

LILY PAD LAKE ECOLOGICAL RESERVE No. 5  
and  
BUCK HILLS ROAD ECOLOGICAL RESERVE No. 6

SURVEY 1990

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March, 1991

LILY PAD LAKE ECOLOGICAL RESERVE No. 5

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BUCK HILLS ROAD ECOLOGICAL RESERVE No. 6

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Two previous reports cover these reserves (McLeod and South, 1977 and Bayliss and Blake, 1977). Rather than duplicate their work the present study is intended to provide infilling of a few gaps and some measure of up-dating.

#### INTRODUCTION

As part of its formative stage the Ecological Reserves Program compiled a generalised list of components necessary to meet its objective of securing coverage of representative and unique ecosystems throughout the province. These requirements were made known informally with a request for submission of suitable candidate areas. Most reserves in the North Okanagan region were put forward by the North Okanagan Naturalists' Club, including the two forming the subject of this report - one to cover a mid-altitude lake in montane forest, the other an example of Western larch in what is now referred to as the Montane Spruce zone. Both received official status in 1971.

Being separated at their nearest corners by less than half a kilometre, Lily Pad Lake and Buck Hills Road reserves may conveniently be treated together as one unit for the purpose of this report, with special reference to Buck Hills separately

only where it differs by having areas of bouldery outcrop colonised by Western larch. Comments exclusive to Lily Pad Lake Reserve refer to the lake area itself and all other remarks can be taken as equally valid for either unit.

## ACCESS

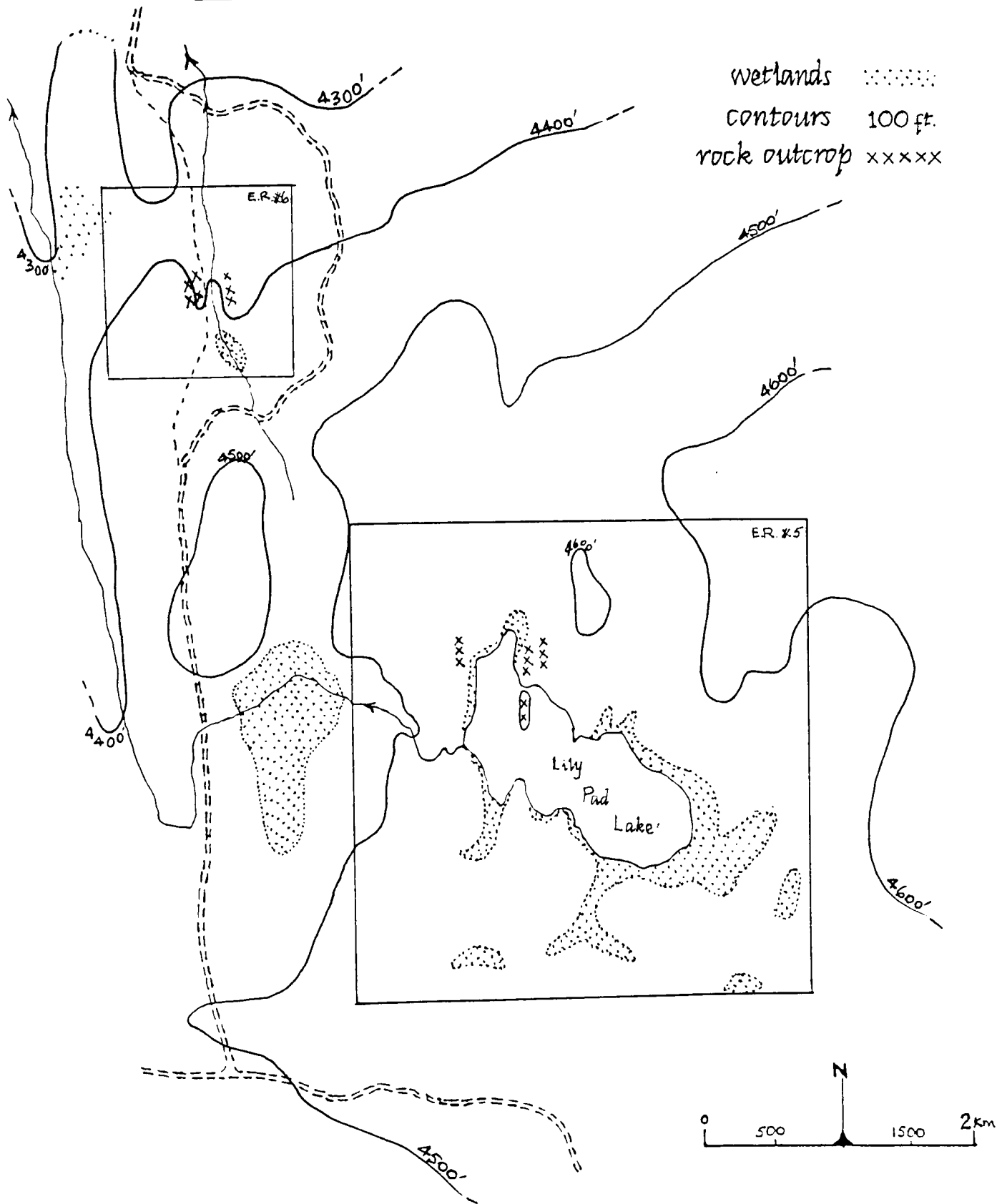
Good forest roads are available to both reserves. Follow Highway 6 east from Vernon to Lavington where a right turn is made at the store. At the end of this short road turn left on to Learmouth Road which continues sinuously up hill and eventually becomes gravelled. Left turn at Reid Road which after a short distance becomes a Forest Service road from which point kilometre markers can be used.

