

INTRODUCTION

After passage of 11 years from the original proposal by the North Okanagan Naturalists' Club, Cougar Canyon was finally granted Ecological Reserve status in November 1981. Its c. 443ha (c.1070 acres) start approximately 10km south of Vernon running in a south-westerly direction almost to the south end of Kalamalka Lake.

Apart from an assessment visit by staff of the Ecological Reserve Unit, the only previous study was by Rob Cannings who made reference to the canyon in "Interpretation Assessment of Kalamalka Lake Park", Report No. 25 dated October 1975 written at a time when consideration was being given to including the area within the proposed new provincial park.

TOPOGRAPHY

The narrow, steep-sided valley of Cougar Canyon is bounded on the north-west and separated from Kalamalka Lake by the pole-line ridge (PLR in this report) and on the south-east by slopes rising eventually to over 4,500 ft. on the rolling, forested plateau of Grizzly Hills (in the absence of metric maps altitude is given in imperial measure). Above lake #9 PLR reaches its greatest height above the canyon floor of 2800 ft. or a rise of 1100 ft.. Except for a short initial stretch at the north end the lower enclosing slopes on both sides of the valley average around 45° helping to give a feeling of isolation and ruggedness.

From an altitude of c.1850 ft. above lake #1 the canyon floor declines to 1600 ft. at its southern end, or 76m over 7km - a degree of slope that belies actual experience when traversing it on foot.

