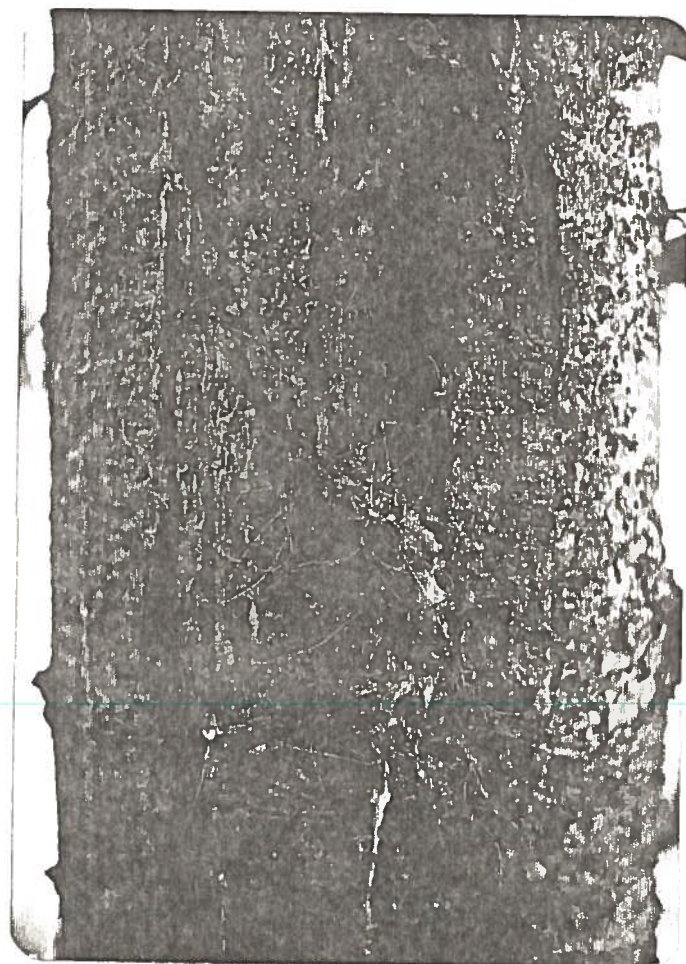


Plate 18. This sign, believed to be due to grizzly bear, suggests that these animals may be along the Liard River in spring as well as in fall. (late-May)

scars (on trembling aspen) that would be suitable for interpretive purposes are best exemplified at campsite number seventeen. Of historical interest is the report made to Rand that as many as eighteen bears could be simultaneously observed at the Lower Liard Crossing garbage dump.

Grizzly Bear Ursus arctos horribilis Ord

Pavlick (1974) has previously reported this species ranging on Mt. Ole. Mr. R. Puttonen has reported sighting this bear on the flatlands surrounding his cabin located at the former U.S. Army camp. Bear sign was observed and photographed (Plate 18) near the Liard River on May 31, 1975. This is in contrast to Rand's statement "Mould tells that in the lower, wooded country along Liard River tracks are seen only occasionally in the autumn."

Family Mustelidae

Marten Martes americana actuosa (Osgood)

Tracks in the snow were commonly observed within and adjacent to the park.

Fisher Martes pennanti columbiana Goldman

Hypothetical. The known spotty local distribution pattern (Soper, 1964) plus Mr. R. Puttonen's absence of track observations suggest that the species may not be found within the park. However, the animal's travelling ability "having a more or less regular beat up to 20 miles, or more from the home locality" (Soper, 1964) plus the collection site "near Fort Halkett" listed by Cowan and Guiguet, 1965 in addition to a trapper report (presumably Mr. T. Mould) as "not uncommon" in the area immediately north of the park (Rand, 1944) suggest that the species may occasionally enter the park.

Short-tailed Weasel Mutela erminea richardsoni Bonaparte

Tracks in the snow were occasionally noted within and adjacent to the park. One specimen trapped by Mr. Puttonen was examined. The species has been collected at Fort Halkett (Cowan and Guiguet, 1965) and Rand (1944) considered the species common throughout his entire study area.