Between the 10km and 11km points turn left on to Nicklen Lake Road (posted as "Haddo Riverside Channels), then between 13km and 14km turn left again where also sign-posted to Nicklen Lake. Within a very short distance beyond the 24km marker on this road a less used road branches off on the left. Distance markers on this road run on an unrelated sequence so that before one kilometre has been travelled a marker advertising 28km will be seen. The small stream passing under the road just prior to this point is the outlet from Lily Pad Lake.

Foot access can be made on an indistinct trail around the left side (north) of a boggy area just outside the reserve boundary. This crosses back over the creek once inside the reserve and roughly follows its course to the lake. Alternatively, instead of turning on to the lesser road after the 24km marker, proceed a few hundred metres until it is convenient to park and cross the clear cut to the north. An E.R. boundary sign will be seen but may not be so obvious once replanting has been carried out.

Buck Hills Road Reserve is reached by continuing beyond the 28km marker previously mentioned (where the outlet from Lily Pad Lake is crossed) for slightly more than half a kilometre. At this point the road bends right to swing around the east side of the reserve. By dropping on foot off the road to the left the line of the old road bed can be followed into and through the reserve.

# LILY PAD LAKE AND BUCK HILLS ROAD RESERVES



## PHYSIOGRAPHY AND GEOLOGY

See McLeod and Smith, 1977

The immediate area of Reserve 5 comprises a shallow basin open on its west side where drainage from Lily Pad Lake escapes before turning north towards Lumby. Highest elevation occurs in the north-east corner at c. 1420m (c. 4,650 ft.) and lowest where the outlet creek crosses the mid-point of the west boundary at c. 1355m (c. 4,450 ft.). No other permanent flowing water exists although some of the seeps nearest the lake run as small streamlets early in the summer. Presumably it is these in combination with an area of bog at the head of the lake and annual snowmelt which jointly contribute input to maintain Lily Pad Lake. In 1990, a year of average rainfall, a surface decline of around 10cm took place during the season.

Because of the underlying igneous rock, drainage is good, the only exception being hollows and troughs where fine soil particles have accumulated. Main areas of permanently wet ground and seepage are shown on the foregoing map.

Widespread cover of glacial drift masks bedrock over large stretches of the plateau area south of Highway 6, forming part of the Okanagan Highlands. Such outcrops as are mapped are shown as a Mesozoic granitic series, varying among granodiorite, granite, minor diorite, gabbro and quartz diorite in composition. There might also be small gneissic bodies present but none was evident during surveying.

Several low ridges of granodiorite cluster around the north-west end of Lily Pad Lake and tend in this area to control its outline and presence of inlets along the shore line. Orientation is slightly east of north, more or less the same direction as the two ridges running down Buck Hills Road Reserve.

Soils - see McLeod and Smith, 1977.

## CLIMATE

In presenting meteorological readings from Carmi and McCullogh (70 and 40km to the south respectively) as proxies for Reserves 5 and 6, McLeod and Smith overlooked the reporting station at Coldstream Ranch just 18km to the north-west. Although this is located about 900m lower, some idea of the difference between a valley site and an upland site can be drawn by comparing figures for a similar couplet in the central Okanagan, also about 900m different in elevation - Kelowna and McCullogh. From published climatic normals a generalisation can be made indicating a temperature roughly 6°C lower through-

out the year at McCullogh compared with the valley level station and 40cm more total precipitation over an average year. This is particularly pronounced in winter with McCullogh receiving roughly 300cm more snowfall or over four times as much as at Kelowna Airport.

Reported readings from Coldstream Ranch averaged over the ten years 1981 to 1990 are as follows and should be read with the Kelowna - McCullogh differentials in mind:

Mean daily temperature(°C)

J	F	M	A	M	J	J	A	S	O	N	D	Total or av.
-2.9	-1.9	4.3	8.6	12.9	16.8	19.1	18.9	13.9	7.5	1.0	-3.6	7.9

Mean precipitation (mm)

35.2	30.6	26.3	32.4	49.3	61.1	46.5	40.8	44.4	32.3	43.4	48.1	490.8
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Mean snowfall (cm - included in Mean precipitation)

28.9	18.3	2.6	0.4					0.6	14.4	40.8	106.0
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During this period extreme high temperature reached 35°C on several occasions and extreme lows around -30°C.