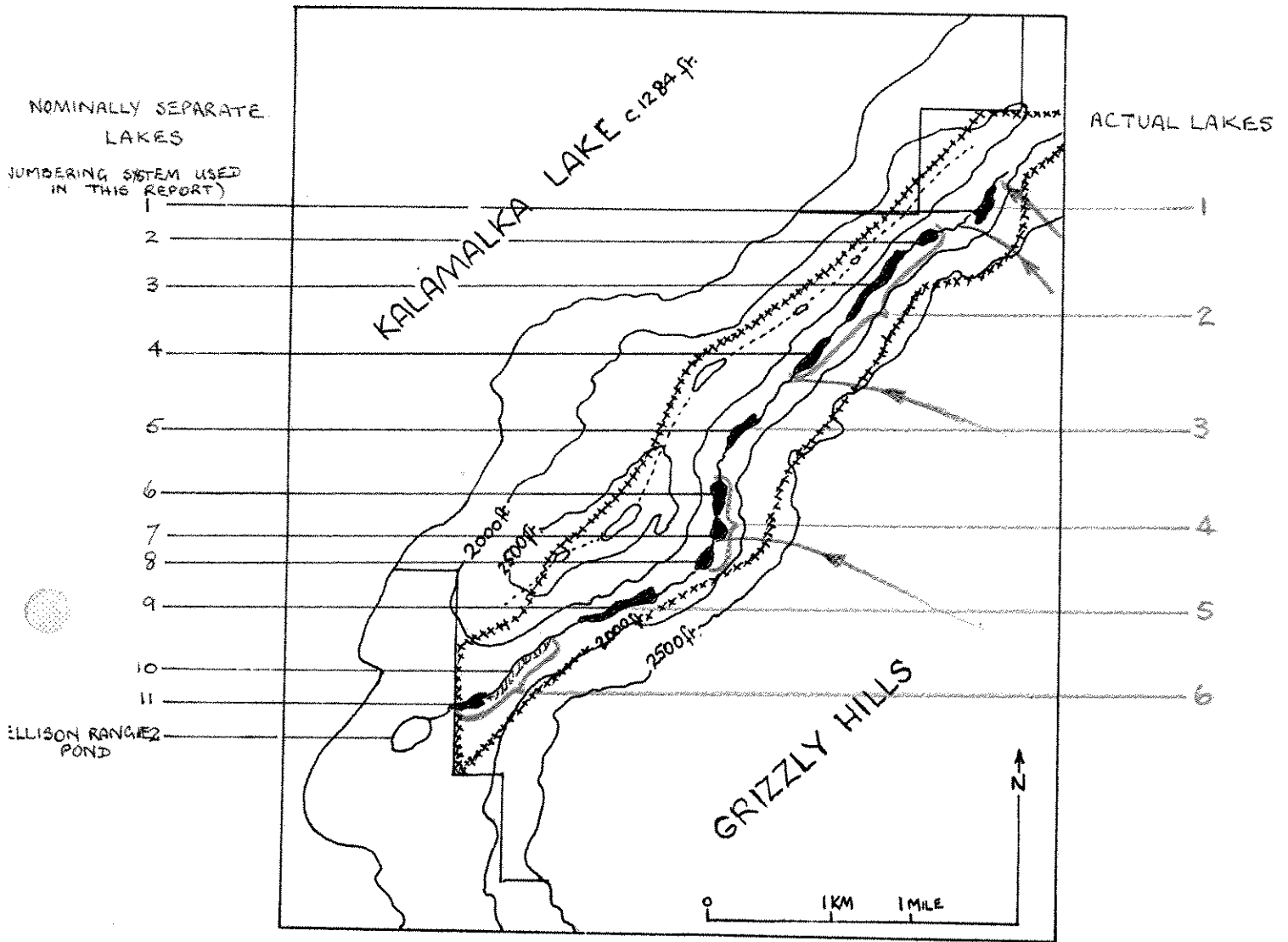
LAKES

For the purpose of this report the lakes are numbered from 1 to 11 counting from the north, these being as shown on National Topographical System map covering 82 L/3 West at 1:50,000 with the addition of lake #10 (not shown on the map) adjoining and prior to the last lake in the chain. In actual fact this is incorrect as observation on the ground reveals only 6 individual lakes as indicated on map 1. Shallow water areas are largely filled with cat-tails giving the appearance of ground vegetation on aerial photographs and causing cartographers to infer breaks between lakes where none really exists.

STREAMS

Topographic maps on this scale indicate the long Grizzly Hills slope as being completely devoid of running water. Certainly for a rise of nearly 3000 ft. it is remarkably free of streams but at least 4 of modest flow (marked on map 1) are

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present throughout a normal precipitation year, the most northerly of which is responsible for the "weeping wall" effect over part of the easterly cliff just prior to lake #1.

It is highly unlikely that these four together with any other intermittent flows are responsible for all the surface water present in the valley bottom, taking evaporation, transpiration and outflow into consideration, indeed the stream linking all the lakes in the system itself originates in several small springs above lake #1 and others may well arise elsewhere or open directly into lake beds.

Outflow at the south end is into a larger shallow lake beyond the reserve boundary (Ellison Range pond) but direct flow ceases as soon as spring freshet declines. As lake levels drop during summer, seepage into the ground can be seen at the south-west end of lake #11. This is insufficient to maintain Ellison Range pond which shrinks markedly and has been seen completely devoid of standing water.

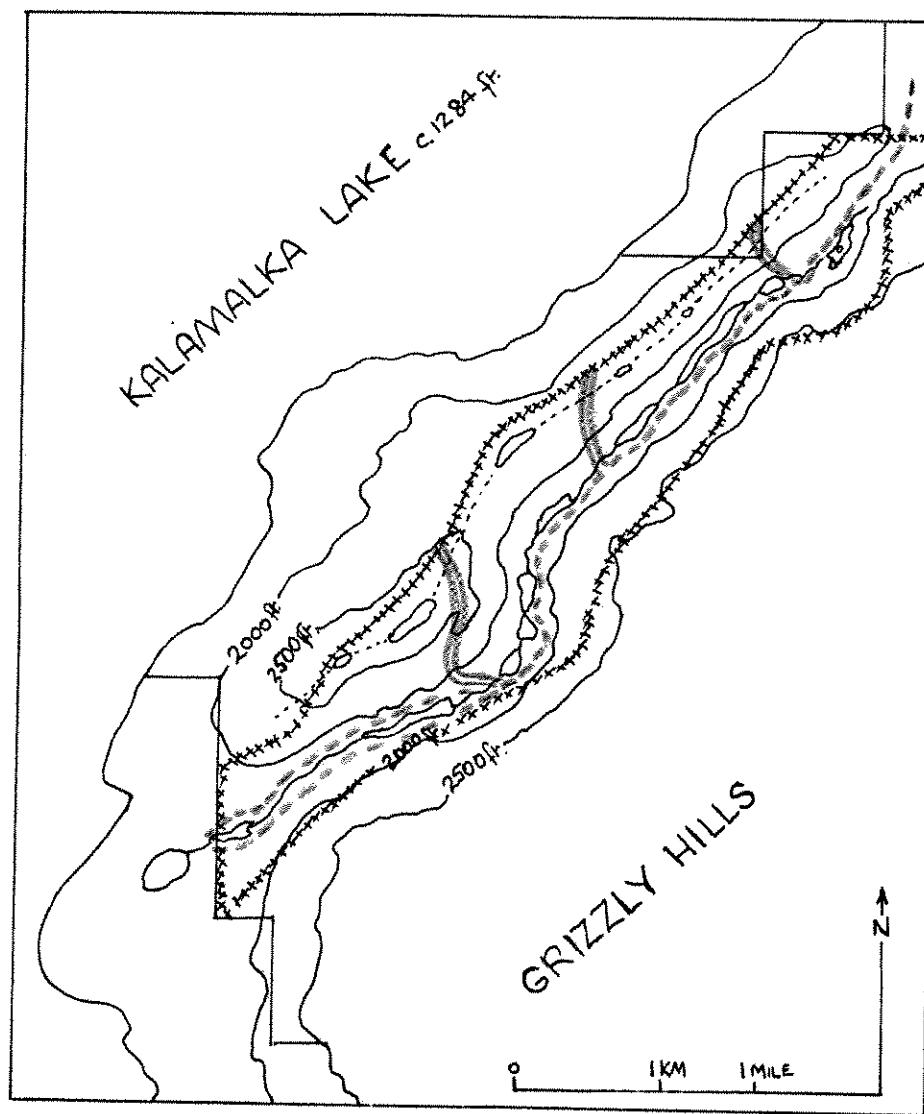
ROUTES OF TRAVEL

Following a course on or just west of the height of land, West Kootenay Power's right-of-way forms the west boundary of the ecological reserve. The nearby access road wanders from the power line a little according to topography and provides the easiest means of traversing the length of Cougar Canyon, though at some elevation from the lakes. From it the valley in its central section can be reached faster and more conveniently than attempting the often tortuous going along its floor even though it entails an energetic rise up the PLR road followed by a steep drop into the canyon. Three suitable descents (or ascents in the opposite direction) are shown on map 2 where cliffs can be avoided.

