Bonneau Lake and
Denison Lake

Report No. 104

APPLICATION FOR ECOLOGICAL RESERVE

1. Legal description of the area (or general "Metes and bounds" description)

2. Geographical location (relate to nearest settlement, mountain, river, etc.)

Bonneau Lake and Denison Lake, above Creighton Creek near Shuswap Falls.

3. Indicate the biogeoclimatic zone of which the reserve is representative.

The Engelmann spruce - subalpine fir zone (ESSFa)

4. Approximate total acreage.

2100 acres (850 ha)

5. Purpose of the reserve.

(a) Primary (state acreage)

-

(b) Others if any (state acreage)

-

(c) Buffer areas (state acreage)

6. Attach a map and indicate: (a) the perimeters and acreage of the areas detailed in 5 above, and (b) indicate the species and total timber volumes in these areas.

Signature T.C. Braysha

INTERNATIONAL BIOLOGICAL PROGRAMME

SECTION CT: CONSERVATION OF TERRESTRIAL BIOLOGICAL COMMUNITIES

CHECK SHEET (Mark VII) FOR SURVEY OF IBP AREAS*

To be completed with reference to the GUIDE TO THE CHECK SHEET

Serial Number

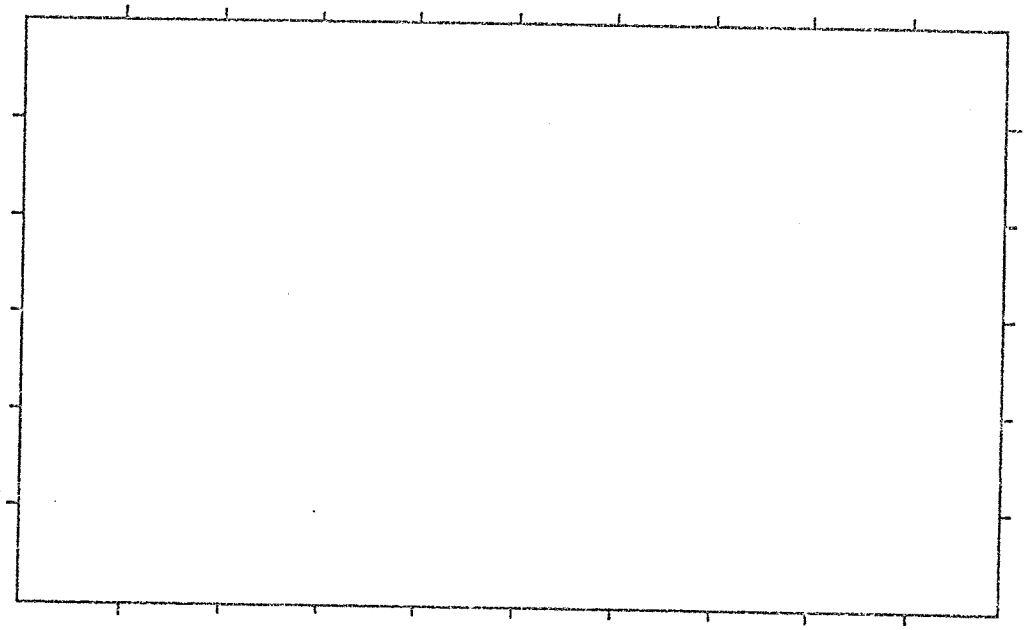
For Data Centre Use only

1.

1. Name of surveyor T.C. Brayshaw J.E. Heriot
2. Address of surveyor Provincial Museum R.R.2.
   Victoria, B.C. Vernon, B.C.
   Canada
3. Check Sheet completed (a) on site X (b) from records
4. Date Check Sheet completed 12/June/1972

2.

1. Name of IBP Area BONNEAU LAKE
2. Name of IBP Subdivision (or serial letter)
3. Map of IBP Area* showing boundaries attached? Yes X No
4. Sketch map of IBP Area*. Please mark direction of north, the scale and grid numbers where applicable.



* For "IBP Area", read IBP Area and/or IBP Subdivision.

For Data Centre Use only

3. Location of IBP Area*

1. Latitude 50° 09' N Longitude 118° 44' W.
2. Country Canada
   State or Province British Columbia County .....
   (State or Province ..... County .....)

