APPLICATION FOR ECOLOGICAL RESERVE 74

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

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

   Great Blue Heron nesting place and Douglas-fir forest, Endownment Lands, University of British Columbia

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

   CDFb

4. Approximate total acreage.

   300 acres

5. Purpose of the reserve.

   To conserve the Great Blue Heron nesting place and the secondary forest (after natural regeneration). Excellent teaching facility for the graduate students of U.B.C.

   (a) Primary (state acreage)

   300 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.

   Conifers: Abies grandis, Picea sitchensis, Pseudotsuga menziesii var. menziesii, Thuja plicata, Tsuga heterophylla
   Angiosperms: Acer circinatum, A. macrophyllum, Alnus rubra, Populus trichocarpa, Prunus emarginata and Rhamnus purshiana

Signature V.J. Krajina / Jim Pojar
I.B.P. Surveyor

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

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

Serial Number | | | | | | | |

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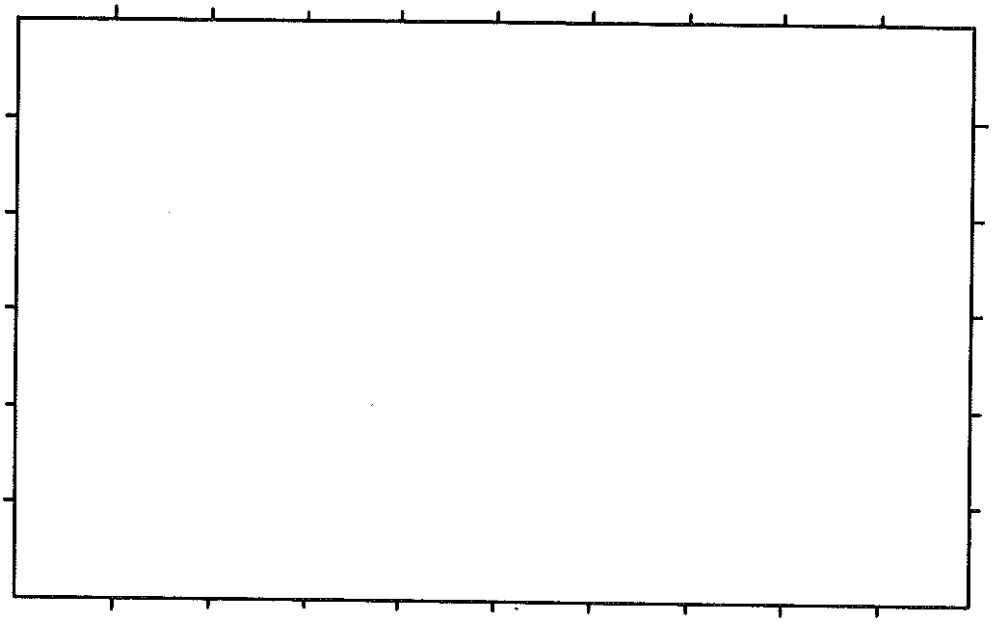