Mink Mustela vision energumenos (Bangs)

Pavlick (1974) stated "One mink was seen swimming in a thermal brook." Rand (1944) noted "the abundance of mink seems to depend on the abundance of fish" and trapper information (Mr. T. Mould?) suggested that they were "scarce, not a good mink country" in the area north of the park "but occur along Liard River itself."

Wolverine Gulo luscus luscus (Linnaeus)

Hypothetical. Rand (1944) reported tracks seen only one year for a trapper's six year experience north of the park. Mr. R. Puttonen has not seen any indication of this species for the two years he has been trapping.

#### Family Felidae

Cougar (Mountain Lion) Felis concolor missoulensis Goldman

Hypothetical. Cowan and Guiguet (1965) state that this animal is "Rare north of the 54th parallel of latitude." However, Rand (1944) provides the following information from trappers:

"Buckinghorse River: one set of tracks seen in the snow several years ago.

Tobally Lake: one set of tracks was seen in the snow several years ago.

Big Muddy River: one taken by an Indian several years ago. The skin was hung in the Hudson Bay Company store for some time, and several trappers told of seeing it."

The Tobally and Big Muddy (now known as the Kechika) records suggest that an occasional rare animal may be found near the park.

Canada Lynx Lynx Canadensis canadensis Kerr

Track records from a single animal were occasionally made near the park cabin during the late fall and early winter of 1974. A visual sighting was made by my wife on one occasion, and the size suggested this animal was born that year. Lynx tracks were not noted in any area of the park after mid-winter, although tracks (believed to be from a larger animal) were occasionally observed at the mouth of the Trout River. The reason for the comparative scarcity of these predators is suggested by the very low varying hare population. Mr. R. Puttonen noted in early 1975 that more lynx had been taken in the Fort Nelson and Coal River areas than in his trapline area. These areas of greater lynx population appeared

to have a higher varying hare population as well. Rand (1944) noted "Lynx numbers fluctuate with those of the rabbits; where there is little fluctuation in the rabbit populations the lynx population remains fairly steady."

Order Artiodactyla

Family Cervidae

Rocky Mountain Elk (Wapiti) Cervus canadensis nelsoni Bailey

I received reports of tracks on the C.N. tower road in mid January, April 10 and 11, 1975. Ten days later, two separate visual observations of the animals in the forestry area were reported to me. Tracks from two animals were reported from the same area on May 3 but the animals had moved to the flatland east of Mt. Ole by the end of May. Based upon a number of reports, the local band appears to number about fifteen to perhaps twenty individuals. Sheldon (1932, cited in Rand, 1944) suggested that these animals may belong to the Muskwa-Toad River (Tuchodi Lake) band. Rand reported this band at 200 animals in 1935, 150 in 1937, and "holding their own" at least until 1941. Sheldon stated the band ranged to the Liard River with some suggestion of them ranging even north of that. Rand failed to find evidence of elk existing north of the Liard. I have received one trapper report suggesting that these animals range eastward at least to the Aline and Nordquist Lakes. The range of this band given by Cowan and Guiguet (1965) was "Tuchodi Lake area, with occasional records north to Lower Post and the upper Liard River."

Mule Deer Odocoileus hemionus hemionus (Rafinesque)

Animals in this area are near the northernmost part of their range. Rand (1944) notes that six or seven animals were reported to have wintered on Mt. Ole. My observations included track and scat observations in the forestry area, in the newly reported ("TR49") and "TR50") hot spring area, and along the slope and base of Mt. Ole. On one occasion an animal was started from the woods adjacent to the Liard River at this point. Spring, 1975 records tracks observed in the new hot spring area on April 15 and 22, a report of track records for two animals in the forestry area on May 3, and a report of a visual sighting of one doe within the park on May 20. I also recorded tracks outside the park (flat land east of Mt. Ole) on May 31.

British Columbia Moose Alces alces andersoni Peterson

Rand (1944) noted "The big beaver pond below the hot springs is apparently a moose lick, and its bottom is trampled with moose tracks. The meadow by the road...was said to be a favourite place for moose in the rutting season." At least four different animals could be observed within the park during the summer of 1974.