4. Administration

National 1. Official category Crown Land

2. Address of administration Department of Lands, Forests & Water Resources (B.C.)
   Victoria, B.C.
   Canada

International Class

3.

Included in U.N. List	Rejected from U.N. List	Area with formal conservation status	No formal cons. status
(A)	(B)	(C)	(D)

5. Characteristics of IBP Area*

1. Surface area (state units of measurement) 2100 acres (850 ha)
2. Altitude (state units of measurement) Maximum 5400 feet (1650 m)
   Minimum 4500 feet (1370 m)

6. Climate

Nearest climatological station :

1. Name Shuswap Falls
2. Climatological station on IBP Area*? Yes ..... No X
3. If (2) not, distance from edge of IBP Area* (state units) 11 miles (17 km)
4. Direction from IBP Area* NNW
5. Additional data sheet attached? Yes ..... No .....

For Data Centre Use only

7. Vegetation and Soil

1 Vegetation

Community Reference Number	Vegetation Code					Plant communities (give usual name using full Latin names of a species where applicable)	Area (state units)
	Primary Structural Group	Class	Group	Formation	Sub-Formation		
1	1	A	1	7	a	(Pinus contorta) - Picea glauca ssp. engelmannii - Abies - Vaccinium scoparium.	
2	1	A	1	7	a	(Pinus contorta) - Picea glauca ssp. engelmannii - Abies - Rhododendron albiflorum	
3	1	A	1	7	a	Abies balsamea ssp. lasiocarpa - Valeriana sitchensis - Equisetum sp.	
4	1	A	1	7	a	Picea - Abies - mosses (Calliergon etc.)	
5	1	A	1	7	a	Picea - Lonicera involucrata	
6	1	M	2	1		Carex spp. meadow	
7	1	P	2	3		Nuphar polysepalum aquatic community	
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Please give information about further communities on a separate sheet.

For Data Centre Use only

7. (cont.) 2 Soil

Community Reference Number	Soil type	Other notes
1	ABC F_5	Upland with moderate drainage
2	ABC F_5	Rocky and stony well-drained slopes
3	AGC P_2	Moist & seeping depressions
4	AGC P_2	Gentle slopes with moderate drainage
5	A C I_2	Wet draws & stream banks
6	AGC P_2	Margin of lake and broad shallow depressions
7	?AGC? P_2	Floating-leaf community in zone parallel to shore
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

For Data Centre Use only

8. Similar Communities in Country (or State)

Community Reference Number	Protected					Protected and Unprotected				
	Abundant	Infrequent	None known	Decreasing	Increasing	Abundant	Infrequent	None known	Decreasing	Increasing
1									X	
2									X	
3									X	
4									X	
5									X	
6						X				
7						X				
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

For Data Centre Use only

9. Landscape

1. General Landscape (give brief description) Undulating tableland with steep escarpment across northern edge. Shallow depressions occupied by lakes and sedge meadows.

2. Relief Type

	Flat	Undulating (0)-200 m.	Hilly 200-1000 m.	Mountainous > 1000 m.	%
Sharply dissected		15%			15
Gently dissected		85%			85
Incised					
Skeletonised					
%		100%			100%

3. Special landscape features (list) Bonneau & Denison Lakes; and steep basalt cliffs and talus, especially N. & NE. of Denison Lake

10. Coastline of IBP Area*

1. Protected bays and/or inlets — Many [ ] Few [ ] None [X]

2. Substratum. % of coast

Rock	Boulder Beach	Shingle Beach	Sand Beach	Shell Beach	Mud	Coral	Ice

3. Physiography. % of coast

Cliffed	Sloping	Flat

4. Special Coastal Features (list)

5. Tide. Maximum range (state units of measurement)

6. Total length of coastline :

Less than 1 km. [ ] 1-10 km. [ ] Above 10 km. [ ]

For Data Centre Use only

11. Freshwater within IBP Area*

1.

	Permanent	Intermittent
General		
Standing	X	
Running	X	

2. Standing Water

	Permanent	Intermittent	Unproductive	Productive
Swamps	X			
Ponds	X			
Lakes	X			

3. Running Water

	Permanent	Intermittent
Springs, cold		
Springs, hot		
Streams	X	
Rivers		

4. Special freshwater features ...Bonneau Lake is in state still undisturbed by man. Denison Lake is stocked with fish. Denison Lake is perched on top of basalt cliffs

12. Salt and Brackish Water within IBP Area* nil

Salt Lakes		Lagoon		.....	
Estuaries		Salt pools		.....	