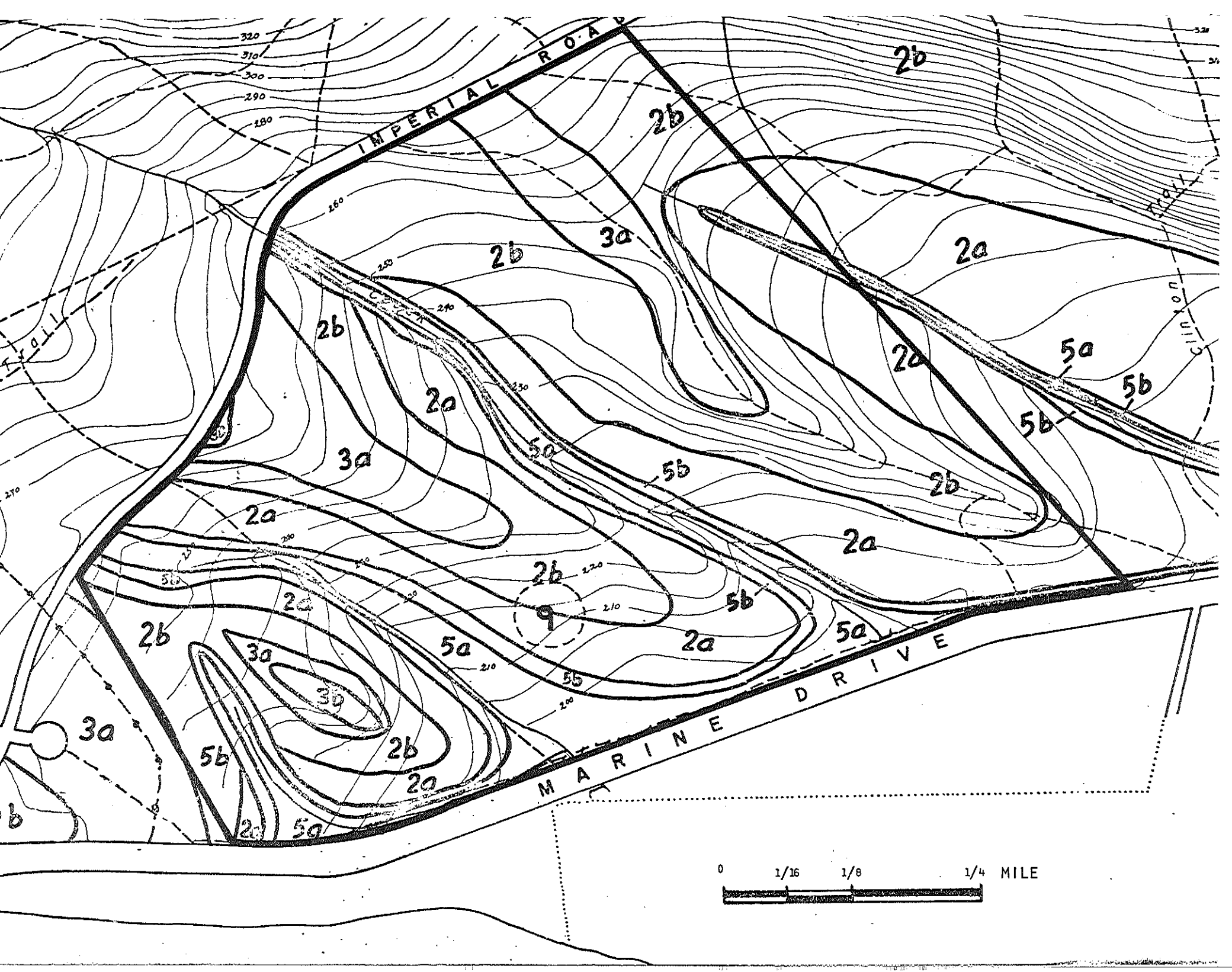
1. 1. Name of surveyor V.J. Krajina and Jim Pojar
   2. Address of surveyor Department of Botany,
   University of British Columbia
   Vancouver, B.C.
   3. Check Sheet completed (a) on site X (b) from records X
   4. Date Check Sheet completed November 10, 1974

2. 1. Name of IBP Area Great Blue Heron nesting place and Douglas-fir forest, Endowment Lands, U.B.C.
   2. Name of IBP Subdivision (or serial letter) CDFb
   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.


IMPERIAL ROAD
MARINE DRIVE
Clinton
320
310
300
290
280
260
250
240
230
220
210
200
2b
3a
2a
5a
5b
3b
0
1/16
1/8
1/4 MILE

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3. **Location of IBP Area***

1. Latitude 49 ° 15' N Longitude 123 ° 14.6' W
2. Country Canada

State or Province British Columbia County Vancouver

(State or Province ..... County .....)

4. **Administration**

National 1. Official category Crown Land (U.B.C. Endowment Lands)

2. Address of administration British Columbia Department of Lands,
Forests and Water Resources,
Parliament Buildings,
Victoria, B.C.