At valley level lake #1 is reached from a logging track outside the reserve. A slight trail follows the west side of this lake, bushy at its far end, leading into thick forest with relatively easy going as far as lake #2. The east side then becomes preferable over and among large rocks fallen from the prominent vertical cliff above, and although this section is short it necessitates care and time. At lake #3 steep slopes flank the east side requiring high-angled bushwacking as one proceeds further south, fortunately after one difficult section easing along lake #4. Few clear views of the water present themselves and the sound of passage through thick vegetation is not conducive to meeting wildlife.

The going on the east side past lakes #5, 6 and 7 is not serious and buoyed by the rate of progress the weary traveller is suddenly disturbed to find the angle steepen dramatically until it becomes a cliff plunging into lake #8 which can be by-passed only by climbing half way out of the canyon before

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MAP 2.



route of descent
route of travel

dropping back down to lake #9. The opposite side of the valley promises even more exacting difficulties.

From Lake #9 to #11 the east side continues thickly vegetated requiring a steady expenditure of energy until part way along the last lake. On the west side of this section the route is more open though slow over fairly stable scree.. Easy walking on a lightly treed bench stretches to the south end of the reserve from where farm tracks through private grazing extend to Sawmill Road at Oyama.

GEOLOGY

Since the time of Geological Survey of Canada Memoir #296 covering the Vernon map area (Jones 1959) field work has been concentrated to the north of Vernon and none has taken place in the vicinity of Cougar Canyon. Mapping now refers to the whole region as being part of the "Okanagan Plutonic and Metamorphic Complex" with the area east of Kalamalka Lake falling into the category shown as "undifferentiated Palaeozoic and Mesozoic gneiss containing minor hornblende, biotite gneiss, paragneiss, minor schist, marble quartzite and amphibolite". Most of the cliff faces are seen to be gneiss, light in colour where fresh and weathering darker often with a reddish cast. Of the minor constituents listed above only a coarse black mafic intrusive of gabbroic nature corresponding with the amphibolite is present for certain within the subject area. This dark friable member underlies much of the slopes containing lake #4, particularly on the west side. Some was also noted further south.

There is no record of any mineral claims ever having been staked and no mineralization is evident. Elsewhere in the north Okanagan sediments apparently derived from areas of amphibolite have given rise to anomalously high geochemical readings for nickel and may do so here if tested. North of lake #2 on the ridge a squared stake bears numbers that seem unrelated to claims records and may be the corner post of surface lot #4679.

Soils are thin and except on the valley floor, where organic remains accumulate, are mostly derived from the underlying bed-rock directly rather than from glacial and post-glacial deposits.

It is likely that Cougar Canyon is orientated along a line of structural weakness paralleling the fault-controlled shores of Kalamalka and, further west, Okanagan Lakes. It has been advanced that melt water from the deglaciation stages of the numerous Pleistocene ice advances used this line of weakness as a channel to by-pass the obstruction of late-melting ice where Kalamalka Lake now lies, incising and deepening it following each glaciation. Erosion by fast flowing water kept the walls at a constant high angle which in turn was probably responsible for the rock falls that give rise to the numerous areas of scree. Much of the smaller sized debris would have been transported out of the canyon where it was deposited as a delta in the post-glacial lake filling that part of the Okanagan free of ice.

This delta now forms the flat part of Ellison Range just outside the reserve and stands out prominently at a height of about 106m (350 ft.) above the present level of Kalamalka Lake when viewed across from Highway 97.

CLIMATE

General climatic conditions would vary little from those of Vernon with the following exceptions. Being on the east side of the Okanagan Valley where westerly and south-westerly winds are forced to rise, some increase in precipitation is likely, while the difference in height would account for a slightly lower temperature.

As the canyon loses definition to the north it would tend to be less open to wind originating in that sector unlike the open southern end where warm winds are funnelled in causing a much drier appearance as far as the bend around lakes #6,7 and 8. Drier also due to intense insolation is the west side of the valley (facing mostly south-east) compared with the opposite side (facing mostly north-west), the one carrying a fair amount of Ponderosa pine among douglas-fir, the other douglas-fir only.

From November through February it is possible to imagine little direct sun shining into the lowest part of the canyon due to its high east wall, except late in the day from the south to south-west and this would tend to slow diurnal warming after nights when cold air would have descended into and been channelled through the valley making it considerably cooler than more open land at the same height.