13. Adjacent Water Bodies (not within IBP Area*)

1. Fresh [ ] Lake [ ] River [X] Stream [ ]

2. Salt and Brackish nil

Estuary	Salt lake	Salt pool	Lagoon	Ocean		

For Data Centre Use only

14. Outstanding Floral and Faunal Features

1. None .....

2. Fauna

not studied

	Species diversity	Abundance of individuals	Superabundance of individuals	Rare species	Threatened/Relict species	Spp. of biogeographical interest	Exceptional Associations	Breeding or Nesting Populations	Migrating Populations	Wintering Populations		
Mammalia												
Aves												
Reptilia												
Amphibia												
Pisces												
Insecta												

3. Names of main threatened, endemic, relict and rare species

.....

.....

.....

.....

.....

.....

.....

4. Flora

	Species diversity	Abundance of particular species	Rare species	Threatened/relict species	Stage of biogeographical interest	Exceptional associations	Outstanding specimens				
Angiospermae :											
trees	X										
shrubs		X									
herbs	X										
grass		X									
Gymnospermae	X										
Pteridophyta	X										
Bryophyta	X										
Lichens and Algae	X										

5. Names of main threatened, endemic, relict and rare species

.....

.....

.....

15. Exceptional Interest of IBP Area*

Bonneau Lake has no man-made dam, and has no deliberately introduced stocks of fish. It is thus still in its original natural condition, an unusual circumstance now in this region. Aquatic life would be worth research. Denison Lake has been stocked with fish and is now fished for sport. This invites research for comparison of the ecological evolution of "developed" and undeveloped lakes. Communities on the basalt escarpment have not been sampled and should be worth studying.

16. Significant Human Impact

1. General : None in entire IBP Area* .....

None in part of IBP Area* .....

Impact on entire IBP Area* .....X.....

2. Particular

	Past impact	Present impact	Trend: Increasing	Trend: Decreasing	Trend: No change	Trend: No information
Cultivation						
Drainage						
Other soil disturbance						
Grazing	X					
Selective flora disturbance						
Logging	X	X				
Plantation						
Fishing & Hunting	X					
Removal of predators						
Pesticides						
Introductions — plants						
Introductions — animals	X					
Fire	X					
Permanent habitation						
Recreation and tourism						
Research						

3. Additional details on each type of impact attached?

Yes .....X..... No .....

See next page

17. Conservation Status

	Protection			Utilization			Conservation Management			Required Research		
	none	partial	total	none	extended	unrecorded	none	in other areas	in main area	experimental	observational	undefined
Flora												
Fauna												
Non-living												

18. References

1. List major biological/geographical references for the IBP Area.

   Sheet attached? Yes ..... No .....

2. List main maps available for the IBP Area. Dept. of Energy, Mines & Resources (Canada)
   CREIGHTON CREEK 82 L/2
   1/50,000

   List attached? Yes ..... No .....