There were a yearling bull, mature bull, dry cow, and a cow with twin calves. When Rand considered the problem of abundance of these animals throughout northern British Columbia, he noted "Compared with conditions on Blueberry River, apparently moose are not very common north of the Minaker, even in the best of the country, like that of the Liard near Lower Crossing." These animals are of major tourist interest, and the effects of these animals can be noted in many areas of the park (Plates 19 to 21).

Osborn Caribou Rangifer tarandus osborni Allen

Pavlick (1974) reported track observations for this species. I have noted tracks within and adjacent to the park. A local resident informed me that they may be seen in winter (although Rand noted "reported to occur occasionally in the spring and autumn.") (Plate 23)

Mountain Goat Oreamnos americanus americanus (Blainville).

This species does not occur within the park, but, on occasion may be found less than ten miles away. This is based on reports I have received about successful goat hunts on the lower slopes of Mt. Halkett (immediately adjacent to the highway). Mr. R. Puttonen has successfully hunted these animals on Mt. Reid and informs me that these animals are attracted to a natural lick located near the junction of the Vents and Liard Rivers. The animals in this area may constitute a minor range extension northward for their known occurrence in this longitude.

Stone Sheep Ovis dalli stonei Allen

Cowan and Guiguet (1965) report examining specimens from the "Liard River". I doubt if this species is found in the Rocky Mountains immediately south of the park (Plate 22).



Plate 19. Moose may be frequently observed within the park.



Plate 20. Cornus stolonifera shows the effects of moose browsing.



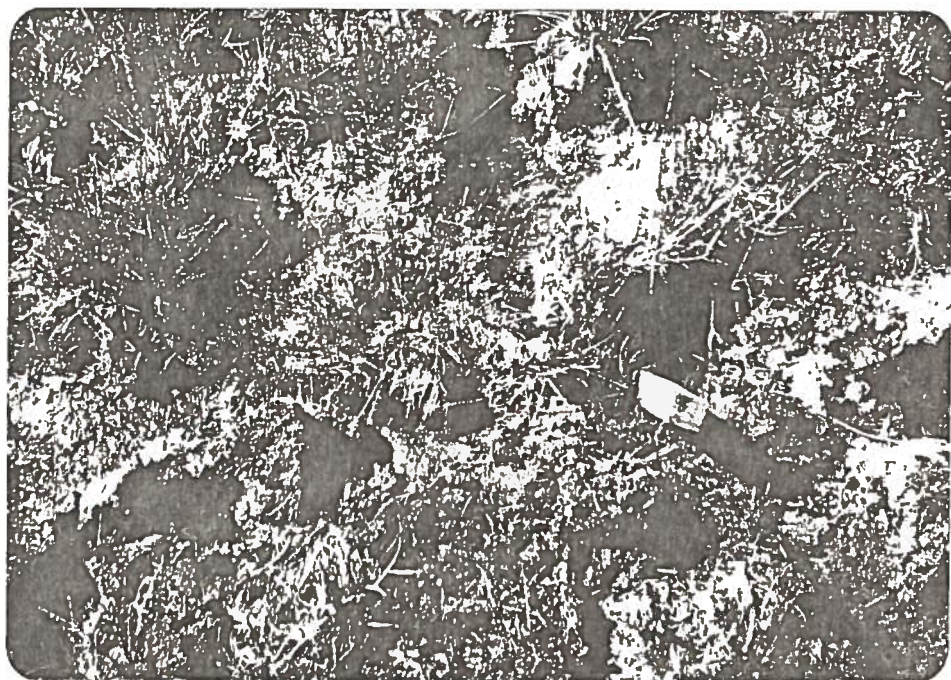


Plate 21. Vegetation establishment is difficult on the moose-churned substrate of the fen near Epsilon Hot Pool.