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) X

5. **Characteristics of IBP Area***

1. Surface area (state units of measurement) 300 acres
2. Altitude (state units of measurement) Maximum 280' (85m)
Minimum 195' (59m)

6. **Climate** Cfb/Csb (after Köppen/Trewartha)

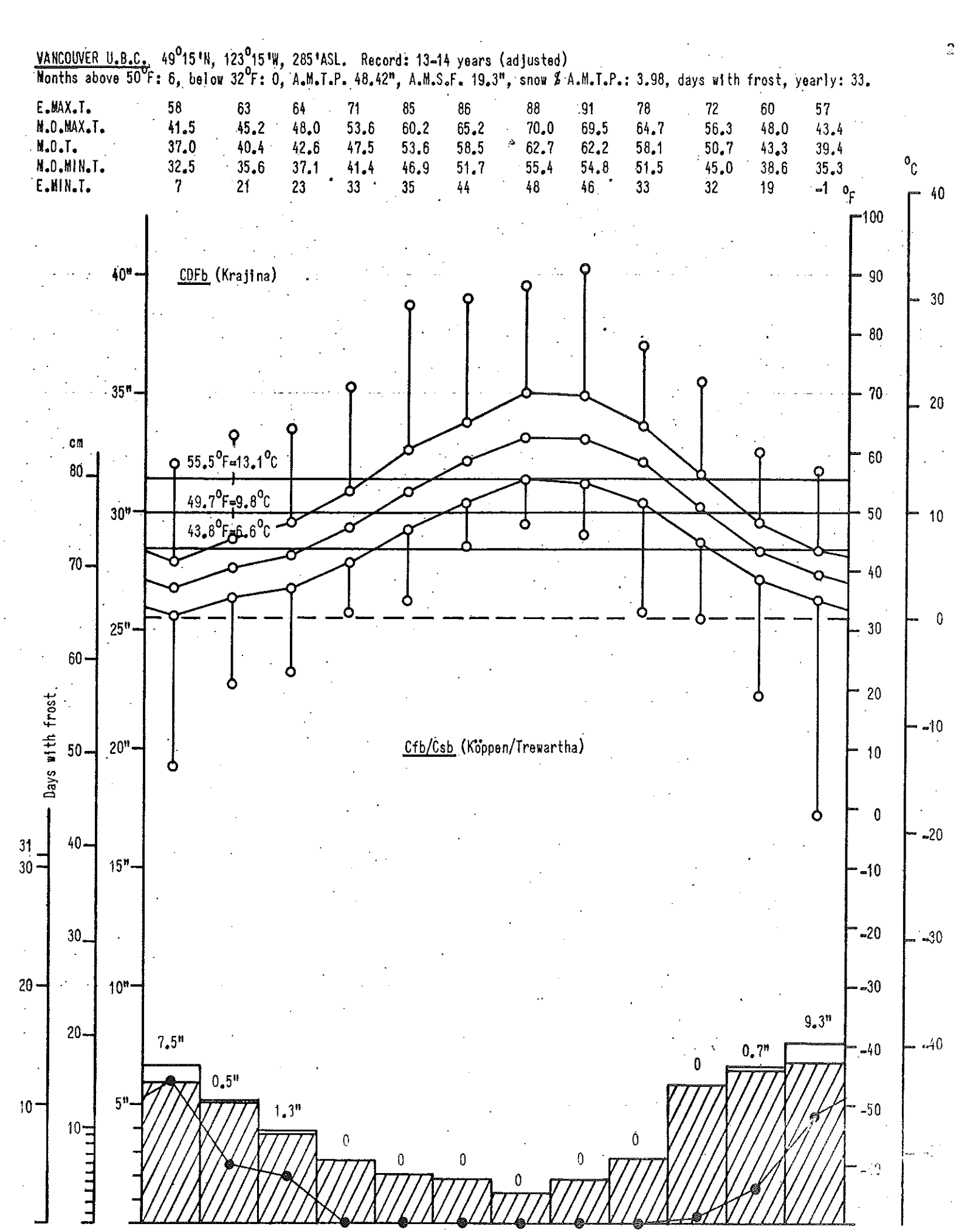
Nearest climatological station :

1. Name Vancouver U.B.C.
2. Climatological station on IBP Area*? Yes ..... No X
3. If (2) not, distance from edge of IBP Area* (state units) 1.8 mi.
4. Direction from IBP Area* NW
5. Additional data sheet attached? Yes X No .....