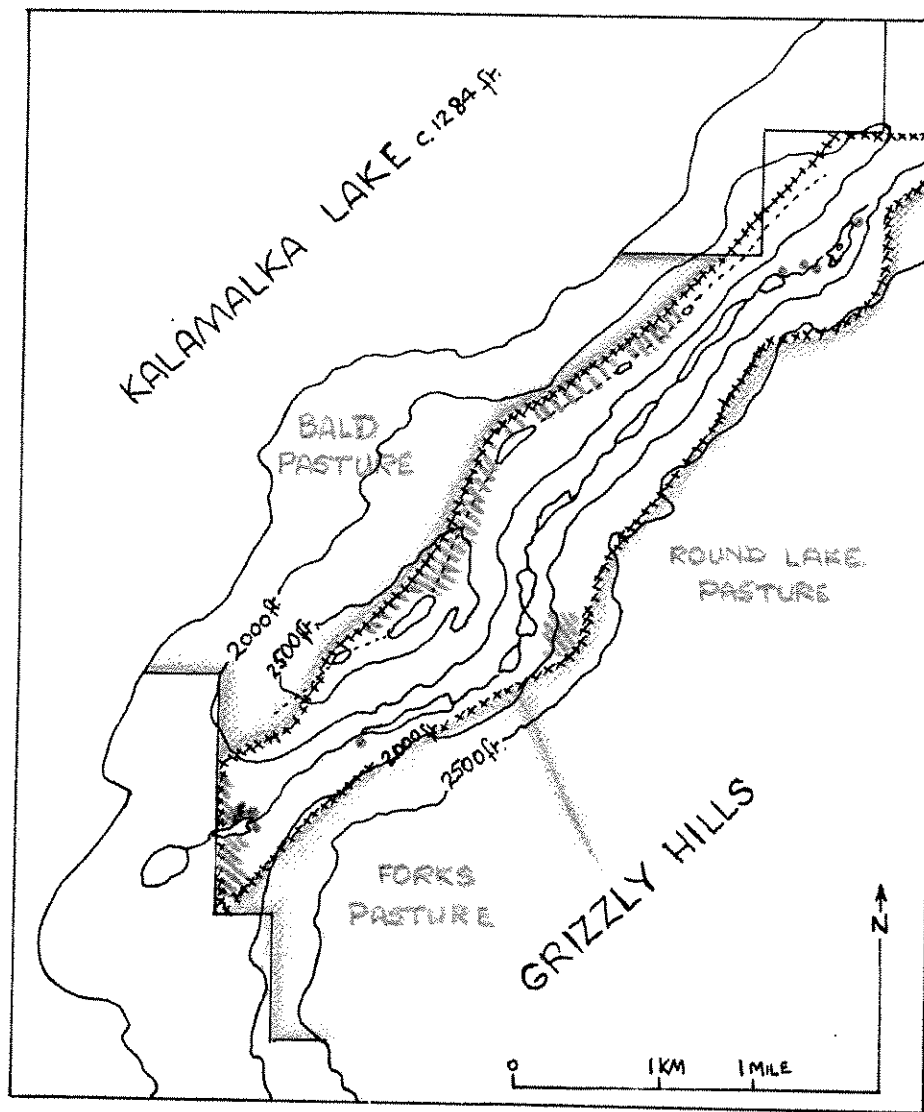
EXTENT OF PUBLIC USE

It was not until West Kootenay Power erected its transmission line along the ridge above Cougar Canyon that access became eased. Logging took place at the north end in the late 1960s though not extending (or only very little) into what is now the ecological reserve. Such timber extraction as has taken place on to of the PLR may have been concurrent with preparing right of way and was not extensive. Because of its proximity to Oyama the southern end has, no doubt, always attracted more use. Some logging on either side of lake #11 occurred in 1963-64 but extends only a short distance inside the present boundary.




Cattle grazing is less dependent on easy access and probably has always occurred to the south. At present the three surrounding Provincial Forest grazing leases (shown on map 3) are held by Mr. Ken Ellison and Mr. Dave Allingham who own the range outside the reserve as far as the gate on Sawmill Road. Cattle wander into the reserve as indicated on the map but numbers are not concentrated and effect is minimal.

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MAP 3.

-  boundary of grazing lease
-  area of cattle presence within lease
-  site of camping

Cartridge and shell in small quantity is found scattered around the mouth and flanks of the canyon at the south with grouse and deer probably the objective. Mr. Ellison is not a hunter and does not encourage entry on his property although lightly treed south-facing slopes terminating the PLR may be attractive to deer in winter and to local hunters.

A Winfield resident, Mr. Rocky Madden, has trapping rights over the permit area south-east of Vernon and he is reported to have been enquiring during the winter of 1983-83 about prospects in the canyon. It has not been possible to contact him to ascertain if he has ever worked there previously however the apparent lack of beaver and sparsity of muskrat suggests that someone has.