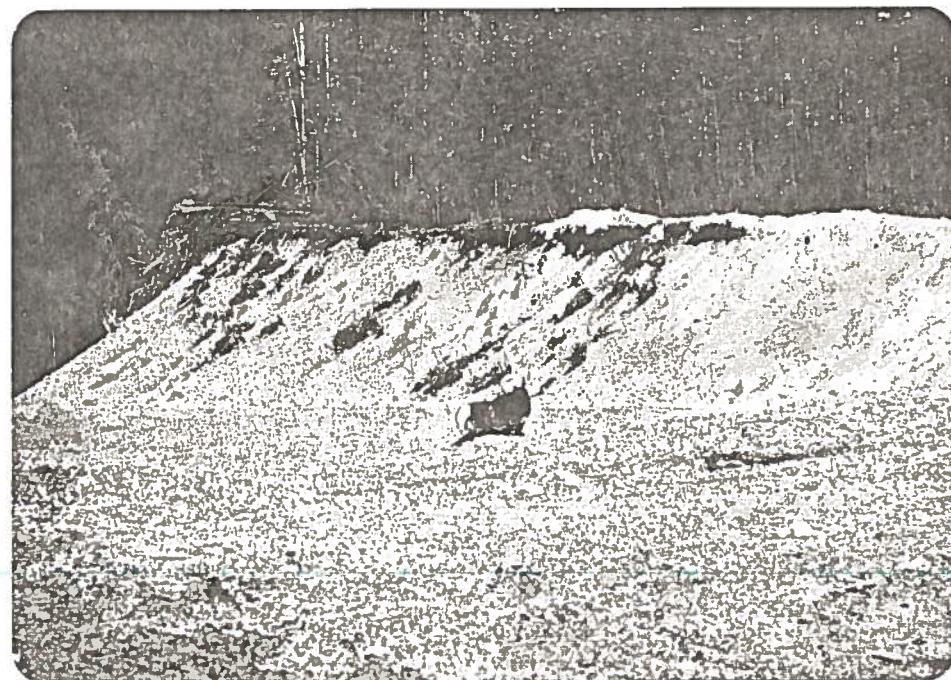


Plate 22. The Stone sheep, photographed at Mile 472, is not found near the park.

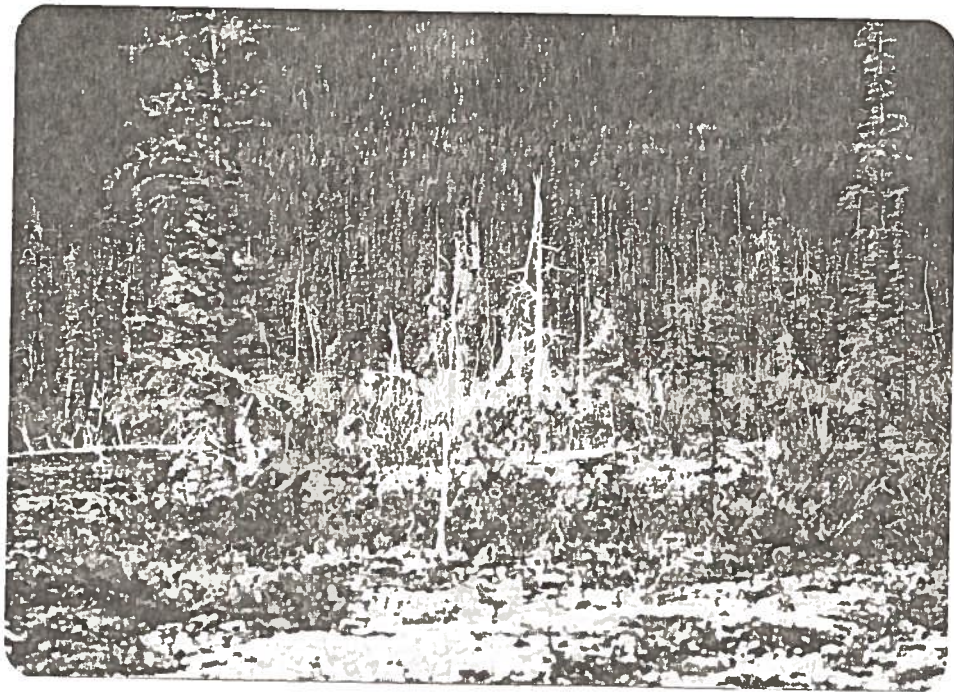


Plate 23. Caribou, photographed near Muncho Lake, were not observed in the park. Tracks of these animals were noted within and adjacent to the park.