## VEGETATION

McLeod and Smith carried out a comprehensive floristic and analytical survey using 48 sample plots covering all recognised plant associations. As a consequence studies in 1990 were restricted to producing a list of vascular plants with some data on phenology. Certain differences are present between this list and that of the two earlier studies. Several taxa reported in 1977 were not seen, several new have been added.

In 1990 a detailed treatment of the Kamloops Forest Region was released as part of the Ministry of Forests continuing programme of ecosystem investigation and classification (Lloyd et al, 1990). It allows a comparison to be made between the reserve surveys of 1977 and 1990 with results collected by Ministry of Forests on a regional basis.

Lloyd et al. maps the Lily Pad Lake - Buck Hills Road area as being near the northern extremity of his MS dm1 unit - Okanagan Dry Mild Montane Spruce variant. Eight site units make up this subzone of which seven can be identified within the reserves, the most dry being lacking. These are tabulated below showing evident differences at the two reserves from the regional norm. Note that Lloyd et al. uses major tree species and about a dozen indicator shrubs and herbs for classification and comments are based solely on the presence or absence of these.

sub unit	Lloyd et al classification	reserve comparison
03	Lodgepole pine-grouseberry-Cladonia	less kinnikinnick, typical of well-drained forest, i.e. S. of LPL.
04	Lodgepole pine-pinegrass-kinnikinnick	less pinegrass; small patches north side of LPL.
01	White spruce x-false box-feathermoss	less Spiraea, less false box, more Shepherdia; only small sections of forest.
05	White spruce x-trappers tea-grouseberry	more alder, no Black Twinberry, no Trappers tea; greater part of reserves where soils thinner and poorer.
06	White spruce x-grouseberry	more alder, little Queen cup, more Foamflower; greater part of reserves where soils thicker and richer.
07	White spruce x-Trappers tea-horsetail	more willow, less trappers tea, no Black twinberry; course of BHR creek and seeps at LPL.
08	Willow-sedge	open bog at E end of LPL

It is evident from this that the area of Reserves 5 and 6 tends to be slightly moister compared with the rest of the subzone, not surprising in view of its location at the northern limit. Despite this, certain species indicative of moisture - notably Glandular trappers tea and Black twinberry - were sparser than would have been expected.

In their biological study, McLeod and Smith divided the reserve areas into "Community Types". These are set out below with the equivalent "Site Units" as described by Lloyd et al

together with a similar comment on how the reserves appear to vary from the Ministry's regional study.

McLeod & Smith	Lloyd et al site unit	Difference observed in reserves
Veronica marsh edge	07	more Pinus contorta less Abies lasiocarpa " Lonicera involucrata " Ledum glandulosum
Picea-Abies bottoms	07 - 06	more Equisetum arvense " Linnaea borealis
Alnus sinuata gullies	06 - 07	more Equisetum arvense " Alnus sp.
Alnus open forest	05 - 01	more Alnus sp. " Calamagrostis rubescens less Ledum glandulosum
Pinus - Lupinus (3 divisions of varying humidity)	01 - 04 - 08	more Shepherdia canadensis " Ribes lacustre

Special mention should be made of the larch stand at Buck Hills Road which presents an anomalous situation. No site unit of this exact composition appears in Lloyd et al. in the Montane Spruce Zone or any other. He does list Western larch as a minor constituent of the zonal unit but associated elements differ markedly.

Although scattered Western larch can be found amongst other trees throughout a broad north-south band centred on the old road right-of-way, the main concentration covers two small ridges of bed-rock outcrop and boulders. Here it forms very open stands of pure larch, though both ridges are of extremely limited extent. The one to the west shows these conditions to best advantage being underlain by open short-turf grass and lichen of edaphic origin brought about by thin soil over the well-drained substrate. At the same time shrubs of Black twinberry and Swamp currant cluster around some of the rock masses arguing for the presence of moisture rather than the dryness apparent on the surface.

Another paradox is the similarity of the grass area to certain short-turf sub-alpine open areas. It even includes a small clump of Alpine clubrush that would normally not occur until some 500m higher, all this under Western larch (and a little Oregon grape) which is really a carry over from the Interior Douglas-tir zone, lower in the elevational sequence.

Aquatic vegetation in Lily Pad Lake was not examined as it had been well covered by Bayliss and Blake, except for one point. In the early 1970s there were differing opinions as to whether fringing vegetation around and between the two original small ponds broke loose when a beaver dam raised the water level and became floating mats, or whether it remained attached to the bottom and grew upwards as water depth increased. Bayliss and Blake, 1977 included a map of the lake which outlined major beds of emergent vegetation. A comparison with their position in 1990 showed no change over the intervening 13 year period indicating that now, at least, vegetation is fixed.