Vancouver U.B.C.

VANCOUVER U.B.C., 49°15'N, 123°15'W, 285'ASL. Record: 13-14 years (adjusted)
Months above 50°F: 6, below 32°F: 0, A.M.T.P. 48.42", A.M.S.F. 19.3", snow % A.M.T.P.: 3.98, days with frost, yearly: 33.

E.MAX.T.	58	63	64	71	85	86	88	91	78	72	60	57
M.D.MAX.T.	41.5	45.2	48.0	53.6	60.2	65.2	70.0	69.5	64.7	56.3	48.0	43.4
M.D.T.	37.0	40.4	42.6	47.5	53.6	58.5	62.7	62.2	58.1	50.7	43.3	39.4
M.D.MIN.T.	32.5	35.6	37.1	41.4	46.9	51.7	55.4	54.8	51.5	45.0	38.6	35.3
E.MIN.T.	7	21	23	33	35	44	48	46	33	32	19	-1



Days with frost	12	5	4	0	0	0	0	0	0	*	3	9
M.M.T.P.	6.66	5.18	3.99	2.68	2.08	1.89	1.26	1.89	2.65	5.90	6.56	7.68
MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

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7. **Vegetation and Soil**

1 **Vegetation**

Community Reference Number	Vegetation Code: Primary Structural Group	Class	Group	Formation	Sub-Formation	Plant communities (give usual name using full Latin names of a species where applicable)	Area (state units)	On the attached map designated as:
1	1	A	1	7	a	Plagiomnio (insignis) - Leucolepido (menziesii) -		-
						Tiarello (trifoliatae) - Polysticho (muniti) -		2a
						Sambuco (pubentis) - Pseudotsugo (menziesii) -		
						Abieto (grandis) - Thujetum plicatae		
2	1	A	1	7	a	Eurhynchio (oregani) - Hylocomio (splendentis) -		
						Polysticho (muniti) - Acero (circinati) -		2b
						Pseudotsugo (menziesii) - Abieto (grandis)		
						Thujetum plicatae		
3	1	A	1	7	a	Eurhynchio (oregani) - Rubo (parviflori) -		
						Mahonio (nervosae) - Acero (circinati) - Alno		
						(rubrae) - Pseudotsugo (menziesii) - Thujo		3a
						(plicatae) - Tsugetum heterophyllae		
4	1	A	1	7	a	Eurhynchio (oregani) - Rubo (parviflori - ursini) -		
						Mahonio (nervosae) - Alno (rubrae) - Pseudotsugo		3b
						(menziesii) - Tsugetum heterophyllae		
5	1	A	2/1	1/7	-/a	Rhizomnio (perssonii) - Leucolepido (menziesii) - Oenantho (sarmentosae) - Lysichito (americani) -		5a
						Alno (rubrae) - Piceo (sitchensis) - Thujetum plicatae		
6	1	A	2/1	1/7	-/a	Eurhynchio (praelongi) - Maianthemo (dilatati) -		5b
						Alno (rubrae) - Piceo (sitchensis) - Thujetum plicatae		

The following major ecosystems may be easily recognized in the proposed ecological reserve area:

Symbol on the Map: 2. Douglas-fir *(Pseudotsuga menziesii)* - grand fir *(Abies grandis)* - western redcedar *(Thuja* plicata) - swordfern *(Polystichum munitum)* plant association. Douglas-fir grows here in height of 160-180 feet tall trees in 100 years. From the plants, living here, the following should be mentioned: *Alnus rubra, Acer macrophyllum, A. circinatum, Cornus nuttallii, Rhamnus purshiana, Taxus brevifolia, Sambucus pubens, Rubus spectabilis, R. parviflorus, Ribes lacustre, Polystichum munitum, Tiarella trifoliata, Athyrium filix-femina, Adenocaulon bicolor, Galium triflorum, Montia sibirica, Trillium ovatum, Geum macrophyllum, Streptopus amplexifolius, Dryopteris austriaca, Polypodium glycyrrhiza, Carex leptopoda, C. hendersonii, Osmorhiza chilensis, Tellima grandiflora, Dicentra formosa, Stellaria crispa, Blechnum spicant, Disporum oreganum, Bromus vulgaris, Cina latifolia* and *Festuca subulata*. From bryophytes at least the following should be mentioned: *Plagiomnium insigne, P. venustum* (on the bark of broadleaf maple), *Leucolepis menziesii, Rhizomnium glabrescens, Brachythecium asperrimum, Epipterygium tozeri* (otherwise very rare), *Isothecium stoloniferum, Claopodium crispifolium, Neckera menziesii, N. douglasii, Dendroalsia abietina, Antitrichia curtipendula, Eurhynchium praelongum, Homalothecium fulgescens, H. nuttallii, Tetraphis pellucida, Lepidozium reptans, Calypogeia fissa, C. suecica, C. trichomanis, Scapania bolanderi, S. umbrosa, Lophocolea bidentata, L. cuspidata, L. heterophylla, Plagiochila asplenioides, Cephalozia leucantha, C. lammersiana, C. media, Cephaloziella divaricata, Radula complanata, Porella cordaeana, P. navicularis, P. platyphylla, Frullania nisquallensis, Pellia neesiana, Conocephalum conicum* and *Marchantia polymorpha*. Soil is mainly Gleyed Dystric Brunisol. In some areas the lateral seepage water, keeping this environment highly productive, was diverted by drainage along the Marine Drive.

Some basic ecological studies were made here in these highly productive forest sites of the Endowment Lands (see R. Garm, 1958: Some aspects of the nitrogen cycle in soil of the Douglas-fir forest).

Two variants are distinguished on the map of this area: 2a (with more permanent seepage) and 2b (with rather temporary seepage). In 2a Douglas-fir may reach its highest site index:180'(55m)/100 years.

Symbol on the Map: 3, Red alder (*Alnus rubra*) - Douglas-fir (*Pseudotsuga menziesii)* - western redcedar (*Thuja plicata*) - western hemlock (*Tsuga heterophylla*) - Oregon grape (*Mahonia nervosa*) - thimble-berry (*Rubus parviflorus*) - moss (*Eurhynchium oreganum*) plant association, developed on the plateau which was submerged under the sea during

. . . 3b

the last glaciation. Soil is still close to Regosols of marine deposits developing towards Dystric Brunisols. If it is rather Regosol, the occurrence of *Rubus spectabilis* and even *Sambucus pubens* is frequent. These plants become less frequent in Dystric Brunisols, where *Vaccinium parvifolium* is becoming frequent, *Polystichum munitum* is only sparse. *Mahonia nervosa* is frequent and sometimes dominant. Red alder (*Alnus rubra*) and bitter cherry (*Prunus emarginata*) are frequent and in some areas, where Douglas-fir did not start to grow early enough, these angiospermous trees became dominant, *Alnus rubra* (with some *Cornus nuttallii*) being promoted especially in consequence of nutritionally rich marine deposits. Western hemlock (*Tsuga heterophylla*) got established here on decaying wood. There are some plants which grow better in the swordfern plant associations (see plant community no. 2), but most of them grow in much lower vigour and species significance here. Besides *Mahonia nervosa*, which is missing in the typical swordfern plant communities and on the contrary very common here, *Trientalis latifolia* is frequently growing here.