Because of its ruggedness the canyon is not much travelled by casual visitors, yet these same values increase its attractiveness to other hardy souls some of whom must have spent a little time there. Camp sites, some recent, most older, are roughly indicated on map 3. Day hiking seems rarely to extend beyond either end of the valley apart from those taking the PLR road from Kalamalka Lake Park through to Oyama. As a measure of use in 1983 it appears that two sizeable groups of people visited lake #1 at the north end in August with possibly another during September, while one sizeable party went in to the head of lake #11 at the south end in the summer probably with others in ones and twos who left no evidence.

An old raft of more than casual construction remains at the south end of lake #4. One party with canoes traversed the whole system many years ago portaging through thick woods between lakes and forcing slow passage through cat-tails elsewhere in what must have been a long and purgatorial trip.

BIOTA

The lack of marked boundaries apart from the west makes it difficult to be certain at all times whether an observation is actually within the reserve or not. Judgement has been generous. Some nearby sightings were obviously outside but close enough that longer time spent or closer examination could well add them to the following lists. These have been added separately at the end of each section as "seen nearby".

Birds

The overall total of 56 species registered during 1983 is surprisingly low compared with twice this number in a normal year in Kalamalka Lake Park. Only partly can this be explained by the difficulty in making observations in thick vegetation where movement causes disturbing noises. Better recognition of calls would have added a few to this list.

For a reserve based on a chain of lakes one would have expected waterfowl to show greater prominence. Probable shallowness of

water would deter deeper diving species but of surface feeders only mallard was present. During April as many as 10 pairs of Barrow's goldeneye were seen at one time on the three northern lakes yet none appears to have remained for nesting despite plentiful fringing trees. Of the species that did breed, ring-necked duck (2 pairs?) and Canada goose (4 pairs) seemed to move their broods as quickly as possible to the more open and presumably less vulnerable waters of ER pond and lake #11. A mallard nest with 11 eggs above lake #2 was unsuccessful, one half shell only remaining several weeks later. On PLR pond a pair of mallard were in occupancy in May with a female and one juvenile later in the year. With such extensive beds of cat-tails the absence of sora was surprising and may be a case of "not seen" rather than absent.

Migrating water birds appear to keep to the main Kalamalka valley rather than venturing through the canyon as muddy shorelines such as found around ER pond late in the summer are infrequent in Cougar Canyon. On 20th September a rough count showed 20 ring-neck, 50 mallard, 20 lesser yellowlegs, 30 least sandpipers and 10 killdeer just outside the reserve around the edge of ER pond.

Whether the presence of sharp-shinned hawk in mid-July implies breeding or whether it was already on the move from elsewhere is questionable. Others were seen with some regularity thereafter: conversely golden eagle records ceased after early June. No time after dark could be spent in the reserve and its owl population remains unprobed except in so far as several pygmy owls were calling from various stations along PLR on 25th September which seemed to be a day of some consequence in their calendar.

Bulrush beds in lake #9 held considerable attraction for a female hummingbird of indeterminate species which spent much time going from head to head presumably for small insects.

One of the most complete surprises was a total lack of sap-suckers, so common around pools and minor wet areas in Kalamalka Lake Park. I am inclined to put this down to there being no cottonwoods within the canyon as these were favoured for nesting in the park. At one time there had been cottonwoods as downed remnants of large diameter are still identifiable at the south end of lake #9. Common flicker is the most frequent woodpecker in the open woods of PLR with the occasional hairy but in the valley bottom it is piliated woodpecker that is supreme and not uncommon. A family group was watched for some time in August in the cedar wood north of lake #1.

Undoubtedly further birdwatching would add flycatchers to the list and probably more wood warblers also. Small shrub and tree frequenting species are particularly difficult in thick vegetation unlike noisy and fearless Stellers jay and nuthatches that were recorded at virtually every visit.

Dragonflies and other winged insects are in large numbers around each lake and yet once the crowds of red-winged blackbird moved away to their agricultural pursuits they remained practically unharvested. By late summer on the Cattle Pond in Kalamalka Lake Park cedar waxwings spent much productive time fattening on dragonflies but not one was seen on Cougar Canyon.

	April	May	Jun	Jul	Aug	Sep	Nov						
	4	18	10	20	4	27	17	29	15	22	20	25	13
pied-billed grebe							x				x		
Canada goose	x	x	x										
mallard	x	x	x	x		x	x	x	x			x	x
ring-necked duck		x			x	x	x		x				
Barrows goldeneye	x	x	x	x									
sharp-shinned hawk							x			x		x	
red-tailed hawk	x					x						x	
golden eagle		x		x	x								
blue grouse	x												
spruce grouse			x										
ruffed grouse				x		x			x	x			
great blue heron			x	x		x		x	x				
Virginia rail									x				
mourning dove				x				x	x				
pygmy owl													x heard
poorwill				x									
common nighthawk						x	x	x					
rufus hummingbird				x									
calliope hummingbird					x								
belted kingfisher			x				x	x	x		x		x
common flicker		x	x	x	x		x	x					
pileated woodpecker						x		x		x		x	
hairy woodpecker		x	x										
violet-green swallow		x	x	x	x	x							
rough-winged swallow			x		x								
Stellers jay	x			x	x	x	x	x	x	x		x	x
common raven	x		x		x								
common crow								x		x			
Clarks nutcracker										x heard			
black-capped chickadee		x		x	x	x	x	x	x	x	x		x
mountain chickadee												x	
white-breasted nuthatch													
red-breasted nuthatch		x	x	x	x	x	x	x	x	x	x	x	x
house wren						x				x			x
winter wren	x	x		x									x
American robin		x	x	x	x	x		x					
Swainsons thrush								x					
Townsend's solitaire		x			x	x							
golden-crowned kinglet													
ruby-crowned kinglet													x
solitary vireo												xx	
red-eyed vireo				x	x	x							
Tennessee warbler				x									