Initially it was remarked that the northern part of the Okanagan Highlands at this altitude falls into the Montane Spruce Zone. In a way this observation departs into theoretical fiction rather than staying with ecological fact in that rarely does this zone reach its forecast climax of mature spruce forest. In the normal course of events the succession from an open state is to a seral forest of Lodgepole pine which would reach maturity as it neared an age of 100 years, by which time seedlings of spruce and Subalpine fir would have become established in its shade. Although pine may reach 200 years or more it rapidly becomes susceptible to disease, particularly to the ravages of Mountain Pine Bark Beetle which is able to take advantage of these almost pure even-aged stands to create major epidemics thereby killing a majority of the pine. Growth of spruce and fir would then be freed to assume dominance, however, large areas of dead standing pine usually eventually succumb to fire causing the sequence to revert to stage one again before the spruce and fir are able to take over, except in limited, disconnected wet spots.

The years around the turn of this century were ones during which MPB was at epidemic proportions. Subsequent fires brought new even-aged pine forests into being which have now reached an age where they are at the same point of susceptibility in the cycle. Predictably the 1980s MPB outbreak has occurred and is continuing to work its way through maturing pine stands, the only difference being that instead of natural death and regional forest fire deforesting an area, commercial salvaging will be the clearing agent.

Present management policies dictate that in future new planting will continue to be of Lodgepole pine but that commercial harvesting will intervene as soon as they reach an age of 70 to 80 years, thereby putting the Mountain Pine Bark Beetle out of a job.

VASCULAR PLANTS RECORDED IN 1990

Following many of the names on the list below are the dates (day/month) each was seen in flower. BH = Buck Hills Rd.

ASPLENIACEAE

Athyrium filix-femina  
Cystopteris fragilis  
Dryopteris carthusiana  
" expansa  
Gymnocarpium dryopteris  
Woodsia scopulina

OPHIOGLOSSACEAE

Botrychium lunaria

EQUISETACEAE

Equisetum arvense

LYCOPODIACEAE

Lycopodium alpinum  
" annotinum  
" complanatum

CUPRESSACEAE

Juniperus communis  
Thuja plicata

PINACEAE

Abies lasiocarpa  
Larix occidentalis  
Picea x glauca  
Pinus contorta

APIACEAE

Cicuta bulbifera 27/7  
Osmorhiza purpurea 17/6

ASTERACEAE

Anaphalis margaritacea 24/8  
Antennaria microphylla 27/7 BH  
" neglecta 17/6 H  
" racemosa 17/6  
Arnica latifolia 17/6, 27/7 BH  
" cordifolia 27/7  
Aster conspicuus 24/8  
" foliacius 24/8  
" modestus 24/8  
Cirsium hookeri 27/7 BH  
Erigeron acris 27/7 BH  
" philadelphicum 27/7, 24/8  
Hieracium albiflorum 27/7, 24/8  
Petasites frigidus 17/6  
" palmatus 17/6  
Senecio pseud aureus 27/7  
" triangularis 27/7  
Taraxacum officinale 21/5, 17/6

BERBERIDACEAE

Mahonia aquifolia 17/6 BH

BETULACEAE  
     Alnus incana 21/5  
     "    viridis  
     Betula glandulosa  
 BRASSICACEAE  
     Cardamine oligocarpum 27/7, 24/8  
 CAPRIFOLIACEAE  
     Linnaea borealis 27/7  
     Lonicera involucrata 17/6 BH  
     "    utahensis 17/6  
     Symphoricarpos albus  
 CARYOPHYLLACEAE  
     Cerastium fontanum 27/7  
     "    nutans 27/7  
     Sagina saginoides 17/6  
     Stellaria longipes 27/7  
     "    calycantha  
 CELASTRACEAE  
     Paxistema myrsinites 17/6  
 CORNACEAE  
     Cornus canadensis 17/6  
     "    sericeus BH  
 ELEAGNACEAE  
     Shepherdia canadensis 21/5  
 ERICACEAE  
     Arctostaphylos uva-ursi  
     Chimaphila umbellata 27/7, 24/8  
     Gaultheria hispidula  
     Ledum glandulosum 17/6  
     Vaccinium membranaceum 21/5  
     "    scoparium  
 FABACEAE  
     Lupinus arcticus 27/7, 24/8  
     "    burkei 17/6, 27/7, 24/8  
     "    wyethii 27/7  
     Trifolium repens 27/7, 24/8  
 GENTIANACEAE  
     Gentianella amarella 27/7 BH  
 GROSSULARIACEAE  
     Ribes lacustre 17/6  
 HALOGORACEAE  
     Hippurus vulgaris 17/6  
 LAMIACEAE  
     Prunella vulgaris 24/8  
 NYMPHAEACEAE  
     Nuphar polysepalum  
 ONAGRACEAE  
     Circaea alpina 27/7  
     Epilobium alpinum  
     "    angustifolium 27/7  
     "    ciliata 27/7  
     "    leptocarpum 27/7, 24/8

PLANTAGACEAE

Plantago major 27/7

PARNASSIACEAE

Parnassia fimbriata BH

POLYGONACEAE

Polygonum amphibium 27/7, 24/8

Rumex acetosella 27/7

PYROLACEAE

Moneses uniflora 27/7

Pyrola chlorantha 27/7

Orthilia secunda 27/7

RANUNCULACEAE

Aconitum columbianum 27/7

Actaea rubra 17/6

Aquilegia formosa 27/7

Clematis columbiana 27/7

Ranunculus emelinii var. hookeri 27/7, 24/8

" uncinatus 17/6, 27/7

ROSACEAE

Amelanchior alnifolia 17/6, 27/7

Fragaria vesca 27/7

" virginiana 17/6

Potentilla palustris 27/7

Rubus leucodermis BH

" pauciflorus 27/7 BH

" pedatus 17/6

" pubescens 17/6

Sorbus scopulina BH

Spiraea betulifolia

SALICACEAE

Populus balsamifera var. trichocarpa

" tremuloides

Salix bebbiana

" drummondii or planifolia

" sp.