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## I. BIRD REPORT

Personal observation plus a review of published records provided the basis for the following annotated list. This list represents birds known to be present in (or to be observed from) the park. An effort was made to obtain spring migration data. (Consequently, intensive field work was performed during this month of peak migration (May). Other duties, however, precluded the possibility of any serious observations during the nesting period. It is to be expected that many birds known to be summer residents could be shown to breed within the park if some field time was devoted to this problem. Observations on fall migration were not made. The approximate number of hours of field observation are: November, 1974 (1); December (2); January, 1975 (5); February (6); March (8); April (14); May (50); June (2); July (2).

The status given is believed to represent the status of that species within the park. If the status remains unclear it is left blank. Waterfowl status may be given for the immediate area (e.g. within two or three miles of the park) as it was thought to give a truer picture of the real situation than would have been given by a "Transient" status. A few other obvious exceptions (eg. Golden Eagle, Ptarmigan) to the general status guideline were also made. Unless otherwise noted, all observations were made from within the park. Numbers in brackets refer to the maximum number of birds observed on that date. Exceptions to this rule (eg. Whistling Swan) should be obvious. Some phenological observations were thought desirable, so nesting and migration dates were often given "for other locations". This vague reference may refer to any point between Muskwa (near Fort Nelson) to Watson Lake, Yukon Territory.

A.L. Rand made bird observations and collections within the park from August 4-14 and 20-24, 1943. A.J. Erskine visited the park in early July, 1974, after intensive bird observations in the Fort Nelson area. He has co-authored a paper with G.S. Davidson on his work in this region. ~~D.E. Griffith made some park observations on September 4 and 5, 1969 (given in Erskine and Davidson) and also published a paper on the birds at Summit Pass.~~ L.E. Pavlick has listed species observed in July of 1972 or 1973. Literature

citations to these sources are given as R, E-D, G. and P. respectively. With the exception of the "P" citation, a listed citation usually means additional observations (between Muskwa and Watson Lake) not given in the following text.

It may be noted that the following list closely parallels lists available for boreal areas to the east (eg. Erskine, 1968.)

BIRDS OF LIARD RIVER HOTSPRINGS PARK

Whistling Swan Olor columbianus Transient

Overhead May 3-6. May 3; two flights (70,40); 4: three flights (35,40,25); 5: three flights (40, 2 aurel); 6: two flights (aurel). I received one report of an estimated 1,500 birds on the night beginning May 4. E-D.

Canada Goose Branta canadensis Summer Resident (in the area)  
breeding

Report April 26 (40-50) by Puttonen. May 4 (10) overhead with swan flight. May 20, 21 (2) on park ponds. Breeding on Smith R. (Puttonen) and "...sparingly all along the Liard River...Mr. Tom Mould told me that on August 5, 1943, he saw a party of six geese, adults and young on the Liard River a short distance below the crossing..." (R) Migrants September 4-5, 1969 (Griffiths, in Rand) E-D, R.

Mallard Anas platyrhynchos Summer Resident (in the area)

One pair attempted overwintering and were recorded in the Warm Poned Swamp complex November 30 and December 1, 1974. Three unidentified ducks in this area January 14, 23. One female mallard Feb. 10. First migrants April 29 (1 pr.) in Warm Poned Swamp. May 10 (1 pr. 1 M) E-D, R.

Green-winged Teal Anas carolinensis Summer Resident (in the area)

May 11 (2 pr.) Liard R.; 17 (2 pr.) park pond by highway; 20 (2M, 1F) park pond LCP. Rand reports fall migrants at other locations August 26 - September 8. 1943. E-D, R.

Blue-winged Teal Anas discors

May 10 (3, possibly 4M) on Warm Poned Swamp (Plate 24) E-D



Plate 24. Blue-winged Teal and American Widgeon were spring transients observed in the Warm Poneded Swamp.

American Widgeon Mareca americana Transient  
Report of uncertain identity, but probably this species  
April 25 - small flock (Puttonen). May 10 (1M) in Warm  
Ponded Swamp (Plate 24); 11(10) on Liard R. Rand reports  
fall migration August 13 - September 8, 1943. R.