	Apr	May	Jun	Jul	Aug	Sep	Nov
	4 18	10 20	4 27	17 29	15 22	20 25	13
yellow-rumped warbler		x					
yellowthroat			x				
red-winged blackbird	x	x	x	x			
brown-headed cowbird			x				
western tanager			x				
Cassins finch	x						
pine siskin				x	x	x	x
red crossbill				x	x		
rufus-sided towhee			x		x		
dark-eyed junco	x	x	x	x			x
chipping sparrow			x				
white-crowned sparrow						x	x
song sparrow			x	x	x		

Seen nearby - killdeer, lesser yellowlegs, least sandpiper, American goldfinch, western bluebird, Vaux swift, grey jay.
See also Addendum at end of this report.

Mammals

Widespread gnawings of beaver and downed deciduous trees point to a good distribution through the canyon at one time. Just how long ago it is difficult to say. Most of the chips were obviously more than a few years old and only in one place did they have the appearance of relative freshness. This was at the north end of lake #5 and is of some significance in being approximately the mid-point and the most distant for anyone trapping from either end and therefore possibly the last area to be trapped out. One beaver lodge is visible from the peninsular that nominally divides lake #10 from #11 and a dam closer to the north end where it is just possible to cross dry-shod but in neither area does there appear to be any recent activity.

Most of the lakes are suitable muskrat territory and their sparsity despite ample opportunity for observation also speaks for trapping activity. One animal was seen on lake #11, the most accessible, and another on lake #10 so there ought to be more further within the canyon.

Lake #10, the long cat-tail marsh, in places had passages pushed through the reeds from one side to the other as though a large animal had crossed. Mr. Ellison and family have long lived and farmed in the vicinity but he has no knowledge of moose ever having been reported so it is possible that no ungulates larger than mule and white-tailed deer are to be expected. Deer must be very plentiful judging by the abundance of game trails on both slopes.

Black bear will cross shallow water too, leaving a trail through cat-tails. There is plenty of evidence of their presence along PLR and wooded areas at either end of the valley, less on the steeper or drier slopes within it. By late summer

regularly there were droppings on trails outside the reserve at the south end where wild berries and orchard apples were a lure.

Lake edges seemed to be well patrolled by coyote provided the going was reasonably open even if it meant crossing long stretches of scree. Two empty turtle shells were found, one with coyote scat, indicating one of the attractions in these parts.

The difficulty in making return visits to empty traps prevented any live trapping being undertaken consequently of small rodents only one vole was noted. Small unclear prints in mud at the south end of lake #9 may have been weasel, mink or something of that size.

yellow-pine chipmunk	Eutamias amoenus (Allan)
red squirrel	Tamiasciurus hudsonicus (Erx)
vole sp.	Microtus (montanus or pensylvanicus)
muskrat	Ondatra zibethica (L)
coyote	Canis latrans Say.
American black bear	Ursus americanus Pallas
mule deer	Odocoileus hemionus (Raf)
white-tailed deer	Odocoileus virginianus Bailey

Seen nearby - snow-shoe hare Lepus americanus Erx.
See also Addendum at the end of this report.

Amphibians

Almost certainly additional searching would add western long-toed salamander to the list and possibly Great Basin spadefoot.

northwest toad	Bufo bufo boreas Baird & Girard
pacific tree frog	Hyla regilla Baird & Girard
spotted frog	Rana pretiosa

Reptiles

A number of times when crossing areas of rock fallen from cliffs above when eyes were busily employed aiding balance and placement of feet peripheral vision picked up a sudden flash of dark movement. These were assumed to be alligator lizards fleeing for cover. Rather than being totally exposed, these areas usually had a little light shade. Only two rattlesnakes were met (one near water's edge at the north end of lake #11, the other close to the top of PLR) which was surprising in view of the wealth of rocky outcrops and bushy cover of suitable habitat. One reason may be the distance and time taken reaching the reserve which meant it was usually mid-morning before entering whereas in summer it is their exposure to early morning sunshine for body heating that most often reveals snakes before they retire to cover as the day heats up. As the study of rattlesnakes in Kalamalka Lake Park and Campbell-Brown Ecological Reserve has shown that small rodents are the prime food source it is unlikely that the lack of ground squirrels and yellow-bellied marmots

affects the distribution in Cougar Canyon.