SAXIFRAGACEAE

Chrysosplenum tetrandum 21/5, 17/6

Mitella pentandra 17/6

" trifida 17/6

Tiarella unifoliata 17/6, 27/7

SCROPHULARIACEAE

Castilleja miniata

Veronica americana 27/7, 24/8

" serpyllifolia 17/6 BH

URTICACEAE

Urtica dioica 27/7

VIOLACEAE

Viola adunca 17/6 BH

" canadensis 17/6

" glabella 21/5, 17/6

" macloskyi 21/5, 17/6

" orbiculata 21/5, 17/6, 27/7

CYPERACEAE

- Carex concinnoides 21/5, 17/6
- " diandra 27/7
- " disperma 17/6
- " lanuginosa 24/8
- Eleocharis palustris 27/7

JUNACEAE

- Luzula parviflora 17/6

POACEAE

- Agrostis scabra 27/7
- " stolonifera 27/7
- Alopecurus aequilis 27/7
- Bromus vulgaris 27/7
- Calamagrostis canadensis 27/7 BH
- " rubescens
- Cinna latifolia 27/7
- Deschampsia elongata 27/7
- Glyceria borealis 27/7
- Phleum pratense
- Poa annua 17/6 BH
- Trisetum cernuum 27/7

POTAMOGETONACEAE

- Potamogeton gramineus

SPARGANIACEAE

- Sparganium minimum

TYPHACEAE

- Typha latifolia 27/7

LILIACEAE

- Clintonia uniflora
- Lilium columbianum 27/7
- Smilacina racemosa 17/6
- Streptopus amplexifolius 17/6

ORCHIDACEAE

- Calypto bulbosa 21/5, 17/6
- Coralorrhiza maculosa 27/7
- " trifida 17/6
- Goodyera oblongifolia 27/7
- Listera cordata 17/6
- Platanthera dilatata
- " unalaskensis 27/7

Noteworthy in the list above is the addition of Bulbous water-hemlock. Only a few locations are reported for this species in B.C. Mention was made previously of one clump of Alpine clubmoss at Buck Hills far removed from its usual habitat. Other features requiring comment are-

Cerastium nutans - plants along LPL drainage creek appear to fit this rather than other taxa in the genus;

Lupinus burkei - although this is reported in Rare Vascular Plants of B.C. it was in quite large numbers in parts of the LPL pine forest. Some of its rareness may stem from the difficulty in separating species of this genus;

Betula glandulosa - has been left under this name as reported by

McLeod and Smith however most of the plants showed intermediate characters between B. glandulosa and B. pumila, preference for name depending on how much weight is put on each character. Rather than two distinct species as treated by Brayshaw, it may be just one showing plasticity of form. Chrysosplenium tetrandrum - along creeks through both reserves. Reported by all previous observers but unknown elsewhere in this region.

The few "weedy" plants on the previous list are either on the old road bed through Buck Hills Road Reserve or a few at the lower end of Lily Pad Lake Creek, both occasionally frequented by cattle. The unidentified willow occurs at the east end bog on Lily Pad Lake where browsing by deer made it difficult to find suitable flowering specimens.

Adjoining Lily Pad Lake Reserve on the west is a boggy forested area with several taxa not recorded within the reserve. These are listed below as it is quite possible they could be present in similarly wet areas.

Carex aquatilis  
" aureus  
Elymus glaucus  
Equisetum sylvaticum  
Geum macrophyllum  
Glyceria elata  
" stricta  
Moeringia lateriflora  
Platanthera obtusata  
Pyrola asarifolia  
Ribes hudsonianum  
Salix scouleri  
Viburnum edule

#### CRYPTOGAMS

The following lists combine collections from both reserves, except that among the habitat choices is one representing the Buck Hills larch stands. None has been examined by authorities in these fields.