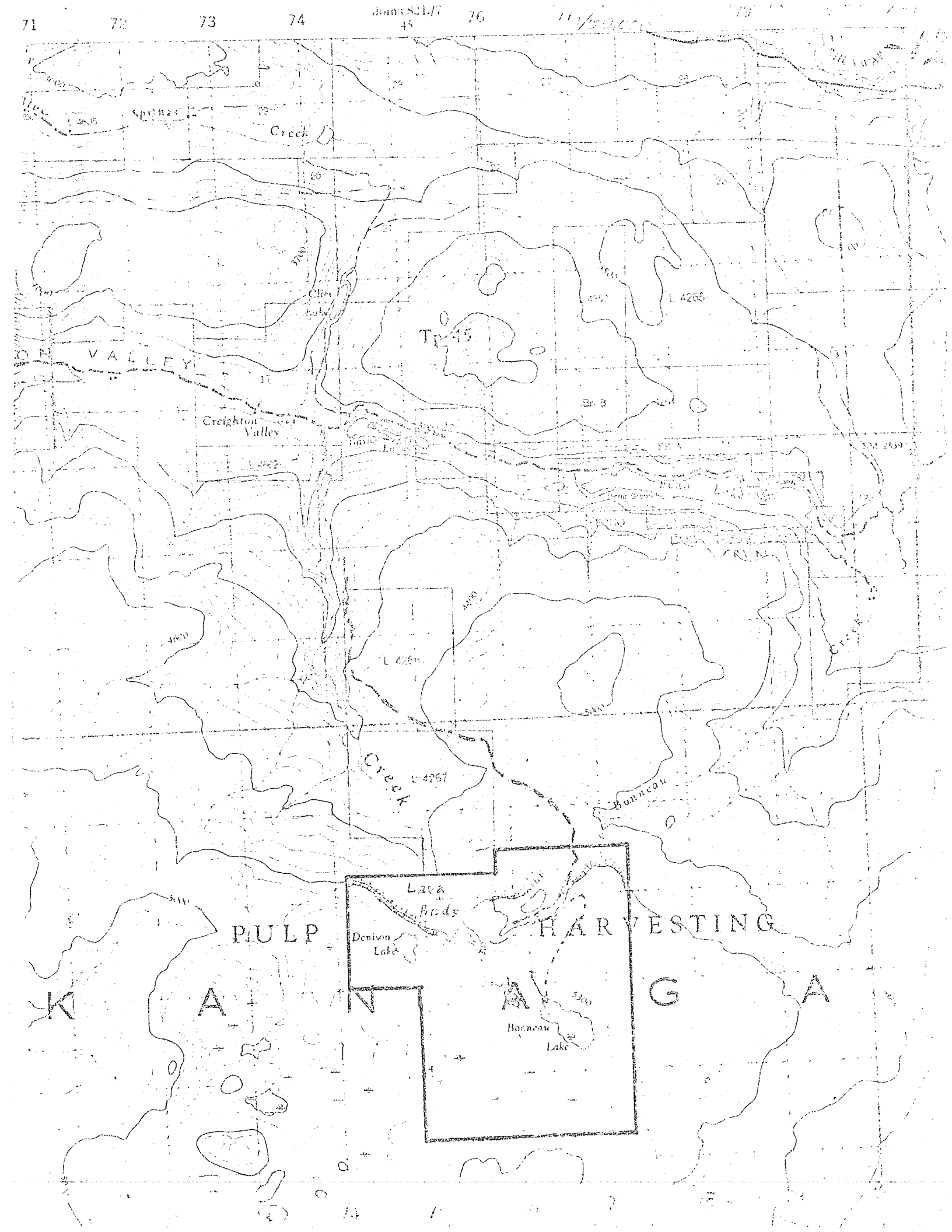
3. Aerial photographs for the IBP Area available?

   For whole area ..X..... For part of area ..... None .....

19. Other Relevant Information

In area outlined on sketch map, logging has occurred along the road below the escarpment recently, not elsewhere. Grazing is carried on, but appears not to be heavy: lake shores and sedge meadows being somewhat affected. It is not regarded locally as very good grazing land.

Signed .....T.C. Brayshaw.....
(Surveyor)


71
72
73
74
76
Creek
Creighton Valley
Tp 45
L 4266
L 4267
Creek
Lava Beds
Denison Lake
Bonneau Lake
PULP HARVESTING
K A N A G A

North Okanagan Naturalists' Club

Box 473, Vernon, B.C.

August 30, 1972

Dr. T. Breyshaw
Assoc. Curator of Botany
Provincial Museum
Victoria, B.C.

Dear Chris:

Very many thanks for your letter of June 22nd, giving your impressions of our projects and the map of the Bonneau Lake area.

Dr. Tom Northcote came up on August 9th and we took him up there and he floated around in my raft taking measurements. He seemed impressed with the lake - but we hadn't time to go into Denison Lake or to find the Sedge Marsh.

We are to go up and look at these as soon as possible - end of August or early September, and then give him a report. The rim rocks up there are not as interesting as ours at Baldy but he liked the lava beds - which harbour a number of picas.

He suggested a geologist should come up and look at the Rim Rocks at Baldy and said it was time there was a "geological" reserve. Yes, there IS logging all along the top - but I don't know that this detracts from the rocks themselves since it cannot be seen from below at all.