Turtles were present on all lakes but less so, it seemed, to the north. On 17th July a juvenile of about 4cm was at the edge of lake #11 and a floating egg, presumably from a destroyed nest. By late fall exhumed and drained eggs littered the west side of this lake having provided considerable sustenance to a resourceful hunter. Without attempting a comprehensive count I estimate at least 20 nests had been dug up ranging from about 1m (3 ft.) away from the water's edge and one third this distance above it, to 7m (22 ft.) away and a similar distance up a steep bank.

northern alligator lizard	Gerrhonotus caeruleus princilis Baird & Girard
western blue racer	Coluber constrictor mormon (B & G)
northwestern garter snake	Thamnophis sirtalis tetrataenia (Cope)
wandering garter snake	Thamnophis elegans vagrans (B & G)
pacific rattlesnake	Crotalus viridis oregonus (Holbrook)
western painted turtle	Chrysemys bellii bellii (Gray)

LICHEN

Neither this list nor the actual specimens have been seen by an expert in the field. The collection has been retained.

Acarosporaceae

Acarospora chlorophana (Ach) Mass ?

Alectoriaceae

Alectoria sarmentosa (Ach) Ach

Bryoria capillaris (Ach) Brodo & Hawk

Candelariaceae

Candelaria concolor (Dicks) Stein ?

Cladoniaceae

Cladonia amaurocraea (Flk) Schaer ?

" bellidiflora (Ach) Schaer

" cariosa (Ach) Spreng

" cenotea (Ach) Schaer

" cornuta (L) Hoffm

" chlorophaea (Flk) Spreng

" furcata (Huds) Schad

" gracilis (L) Willd

" multififormis Merr

" phyllophora (Ehrh) Hoffm

" pyxidata (L) Hoffm

" squamosa (Scop) Hoffm ?

Cladonia mitis (Sandst) Hale & Culb

" rangifera (L) Harm

Hypogymniaceae

Cavernularia laphyrea (Ach) Degl ?

Hypogymnia physodes (L) Nyl

" tubulosa (Schaer) Hav

Parmeliaceae

- Cetraria canadensis Ras
- " chlorophylla (Willd) Vain
- " idahoensis Essl
- " platyphylla Tuck ?
- Parmelia saxatilis (L) Ach ?
- " subaurifera Nyl ?
- " sulcata Tayl
- Parmeliopsis ambigua (Wulf) Nyl
- " hyperopta (Ach) Arn
- Platismatia glauca (L) Culb & Culb
- " lacunosa (Ach) Culb & Culb ?
- Xanthoparmelia conspersa (Ach) Hale

Ramalinaceae

- Fistulariella dilacerata (Hoffm) Bowler & Rand

Stereocaulaceae

- Stereocaulon tormentosum Fr

Umbilicariaceae

- Umbilicaria torrefacta (Lightf) Schrad
- " vellea (L) Ach

Usneaceae

- Evernia prunastri (L) Ach
- Letharia vulpina (L) Hue
- Usnea lingisoma (L) Ach ?
- " subfloridana Stut

Peltigeraceae

- Nephroma parile (Ach) Ach
- " resupinatum (L) Ach
- Peltigera aphthosa (L) Willd
- " canina (L) Willd
- " malacea (Ach) Funck
- " polydactyla (Neck) Hoffm

Stictaceae

- Lobaria pulmonaria (L) Hoffm
- Sticta limbata (Sm) Ach ?

Teloschistaceae

- Caloplaca saxicola (Hoffm) Nordm
- Xanthoria polycarpa (Ehrh) Oliv
- " soorediata (Vain) Poelt

Physciaceae

- Phaeophyscia constipata (Norrl) Moberg
- Physcia dubia (Hoffm) Lett
- " phaea (Tuck) Thoms ?
- " tenella (Scop) DC
- Physconia detersa (Nyl) Poelt ?

Verrucariaceae

- Dermatocarpon miniatum (L) Mann

BRYOPHYTES

Hepaticae

Ptilidiaceae

- Ptilidium pulcherrimum (G Web) Hampe

Lepidoziaceae

- Lepidozia reptans (L) Dum

Lophocoleaceae
 Lophocolea heterophylla (Schrad) Dum
 Jungermanniaceae
 Barbilophozia barbarta (Schmid ex Schreb) Loeske
 Jungermannia leiantha Grolle
 Porellaceae
 Porella platyphylla (L) Pfeiff
 Pelliaceae
 Pellia endiviifolia (Dicks) Dum
 Marchantiaceae
 Marchantia polymorpha L
 Ricciaceae
 Riccia fluitans L