## MOSSES

Following each listed name is one or more numbers representing the substrate on which each was found. as follows-

- 1 = forest floor
- 2 = exposed dry grass (Buck Hills Road)
- 3 = wet soil
- 4 = wet rock
- 5 = aquatic
- 6 = dry rock or humus over rock
- 7 = dead wood

*Amblystegium polygamum* BSG 3  
*Aulocomnium androgynum* (Hedw) Schwaegr 1  
" *palustre* (Hedw) Schwaegr 3  
*Brachythecium* sp. (?*B.rivulare* BSG) 4  
*Bryum uliginosum* (Brid) BSG 3  
" sp. (?*B.caespiticium* Hedw) 1,2  
" sp. 7 (saturated)  
*Dicranowesia crispula* (Hedw) Milde 6  
*Dicranum* sp. (?*D.majus* Turn) 2,7  
" *montanum* Hedw 2,7  
" *pallidisetum* (Bailey) Ivel 1  
" *undulatum* Brid 3  
*Drepanocladus uncinatus* var. *uncinatus* (Hedw) Warnst 6,7  
*Fontenalis neo-mexicana* Sull & Lesq 5  
*Grimmia apocarpa* Hedw var. *apocarpa* 6  
*Hygrohypnum luridum* (Hedw) Jenn 4  
*Leptodictyum riparium* (Hedw) Warnst 4  
*Oligotrichum parallelum* (Mitt) Kindb 6  
*Orthotrichum rupestre* Schleich 6  
*Plagiomnium drummondii* (Bruch & Schimp) Kop 3  
" sp. (?*P.ellipticum* (Brid) Kop) 3  
*Plagiothecium laetum* BSG 1,2  
*Pleurozium schreberi* (Brid) Mitt 1,3  
*Pohlia drummondii* (C.Muell) Andr 3  
" *nutans* (Hedw) Lindb 6  
*Polytrichum juniperinum* Hedw 6,7  
" *strictum* Menz 3  
*Pterigynandrum filiforme* Hedw 6  
*Ptilium crista-castrense* (Hedw) De Not 1  
*Rhizomnium medium* (Williams) Kop 3  
*Sphagnum girgensohni* Rus 3

## LIVERWORTS

*Barbilophozia barbata* (Schmid) Loeske 6  
" *kunzeana* (Hüb) Gams 1  
" *lycopodoides* (Wallr) Loeske 2,7  
*Cephalozia lunulifolia* (Dum) Dum 3  
? *Harpanthus scutatus* (Web & Mohr) Spruce 3  
? *Lophocolea heterophylla* (Schrad) Dum 1,3  
" sp. 7  
*Marchantia polymorpha* L 3  
*Ptilidium pulcherrimum* (G.Webb) Hampe 7

LICHENS

Code for substrate is as follows-

- 1 = dry rock (usually shaded at LPL and exposed at BH)
- 2 = bark (larch at BH)
- 3 = decayed conifer wood
- 4 = humus or soil
- 5 = moss or moss over rock

Acarospora fuscata (Nyl) Arn	LPL	1	
Alectoria sarmentosa (Ach) Ach	"	2	
Aspillicia sp. (?A. cinerea (L) Koerb)	BH	1	
" cinereorufescens (Ach) Mass	LPL	1	
" sp. (?A. verrucigera)	"	1	
" sp. (?Lecanora sp.)	"	1	
Botrydina vulgaris (bearing Omphalina ericetorum)	"	3	
Bryoria fuscescens (Gyel) Brodo & Hawks	"	BH	2
" glabra (Mot) Brodo & Hawks	"	"	2
" lanestris (Ach) Brodo & Hawks	"	"	2
Buellia punctata (Hoffm) Massal	"	"	3
Cetraria canadensis Räs	"	"	2
" chlorophylla (Willd) Vain	"	"	2
" pinastri (Scop) S Gray	"	"	2
" platyphylla Tuck	"	"	2
Cladina mitis Sandst	"	"	4
Cladonia carneola (Fr) Fr	"	"	3, 4
" cenotea (Ach) Schraer	"	"	3
" chlorophaea (Flk) Spreng	"	"	3
" coniocraea (Florke) Spreng	"	"	
" cornuta (L) Hoffm	"	"	4
" deformis (L) Hoffm	"	"	3
" fimbriata (L) Fr	"	"	3
" furcata (Huds) Schrad	"	"	3
" gracilis (L) Willd	"	"	4
" macilentata Hoffm (or C. bacillaris (Ach) Nyl)	"	"	4
" phyllophora Hoffm	"	"	4
?Graphis sp. (?G. scripta (L) Ach)	"	"	2 (deciduous)
?Hypocenomyce sp. (?H. anthracophila (Nyl) James & Schneider)	"	"	3
Hypogymnia enteromorpha (Ach) Nyl	"	"	2
" metaphysodes (Asah) Räss	"	"	2
" physodes (L) Nyl	"	"	2, 1
Icmadophila ericetorum (L) Zahlbr	"	"	3
Lecanora sp. (?L. polytropa (Hoffm) Rabenh)	"	"	1
" " (?L. pulicaria (Pers) Ach)	"	"	3
" " (?L. rupicola (L) Zahl)	"	"	1
" "	"	"	1
Lecidea atrobrunnea (Ram) Schaer	"	"	1
" sp. (?Fuscidea sp.)	"	"	1
Lecidella euphorea (Floerke) Hertel	"	"	2
Lepraria sp. (?L. incana (L) Ach)	"	"	1, 5
Letharia vulpina (L) Hue	"	"	2