Your letter of August 10th and detailed reports arrived - thank you very much indeed; also for the 2 photos of the heron's nests; they are pretty good - considering the difficulties!! The two owners concerned re the property are:

Mr. Harry Hayes, Otter Lake Crossroad, R.R. 3, Armstrong, B.C.

Mrs. Elsie Shaw, 3406 32nd Avenue, Vernon, B.C.

Thank you for all your help.

Sincerely,

Joan Heriot

Joan Heriot: for the North Okanagan Naturalists Club

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8, CANADA

INSTITUTE OF ANIMAL RESOURCE ECOLOGY

6 November 1972

Dr. V. Krajina
Dept. of Botany
Campus

Dear Vlad:

I was asked earlier this year by the North Okanagan Naturalists' Club to accompany them on a survey of Bonneau Lake, near Lumby, in an attempt to locate an Okanagan Highland type lake unexposed to any form of development which might then be given Ecological Reserve Status. Dr. C. Brayshaw had already examined this area from a botanical viewpoint and has suggested reserve boundaries (see attached copies of air photographs).

During my summer vacation it was possible to join up with Miss Joan Heriot and other members of the club on a one day expedition to the lake and I have enclosed a brief report resulting from our studies. Also enclosed is a copy of a letter of 23 September from Miss Heriot giving further information.

I feel that the Bonneau Lake region and the adjacent exposed lava beds are well suited for consideration as an Ecological Reserve area. Brayshaw should have input here and also someone from Geology, perhaps Dr. J. Fyles.

I was asked by the club to check into the status of their reports on the Cougar Canyon area and on the cedar stand near Shuswap. These apparently were sent to Dr. C. Brayshaw. Perhaps you could have him reply to the Club.

Sincerely,

Tom

T. G. Northcote

TGN/nw

c. c. Miss J. Heriot

Bonneau Lake Survey

9 August 1972

T. G. Northcote and family
J. Heriot and members of
the North Okanagan Naturalists' Club.

Morphometry

The lake, using the outline map in Figure 1 has a surface area of approximately 29 acres, a length of 2455 feet, and a perimeter of about 5914 feet. Three sounding series were made on the lake with a handline from an inflatible rubber boat on 9 August. Much of its area appears to be less than 15 feet deep with a maximum depth of 25 feet in a restricted central area (Fig. 1). The lake outlet averages about 6 feet in width immediately below the lake. It had a discharge of about 0. 2 c. f. s. on the survey date.

Physical-chemical characteristics

The lake in midsummer had a sharp thermocline between 5 and 8 feet (Fig. 2) and probably exhibited moderate to severe oxygen depletion below 15 feet although this was not measured. The Secchi disc reading (5 feet) indicated rather low transparency characteristic of most brown-stained Okanagan Highland lake waters.

A sample of surface lake water was taken at Station 1 and analized for the following:

specific conductivity	27. 7 umhos at 22°c
total dissolved solids	76 mg/l.
total hardness	8. 3 mg/l as $CaCo_3$
total alkalinity	8. 2 mg/l as $CaCo_3$
pH	6. 57 (in laboratory)
apparent colour	50 Pt units

Biological Characteristics

(a) Phytoplankton

A 500 ml sample of surface water was taken from Station 1 on the lake at 1400 hours 9 August 1972 and preserved with a standard Lugol solution. A 10 ml subsample was then filtered onto a Millipore filter, cleared and examined with a Zeiss phase contrast microscope at 400X magnification. Algae present in 10 randomly selected fields were identified to genus, counted and expressed as average number per litre (rounded to the nearest thousand). No blue-greens were seen.

Diatoms and desmids	Average No. / l
Chromulina	3,000
Cyclotella	61,000
Mallomonas	11,000
Greens	
Chlamydomonas sp. A	34,000
Chlamydomonas sp. B.	14,000
Chlorococcales	134,000
Flagellated forms, uncertain position	
Cryptomonas	3,000