Shoveler Spatula clypeata Transient  
May 10 (1 pr., 1 M) on Warm Ponded Swamp; (Plate 25) 11(1M)  
on Liard R. E-D, R.

Barrow's Goldeneye Bucephala islandica  
May 2 (1pr.) on the highway pond E-D

Goshawk Accipiter gentilis Summer Resident, breeding  
"Dr. Williams saw an adult near the Hot Springs on the  
Liard...on August 8 (1943), and I saw another...single  
immature birds were seen August 24 (1943)... (near Liard  
Crossing)..." - Rand, 1944. I noted two accipiters that were  
probably this species flying up the Liard River valley at a  
great height over Liard Flight Strip NO. 4 on March 20.

Sharp-shinned Hawk Accipiter striatus Summer Resident, breeding  
May 11 (1) hunting in forestry area. Rand (1944) reports  
single birds at Liard Crossing on August 7, 22, 24 and a group  
of young on August 3 E-D

Red-tailed Hawk Buteo jamaicensis Summer Resident  
Calls heard May 1, 3 and 8. Rand observed four birds  
between August 4-10, 1943. Both normal and melanistic forms  
have been reported for northern B.C. (E-D, R, G.)

Golden Eagle Aquila chrysaetos Permanent Resident (area)  
May 31 (1) feeding on a moose carcass at Trout Creek; July 10  
(1) over Epsilon Pond fen. R

Marsh Hawk? Circus cyaneus (Summer Resident)  
Hypothetical, uncertain identification. May 9 (1)  
Known from near Fort Nelson, Trutch, Muncho Pass (E-D, R.)

American Kestrel (Sparrow Hawk) Falco sparverius Summer Resident  
May 5 (1, probably F) in the Warm Ponded Swamp region. August  
5, 1943 (2) - Rand E-D, R.

Spruce Grouse Canachites canadensis Permanent Resident (area)  
August, 1974 (1) E-D, R, G.



Plate 25. Another spring transient at the Warm Pounded Swamp was this Shoveler.



Plate 26. A common spring sound was the drumming of the Ruffed Grouse.



Ruffed Grouse Bonasa umbellus Permanent Resident

Observations from January 21-June 3. Drumming recorded from April 18 throughout (Plate 26). In 1974, Erskine noted "drumming regularly until 12 June, occasionally until 25 June." During August, 1943 Rand observed "at the Liard Crossing...about six different covies of young birds, of 4 to 6 birds each, were located, and all were very tame...The young birds, nearly full grown... were as tame as Spruce Grouse ordinarily are." E-D, R.

Ptarmigan sp. Lagopus sp. (Permanent Resident (area))

Hypothetical. A local resident reported seeing a few individuals of "the white chickens" on the south side of the Liard. Rand (1944) noted "Tom Mould told me that in the bare topped Caribou Mountains to the north of the Liard River Crossing...he has seen Ptarmigan in flocks of up to 50 and 60 birds." E-D, R,G.

Sharp-tailed Grouse Pedioecetes phasianellus (Permanent Resident)

Hypothetical. Rand (1944) noted "None seen, but Tom Mould tells me that they occur on his trapline just north and east of the Liard Crossing... and each winter he sees a flock of 6 to 8 birds."

Sandhill Crane Grus canadensis Transient

Remembered flocks on September 5, 1974. Griffiths (in E-D) recorded flocks over park September 5, 1969. In other areas, spring migration reported from April 27 early May, 1974 (Davidson, in E-D) and fall migration on September 1, 15, and 16, 1943 (R). Rand (1944) noted "Common in migration; many people told me that immense numbers go down the valleys of the Liard, Muskwa and Peace in the fall."

Sora Porzana carolina Summer Resident

May 13 (1 by Wayne P. Neily, pers. comm.); 16 (1) in rushes of Warm Poned Swamp complex. This location is on the western edge of their breeding distribution (Godfrey, 1966). E-D

Semipalmated Plover Charadrius semipalmatus Transient

May 23 (2) on mud shore of Warm Poned Swamp complex. Not recorded by Griffith, Rand, or by Erskine and Davidson.