Melanelia exasperatula (Nyl) Essl	BH	1
" stygia (L) Essl	BH	1
" substygia (Räs) Essl	"	1
Nephroma parile (Ach) Ach	LPL "	1
Ochrolechia sp.	"	1
Parmelia omphalodes (L) Ach	"	1
" saxatilis (L) Ach	"	1
" sulcata Tayl	" "	1
Parmeliopsis ambigua (Wulf) Nyl	"	3
" hyperopta (Ach) Arn	" "	3
Peltigera apthosa (L) Willd	"	4
" canina (L) Willd	"	4
" malacea (Ach) Funck	" "	1
" membranacea (Ach) Nyl	"	5
" neopolydactyla (Gyel) Gyel	" "	4
" polydactyla (Neck) Hoffm	"	4
" venosa (L) Baumg	"	4
Phaeophyscia sp. (?P. sciastra (Ach) Moberg)	"	1
Platismatia glauca (L) Culb & Culb	"	2
?Porpidia sp. (?P. crustulata (Ach) Hert & Kn)	"	1
Rhizocarpon geographicum (L) DC	" "	1
Stereocaulon tomentosum Fr	" "	4
Umbilicaria hyperborea (Ach) Ach	"	1
" polyphylla (L) Baumg	"	1
Usnea lapponica Vaino	"	2
Xanthoria elegans (Link) Th Fr	"	1
unidentified crustose (?Trapelia/Trapeliopsis sp.)		1

## FUNGI

Along dry fall season failed to produce sufficient moisture for a normal flush of fungi so the following short list must be taken as representing only a small fraction of what is present.

Clitocybe deceptiva	June	ground
Collybia dryophila (Fr) Kummer	"	dead wood
?Cortinarius callisteus (Fr) Fries	"	under Lodgepole pine
Dacromyces deliquens	May	dead wood
Discina perlata Fries	"	ground
Fuscoboletinus ochraceoroseus (Snell) Pom & Smith	July	"
Gloeophyllum saepiarium (Wol) Karst	June	dead wood
Hirschioporus abietinus (Dicks) Donk	"	" "
Laccaria laccata (Fr) Berk & Br	July	ground
Lactarius rufus (Scop) Fries	Aug	"
Leccinum insigne Fr	July	under aspen
Lentinus lepideus Fr	"	dead wood

Morchella elata Fr	June	wet ground
Naematoloma capnoides (Fr)Karst	"	dead wood
Omphalina ericetorum (Fr) m Lange	"	" "
from Botrydina vulgaris	"	" "
Phellinus ignarius (Fr) Pat (L) Quel		dead wood
Phaeolus schweinitzii (Fr) Pat		
Ramaria sp. (?R.myceliosa)	Aug	ground
Russula emetica gp. (Fr) Pers	July	"
Stereum hirsutum gp. (Wild)SF Gray		dead wood
Suillus tomentosus (Kauf)Snell,		
Singer & Dick	July	
Thelophora terrestris (Ehr) Fr	May	ground
Tremella foliacea Fries	"	dead wood

In parts of Lily Pad Lake Reserve and to a lesser extent Buck Hills Road, large quantities of dead branches and whole trees litter the ground bearing the distinctive galls of the micro-fungus Endocronartium harknessii (Jp Moore) Y Hirat. It is difficult to guess how long ago this widespread attack took place. No noticeable gaps now remain in the canopy.

#### VERTEBRATES

In their species lists McLeod and South have very complete coverage of 5 amphibians, 2 reptiles, 61 birds and 26 mammals at Lily Pad Lake; 3 amphibians, 3 reptiles, 39 birds and 22 mammals at Buck Hills Road. In some respects these seem to represent species compiled from checklists of the southern Interior that might be expected to occur in montane forest habitats, and it is not clear whether they were all actually recorded during their relatively short survey period.

During the shorter time spent on site in 1990 the following were seen (with dates in the case of bird sightings).

Northern pocket gopher (diggings)  
 Red squirrel  
 Mule deer  
 Large ungulate tracks (moose/elk)  
 Pine chipmunk  
 Pika (BH larch boulder ridge)

Tree frog  
 Spotted frog

BIRDS

	21/5	17/6	27/7	24/8	
Common loon	x	x			2 young
Ring-necked duck	x				
Sharp-shinned hawk	x				
Grouse sp.	x				
Vaux swift		x			
Belted kingfisher			x	x	
Northern flicker		x	x		
Pileated woodpecker		x			
Hairy woodpecker		x			
Western flycatcher		x			
Tree swallow	x	x	x		
Gray jay				x	
Raven	x	x		x	
Mountain chickadee				x	
Red-breasted nuthatch	x	x			
Winter wren		x			
American robin	x			x	
Varied thrush	x				
Golden-crowned kinglet	x	x			
Vireo sp.		x			
Yellow-rumped warbler	x				
Wilson's warbler		x			
Red-winged blackbird	x				
?Pine grosbeak			x		
Pine siskin			x		
Dark-eyed junco	x	x	x	x	
Song sparrow		x			

SPIDERS

Spiders have again been identified by Biosystemic Research Centre, Ottawa, with special thanks to Mr. J.H. Redner.