(b) Zooplankton

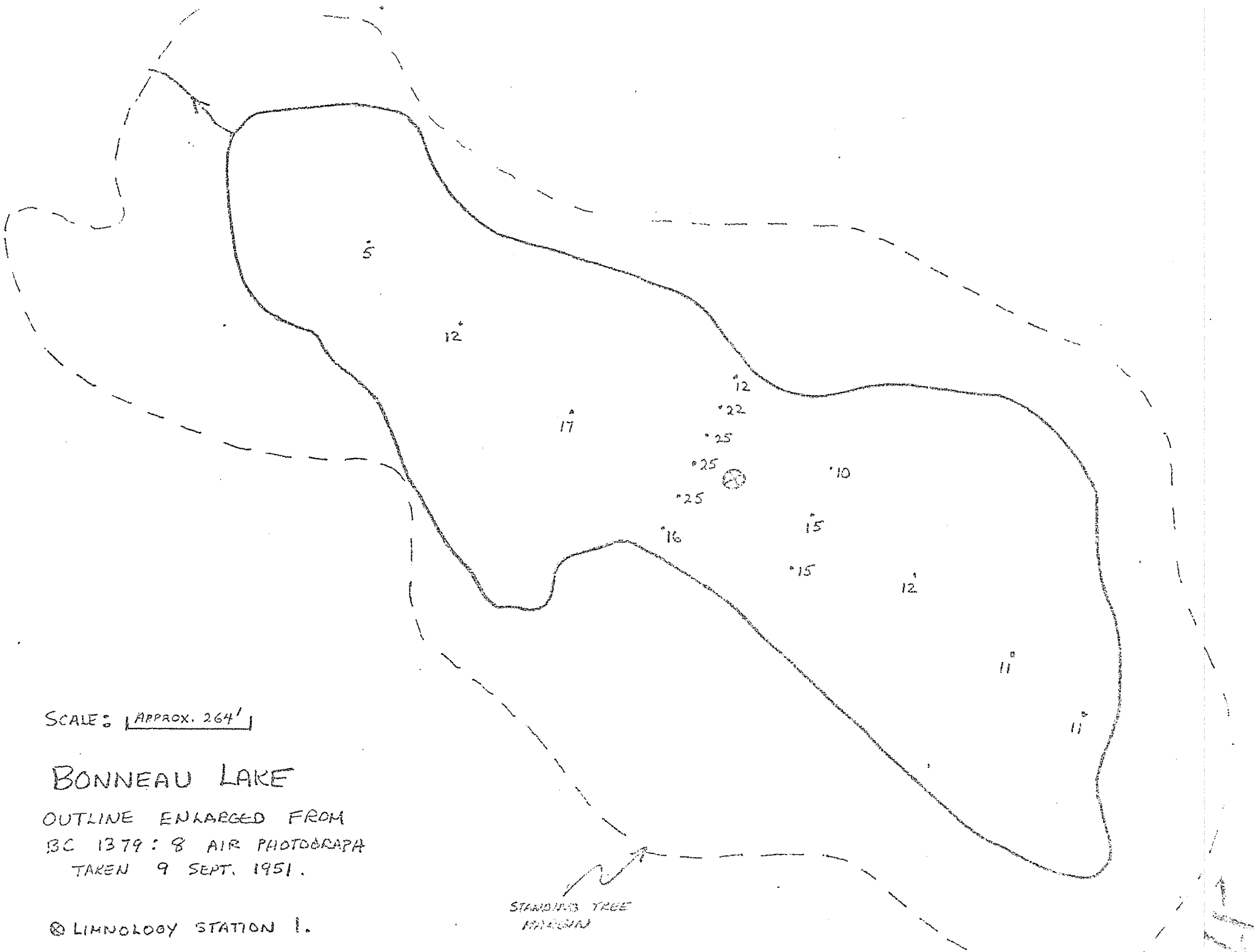
Dipnet samples taken near Station 1 contained two species of Chaoborus larvae - americanus and another, probably nyblaci as dominant forms.

(c) Benthos

The margin of the lake as examined for benthic invertibrates. It revealed a fairly rich fauna with leeches, caddis and dytiscid larvae well represented. Simulid larvae and pupae were evident in the outlet stream.

(d) Fish

Apparently the lake was stocked with rainbow trout several years ago but all died as a result of winter-kill.



SCALE: APPROX. 264'

BONNEAU LAKE

OUTLINE ENLARGED FROM
BC 1379 : 8 AIR PHOTOGRAPH
TAKEN 9 SEPT. 1951.

⊗ LIMNOLOGY STATION 1.

FIGURE 1. AN OUTLINE MAP (APPROXIMATE) OF BONNEAU LAKE, NEAR LUMBY, B.C.