Killdeer Charadrius wilsonia

May 5(1); 10(2); 11(1) in the Warm Poned Swamp complex; and  
May 13 (1) in the Delta Hot Pool area. E-D.

Common Snipe Capella gallinago Summer Resident, breeding

Noted winnowing in various fenland areas from May 3 - July 8.  
Excited calling (July 1, 11) suggested nesting. Pavlick  
(1974, Plate 67) has previously published a photograph of an  
active nest. Rand (1944) reported migrants at Summit Pass  
September 17, 1943. E-D, P.

Spotted Sandpiper Actitis macularia Summer Resident

May 22(1); 23(1) in the Warm Poned Swamp complex. Pavlick  
(1974) reports July 1972 or 1973 observations E-D, R.

Solitary Sandpiper Tringa solitaria Summer Resident, breeding

Singletons recorded May 3,4,8,13,16,21, and 30. Two noted  
May 14 and 23. Birds recorded at Warm Poned Swamp complex,  
Epsilon Poned Swamp, Beta Hot Pool, and fenland from newly  
reported ("TR49" and "TR50") hot springs. On July 1 and 11,  
excited behaviour and calling suggested a nest nearby. Two  
nests located in fenland:

Nest A: June 10-4 eggs; June 17-4 eggs; June 28-3(perhaps  
4) hatched; July 1-nest empty, excited parents suggest young  
are nearby.

Nest B: June 10-4 eggs; June 17 - 4 eggs; June 28 - nest  
upside down and moved from original position, some shell  
fragments found in nest.

Rand reported August 1943 birds as fall migrants. Griffiths  
(in E-D) recorded one on September 4 and 5, 1969. P.

Greater Yellowlegs Totanus melanoleucus

April 28(1) in the Warm Poned Swamp complex and apparently  
feeding on Lake Chub. This sighting is considerably north  
of the published range map for breeding distribution (Godfrey,  
1966) and he states "Breeding range rather poorly known...  
possibly Peace River parklands...stragglers north to southern  
Mackenzie...". Williams (1933) does list it for the Mackenzie,  
but Godfrey (1951) did not list it for the southern Yukon,  
nor was it noted in northwestern B.C. (Weeden, 1960).

Erskine received one report (James Grant, Vernon, B.C.) at mile 280 (i.e. 20 miles south of Fort Nelson) on July 28, 1968. Erskine considered this an autumn vagrant.

Lesser Yellowlegs Totanus flavipes Summer Resident

May 5(20); 6(4); 7(1); 8(3); 10(1); 13(1); 16(4); 23(1) all in the Warm Poned Swamp complex. Rand (1944) reported July 17, 1943 (1) for the general area and park migrants August 5, 1943(3). E-D, R,P.

Least Sandpiper Erolia minutilex Transient

May 11(3) in Warm Poned Swamp; 13 (number unknown - Wayne P. Neily, pers. comm.) E-D, R

Semipalmated Sandpiper Ereunetes pusillus (Transient)

Hypothetical. Wayne P. Neily (pers. comm.) reports tentative identification of this species mixed with Least Sandpiper on May 13. Rand (1944) reports fall migration in other localities on August 16, 1943 (also "probably this species" July 22, 1943). Godfrey (1966) notes "Much scarcer in spring than autumn..." for B.C. transients.

Western Sandpiper Ereunetes mauri Transient

May 22(2) in the Warm Poned Swamp complex. Up to eight individuals may have been present. Godfrey (1966) stated the species was a "scarce mainly Autumn transient..." for interior B.C. Not reported by Erskine and Davidson, or by Rand.

Herring Gull Larus argentatus Summer Resident, breeding

May 6(2); and "probably this species" 20(3) at the Large Cold Pond region. This latter observation appeared to result from the birds flying to this area in response to agitated Canada Goose calls. Erskine recorded two birds in the Warm Poned Swamp on July 9, 1974. This pair successfully raised one chick from their nest on a small island in the Warm Poned Swamp. This appears to be the first known nesting record for the region. Lone adults recorded August 12, 13 and 23, 1943 from the park to seven miles up the highway (R). E-D, R,P.