Three habitat categories are shown on the following list - BH being the open, larch ridges at Buck Hills Road; bog or lake, and forest being the main divisions at Lily Pad Lake.

Two species, marked "BC", one from each reserve, appear to be new records for this province.

		BH	bog or forest	
			lake	
AGELINIDAE				
	Cybaeus exlinae Cham & Ivie	BC	x	
THERIDIIDAE				
	Theridion montanum Em			x
	" sexpunctatum Em		x	
LINYPHIIDAE				
	Agyneta olivacea (Em)		x	
	Bathyphantes brevipes (Em)		x	
	Lepyhyphantes zelatus Zorsch			x
	Linyphyidea sp.		x	
	Meioneta ordinaria Cham & Ivie	BC		x
	Pityohyphantes sp.		x	x
ERIGONIDAE				
	Diplocentria bidentata (Em)			x
	Halorites stylifer (Chamb)		x	
	Zornella cultrigera (L Koch)			x
ARANEIDAE				
	Araniella displicata (Hentz)		x	x
	Cyclosa conica (Pallas)		x	
LYCOSIDAE				
	Arctosa alpigena (Doleschall)		x	
	Pardosa dorsalis Banks		x	
	" dorsuncata Lowrie & Dondale		x	x
	" mackenziana (Keys)		x	
	" moesta Banks		x	
GNAPHOSIDAE				
	Gnaphosidae sp.		x	

## MANAGEMENT

In the past, use of the reserves by cattle has been the only serious cause for concern. This no doubt will continue as grass seeding of adjacent cut blocks by Ministry of Forests will be carried out to enhance grazing licences and may even result in more head of stock using the area. Damage has not been extensive to either reserve and is more of an annoyance and a source of uninvited weeds than a hazard to their integrity. At one time it was felt cattle hoofs might break down the beaver dam at the outlet to Lily Pad Lake but there is no sign of this happening.

More recently, large scale clearing of pine stands infected by Mountain pine beetle has greatly affected the Okanagan Highlands. One limited but direct effect from the removal of tree cover on adjoining blocks has been exposure of boundary lines, particularly at Lily Pad Lake, to unaccustomed wind resulting in severe blow-down. In a few places dense barriers of fallen trees can be found, though at present none greater than about 10m in width.

Indirectly the MPB problem has an undermining influence on the concept of ecological reserves through differing management requirements of Ministry of Forests and Ecological Reserves Program under their respective Acts.

One problem of MPB infestations occurring at such widely spaced intervals in time is that no present personnel have ever experienced an attack first-hand. Policy, therefore, is based as much on supposition as it is on scientific understanding. Actual number of beetles present is taken to be the controlling factor with the simple answer being that a reduction in beetles leads to a reduction in problem: an elimination of beetles leads to an elimination of the problem.

An equally valid, if not better, supposition is that the presence of trees of a susceptible age is the controlling factor. Under this line of thought a reduction of beetles merely spreads out the length of time before an infestation runs its course: an elimination of beetles is therefore possible only by elimination of susceptible trees.

So long as mature Lodgepole pines remain on E.R. property in this area it is possible to foresee continual requests from Ministry of Forests to bait and poison and remove trees, which taken to an extreme conclusion would have in time the same effect as if they had all been logged in the first place. Natural succession and replacement of seral species by climax species would be prevented, and one of the fundamentals of ecological reserve purpose compromised. A comment on reserve management (Taschereau 1974) in the Maritimes stated "Change, itself a natural phenomenon, is not interfered with, but is allowed as far as possible to proceed uninterrupted by man".

In as much as it could have future research benefits to the forestry industry to have an area where they could study processes of recovery or succession where silvicultural practices and man-induced alteration have not taken place, support might be forthcoming from some quarters for a policy of non-intervention.

Concern about fire danger from standing or fallen dead trees could be expected. This would be countered by leaving unplanted buffer strips around each reserve. Difficulty of access would prevent cutting of dead trees for firewood so this, too, would not be a great problem.

No other management concerns were evident.

Special comment should be made about Buck Hills Road, Reserve #6. This was put forward originally and accepted as a representative example of an uncommon vegetation type - pure Western larch. Nominally it fills this requirement but because the actual number of trees is so small, the area they cover exclusively so limited, and the fact that they are divided rather than in a homogeneous block, it is questionable whether the area fulfills its purpose. Their size and shape results in the larch stands being all "edge" and having no "depth". Under the theory of islands, as size diminishes so the number and variety of species contained within them declines, eventually to the point of elimination. This is probably the situation on this reserve.

If the purpose of a reserve is to cover one particular representative or unique ecosystem it should be able to present that ecosystem in its entirety with all complementary life forms, not just an abridged summary. Larger and better stands of Western larch do exist in this Forest District which would be better able to fulfill the E.R. mandate by showing a greater range of species dependent upon larch, not just visiting from surrounding pine forest. It is suggested that consideration be given to a suitable exchange of property.

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