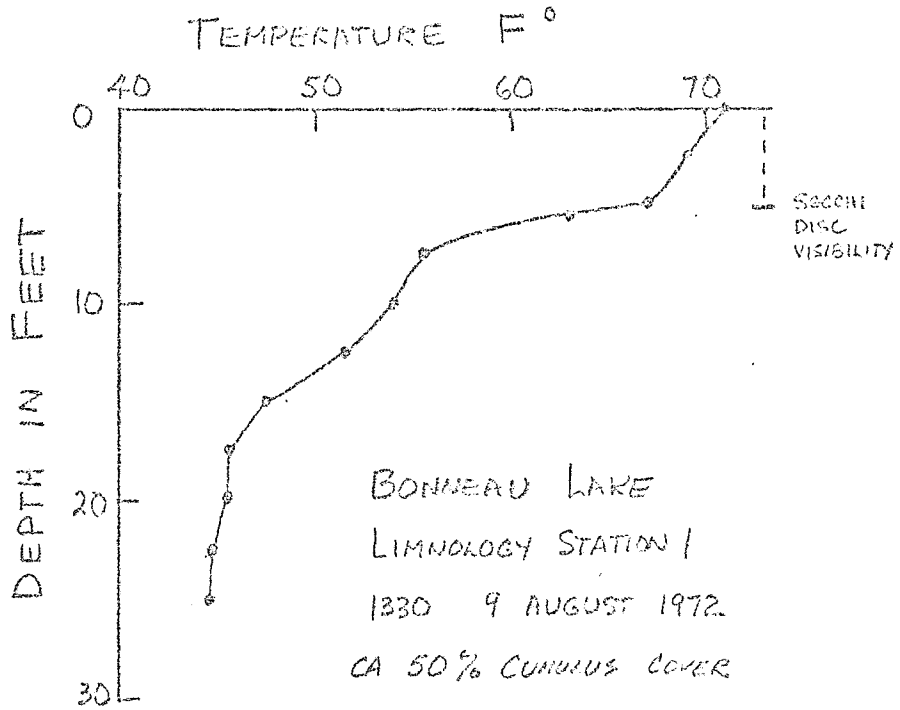


FIGURE 2. THERMAL STRUCTURE AND TRANSPARENCY OF BONNEAU LAKE AT STATION 1 IN SUMMER.

(Xerox copy to V. Brayshaw)

North Okanagan Naturalists' Club

Box 472, Vernon, B.C.

September 23, 1972

Dr. T. G. Northcote
Institute of Animal Resource Ecology
University of British Columbia
Vancouver 8, B.C.

Dear Tom:

We managed to get to Denison Lake last Sunday with a "crew" of six. I enclose a (very poor) xeroxed copy of an aerial photograph of the area: I will send a better one from the Lumby Forest Ranger's office as soon as possible.

Apart from the crossing of Creighton Creek, the trail to Denison Lake is very similar to that leading to Bonneau Lake, and all details noted in Chris Brayshaw's report on vegetation, soil and landscape pertain to Denison Lake also. Creighton Creek at the crossing is an interesting small stream, nicely accessible to anyone interested in stream life. The bottom is covered with angular rocks which are good habitats for the Ecdyonurid type of mayfly, and associated fauna. Denison Lake is smaller than Bonneau and has no marginal growth of Nuphar or rushes. There are just a few lily pads in a small bay by the outlet. Bogbean, along shore, shows little or no sign of advance into open water.

Mr. Hopkins, the Lumby Forest Ranger, has just told me that some years ago he sounded both Lakes for the Fish & Wildlife Branch and as a result both Lakes were stocked. In Bonneau Lake the dieback of Nuphar in winter reduced the oxygen level to a point that no fish survived, but the Denison Lake supported Kamloops trout up to four or five pounds. It became so popular that it was soon fished out but has not been restocked recently.(We noted a number of fish rises while there).

Cattle, which this year have heavily overgrazed a small meadow below the rim rocks by the approach road, do not appear to have penetrated to either lake during this season.

From the aerial photograph it looks as if there was a Beaver dam on Bonneau Creek below the outlet - but no recent Beaver workings have been seen in the area. On the 1956 map the outlet from Bonneau Lake is shown running into Creighton Creek. It may be that the old Beaver dam found by our party on August 9th, redirected the Bonneau Lake outlet into its present channel.