Theoretically, this soil would mature into a Thin Podzol and, then, the plant association would be successionally replaced by the salal (*Gaultheria shallon*) plant community. Interestingly enough, salal is missing here either completely or occurring only on decaying wood. These successional consequences with several variants could be easily demonstrated in the Endowment Lands.

Two variants are distinguished on the map of this area: 3a (which is the main core of this plant association, representing its ecological "nodum") and 3b (degraded type of this plant association).

Symbol on the Map: 5, Red alder *(Alnus rubra)* - Sitka spruce *(Picea sitchensis)* - western redcedar *(Thuja plicata)* - skunk-cabbage *(Lysichitum americanum)* plant association is represented only by fragments, even if it used to be fairly frequent in the Endowment Lands. It occurs on Gleysols with thick black muck, developed in seepage habitats where moving water comes to the surface and permanently saturates even the humus layer. It is a common habitat for Sitka spruce which grows here usually with Oregon crab apple *(Pyrus fusca)*. In the shrub layer *Rubus spectabilis*, *Acer circinatum* and *Rhamnus purshiana* are frequent. *Vaccinium ovalifolium* and occasionally *V. alaskaense* are here as relicts from glaciation. In the herb layer *Lysichitum americanum* is the most significant and common herb (substantially damaged by the artificial drainage) associated with *Maianthemum dilatatum*, *Veratrum viride*, *Oenanthe sarmentosa*, *Montia sibirica*, *Mimulus moschatus*, *Cardamine breweri* and *Veronica americana*. In the moss layer these bryophytes are frequent: *Eurhynchium praelongum*, *Rhizomnium perssonii*, *Plagiomnium insigne*, *Leucolepis menziesii*, *Brachythecium asperrimum*, *B. lamprochryseum*, *Caliergonella cuspidata*, *Climacium dendroides*, *Rhytidiadelphus squarrosus* (this one mostly in the disturbed areas),

. . . 3c

Marchantia polymorpha, Conocephalum conicum, Blasia pusilla, Pellia columbiana, Riccardia sinuata, Chiloscyphus pallescens and *Anthoceros punctatus*. On the leached layer of overturned trees in this area is *Schistostega pennata* (very rare otherwise). To restore some of these habitats the excessive artificial drainage should be stopped. Otherwise Sitka spruce and western redcedar will die out in these habitats.

Two variants may be easily recognized for this plant association: 5a has a strong seepage water supply, saturating permanently the top of the black muck horizon; 5b has less strong seepage water supply, permitting that the black muck layer partly "drying out" during the summer and, therefore, developing more "terrestrial" habitat over which it is possible to walk. In the first variation skunk cabbage *(Lysichitum americanum)* is vigorous and dominant; this plant grows weakly in the second variation, where *Maianthemum* vastly dominates.

The area of the Endowment Lands belongs to the coastal Douglas-fir bio-geoclimatic zone (climate is Cbs or barely Cbf according to Köppen, annual precipitation about 50"). Most of this area was submerged under the sea during the last glaciation. Therefore, the soils, originally as marine deposits, are overlain by glacial till only in the highest parts of this area and many ecosystems are still bearing this evidence. Such plant communities are most interesting for teaching of the ecological interpretation, even if they are more complex than they should be for those who are learning the first steps in ecology.

Since 1949, when I became a member of the Department of Biology and Botany, U.B.C., I have used the areas of Endowment Lands for many field trips which I organized for my students of either plant ecology or dendrology (totally about 500 students) and also for about 35 graduate students. Without these areas I could not teach my students so efficiently as I possibly did according to the personal letters of my graduate students, which I received in 1971. The Endowment Lands, which already lost some of precious "wilderness" areas by some more recent development, and the lands between Marine Drive and the coast or the banks of the Fraser River are the closest natural areas near the University of British Columbia which can be demonstrated to the university students without any greater loss of time otherwise required for the access of similar areas. To teach especially Plant Ecology (both vegetation and its environment) without availability of such areas would be very difficult if not even impossible.