There are three trails to Denison Lake. The new trail, recently cut, runs straight across the plateau through a rather featureless forest "weed patch"

North Okanagan Naturalists' Club

of small larch, spruce and lodgepole pine which Mr. Hopkins would like to see logged off and replanted with lodgepole pine - the only tree which grows well in the area. The trail passes one small sedge meadow Sphagnum bog in which there is some labrador tea, swamp laurel and marsh cinquefoil, but apparently no sundew. We could see no remains of orchids but these may well have disappeared. The main birds seen were boreal chickadees and kinglets. The main interest on the trail at this time of year was the great variety of toadstools and other fungi. One of our number came back loaded. The old trail follows round the edge of Creighton Creek gully and then along the rim rocks. It is much further and rather overgrown so we explored it only for a short distance at each end. Potentially it is a fine nature trail with good views along the way - over the rimrocks to the lava beds far below and with distant views down and across the Valley. We returned by the third trail. This forks off the main trail above the rim rocks and follows a long hog's back ridge ending in an extraordinary series of "castles" of piled up lava from which one gets a fine view of the rim rock cliff below Denison Lake. From this ridge we followed the gullies in the lava beds back to the parking place. The lava beds are honeycombed with pica burrows and some larger burrows were seen - probably of hoary marmots. After a short hunt among the smaller rocks we found one specimen of Grylloblatta campodeiformis. At this time of year the great variety and beauty of the lichens on the lava beds can be seen at their best.

The Rim Rocks below Denison Lake are quite spectacular as a precipice but would appear to be difficult to see from below. The Rim Rocks behind Baldy are far more interesting, being more broken and are also more accessible than these, and if you would give me the name of a geologist willing to come and look at them, we could, perhaps, ask for a " Geological Park" as you suggested.

After having suggested Bonneau Lake to us as a possible ecological reserve, Mr. Hopkins appears to be having some second thoughts. He told me this morning he would like the "forest weed patch" logged off the area and lodgepole pine planted. Clear cutting would be carried out - as we saw on the newly logged area - since this is a pulp-harvesting forest. Also, in such a "weed patch", selective logging is clearly impossible. However, Mr. Hopkins tells me there are some of the oldest Lodgepole pines in the Province in there - over 300 years old - and that he would be glad to have some of these set aside if they can be found in a suitable area. He said he was neither "for", nor against, a reserve in the area - but that he was against reserves going in all over the place before, perhaps, the best areas for our purpose had been found. I said our main purpose was to keep some subalpine lakes in near pristine condition, particularly for nesting loons, now driven from all the lowland lakes. I suppose if they logged the area they must do great damage to the drainage and would be bound to alter the lakes even if they left 300 feet of standing timber all round and did not log across the stream beds.

Mr. Hopkins did suggest another Lake "perhaps more suitable for our purpose" - this is Holstein Lake, on the Silver Hills, immediately North of Bonneau Lake & Denison, across the Shuswap River Valley. He says the lake is of thirty-five acres extent with a small floating bog, with a rich "native" fish fauna consisting mainly of suckers. These provide food for both loons and herons. Nearby is a forty acre sedge meadow which he says is a "moose area". A 'good road' passes nearby. I will try to get in there this Fall if possible but as this lake lies at around 5000 ft. we shall have to be quick. We met a blizzard on Sunday and Silver Star has already been covered with snow. More rain today has not helped!

Heron nesting near Otter Lake

Report No. 105

see 246

APPLICATION FOR ECOLOGICAL RESERVE

1. Legal description of the area (or general "Metes and bounds" description)

2. Geographical location (relate to nearest settlement, mountain, river, etc.)

Heron nesting area:
Near Otter Lake, 9 miles north of Vernon

3. Indicate the biogeoclimatic zone of which the reserve is representative.

The drier subzone of the Interior Douglas-fir zone (IDFa)

4. Approximate total acreage.

30 acres (12 ha)

5. Purpose of the reserve.

Nesting place for great blue heron

(a) Primary (state acreage)

30 acres

(b) Others if any (state acreage)

-

(c) Buffer areas (state acreage)

-

6. Attach a map and indicate: (a) the perimeters and acreage of the areas detailed in 5 above, and (b) indicate the species and total timber volumes in these areas.

Signature T.C. Brayshaw
T.R.P. Surveyor