Great Blue Herons *(Ardea herodias)* nest on the Endowment Lands (see no. 9 on the attached map). It has been estimated that about 50% (about 125 nesting pairs) of these beautiful birds nest on the Endowment Lands close to the Fraser River. "If

. . . 4c

these birds were driven off they would perish since other nesting sites and food sources in the surrounding area could not stand the increased load" (Norris, 1971). This number was substantially lowered in the last year (J. Krebs, pers.comm.).

Vladimir J. Krajina
Honorary Professor, Department
of Botany

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7. (cont.) 2

Soil

Community Reference Number	Soil type	Other notes
1	AGC P_1/P_2	Gleyed Eutric Brunisol
2	$ABC_{/AGC}$ F_5/P_2	Gleyed Dystric Brunisol
3	ABC F_5	Dystric Brunisol
4	ABC F_5	Dystric Brunisol→Mini Podzol
5	AGC P_1	Gleysol (with a thick horizon of Black Muck)
6	AGC P_{1/P_2}	Gleysol (with a thinner horizon of Black Muck)
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

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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						X	
2			X						X	
3			X						X	
4			X						X	
5			X						X	
6			X						X	
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

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9. **Landscape**

1. General Landscape (give brief description) marine sediments, deposited in the sea during the glaciation time and raised up after the glacier, covering the mainland of British Columbia, retreated.

2. Relief Type

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

3. Special landscape features (list) .....

10. **Coastline of IBP Area*** none

1. Protected bays and/or inlets — Many ☐ Few ☐ None ☐

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. ☐

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11. **Freshwater within IBP Area***

1.

	Permanent	Intermittent
General		
Standing		
Running	X	X

2. Standing Water

	Permanent	Intermittent	Unproductive	Productive
Swamps				
Ponds				
Lakes				

3. Running Water

	Permanent	Intermittent
Springs, cold	X	X
Springs, hot		
Streams		
Rivers		

4. Special freshwater features .....

.....

12. **Salt and Brackish Water within IBP Area*** none

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

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

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

Fraser River

2. Salt and Brackish

Estuary	Salt lake	Salt pool	Lagoon	Ocean		
				X		

Strait of Georgia

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14. **Outstanding Floral and Faunal Features**

1. None .....

2. Fauna

	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		X										
Aves	X	X		X	X	X	X	X				
Reptilia		X										
Amphibia		X				X		X				
Pisces												
Insecta	X	X		?		X	X	X		X		

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

Great Blue Herons (Ardea herodias), most beautiful North American species of this genus.

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4. Flora

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

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

Schistostega pennata, Epipterygium tozeri, Pellia columbiana, Dendroalsia abietina

15. **Exceptional Interest of IBP Area***

was described previously on pages 3a-3d

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16. **Significant Human Impact**

1. General : None in entire IBP Area* forest is secondary but recently rather undisturbed

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

Impact on entire IBP Area* .....

2. Particular

	Past impact	Present impact	Trend: Increasing	Trend: Decreasing	Trend: No change	Trend: No information	
Cultivation					X		
Drainage			X				
Other soil disturbance					?		
Grazing					X		
Selective flora disturbance					X		
Logging	X						
Plantation					X		
Hunting	?				X		eagles, deer and bears were removed
Removal of predators					X		
Pesticides					X		
Introductions — plants			X				
Introductions — animals					X		
Fire	X	nil					
Permanent habitation					X		
Recreation and tourism					?		
Research			X				

3. Additional details on each type of impact attached?

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

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17. **Conservation Status** (required)

	Protection			Utilisation			Conservation Management			Permitted Research		
	none	partial	total	none	controlled	uncontrolled	none	to alter status	to maintain status	experimental	observational	prohibited
Flora			X	X					X		X	
Fauna			X	X					X		X	
Non-living			X	X					X		X	

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.

   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**

I wish to urge that this area should not be given for any further development. From the scientific point of view it would be rightly considered as a very unwise step.

Signed V.J. Krajina and .....
(Surveyor)

Jim Pojar