Musci

Dicranaceae
 Dicranoweisia crispula (Hedw) Lind ex Milde
 Dicranum fuscescens Turn
 " *montanum* Hedw
 " *polysetum* Sw
 " *rhabdocarpum* Sull
 " *scoparium* Hedw
 " *tauricum* Sapeh
 " *undulatum* Brid
 Pottiaceae
 Tortula princeps De Not
 Grimmiaceae
 Grimmia alpicola Hedw
 " *apocarpa* Hedw
 " *montana* BSG
 " *pulvinata* (Hedw) Sm
 " *tenerrima* Ren & Card
 " *Torquata* Hornsch ex Grev
 Rhacomitrum canescens (Hedw) Brid
 " *fusciculare* (Hedw) Brid
 " *heterostichum* (Hedw) Brid
 Bryaceae
 Pohlia nutans (Hedw) Lindb
 Bryum caespiticium Hedw
 " *capillare* Hedw
 " *pseudotriquetrum* (Hedw) Gaertn, Meyer & Schreb
 Mniaceae
 Mnium drummondii Bruch & Schimp
 " *venustum* Mitt
 Aulacomniaceae
 Aulacomnium androgynum (Hedw) Schwaegr
 Bartramiaceae
 Anacolia menziesii (Turn) Paris
 Orthotrichaceae
 Orthotrichum hallii Sull & Lesq in Sull
 Ulota hutchinsiae (Sm) Hamm
 Fontinalaceae
 Fontinalis hypnoides C J Hartm, var. *hypnoides*
 Hedwigiaceae
 Hedwigia ciliata (Hedw) P-Beauv

Neckeraceae

Metaneckera menziesii (Hook ex Drumm) Steere

Hookeriaceae

Hookeria acutifolia Hook & Grev

Amblystegiaceae

Campylium polygamum (BSG) C Jens

Leptodictyum riparium (Hedw) Warnst

" trichopodium (Schulz) Warnst

Drepanocladus aduncus (Hedw) Warnst, var. aduncus

" fluitans (Hedw) Warnst

" uncinatus (Hedw) Warnst

Brachytheciaceae

Homalothecium nevadense (Lesq) Ren & Card

Brachythecium albicans (Hedw) BSG

" collinum (Schleich ex C Muell) BSG

Plagiotheciaceae

Plagiothecium cavifolium (Brid) I Wats

" piliferum (Sw ex C J Hartm) BSG

Rhytidiaceae

Rhytidiadelphus triquetrus (Hedw) Warnst

Hylocomiaceae

Hylocomnium splendens (Hedw) BSG

Tetraphidaceae

Tetraphis pellucida Hedw

Polytrichaceae

Polytrichum piliferum Hedw

The list of liverworts and mosses above has not been seen by any expert in the field neither have the specimens. The collection has been retained.

FUNGI

Neither the following list nor any of the specimens collected have been seen by an expert in the field. Most of the perennial polypores and a few of the remainder have been retained.

Russulaceae

Lactarius rubrilactis Hesler & Sm (L. sanguifluus Fr ?)

" torminosus (Schaeff ex Fr) S F Gray

Russula aeruginea Lindb

" brevipes R L Shaffer

" lutea (Huds ex Fr) S F Gray (R. claroflava Grove ?)

" xerampelina (Sear) Fries ?

Hygrophoraceae

Hygrocybe acutaconica (Clements) Singer

" conica (Fr) Kummer

" miniata (Fr) Kummer

" psittacina (Fr) Karsten

" reali (Maire) Lange

Hygrophorus eburneus (Fr) Fries ?

" gliocyclus Fr

" pudorinus (Fr) Fr var. fragrans (Murr) Hes & Sm

Tricholomataceae

Armillariella mellea (Fr) Karsten

Clitocybe gibba (Fr) Kummer var, *gibba*
 " *nebularis* (Fr) Kummer
Collybia confluens (Fr) Kummer
 " *dryophila* (Fr) Kummer ?
Cystoderma fallax Smith & Singer
Laccaria amethystina (Hooker) Murr
Lepista irina Bigelow
Leucopaxillus paradoxus (Murr)
Marasmius urens (Fr) Fr
Mycena galericulata (Fr) S F Gray
 " *maculata* Karsten
 " *pura* (Fr) Quel
 " *tenerrima* (Berk) Quel ?
Omphalina chrysophylla (fr) Murr (*O. luteicolor* Murr ?)
Panus rudis Fries
Pleurotus ostreatus (Fr) Kummer
Strobilurus albopilata (Pk) Wells & Kempton
Tricholoma atroviolaceum Smith ?
Xeromphalina campanella (Fr) Kuh & Maire
Lepiotaceae
 Lepiota clypeolaria (Fr) Kummer
Agaricaceae
 Agaricus sylvicola (Vitt) Fr
Coprinaceae
 Paneolus campanulatus (Fr) Quel
Bolbitaceae
 Agrocybe pedates (Fr) Fayod ?
Strophariaceae
 Pholiota squarrosoides (Pk) Sacc
Cortinariaceae
 Cortinarius multiformis (Fr) Fries ?
 " *pinetorum* (Fr) Kauff ?
 " *turmalis* Fries ?
 Crepidotus mollis (Fr) Stande
 Gymnopilus sapineus (Fr) R Maire
 Hebeloma crustiniforme (St Amans) Quel
Gomphidiaceae
 Chroogomphus rutilus (Fr) Miller
 Gomphidius subroseus Kauff
Pezizaceae
 Discina perlata Fries
 Pseudoplectania nigrella (Fr) Fuckel ?
 Peziza badia Pers ex Merat ?
Helvellaceae
 Gyromitra esculenta Fries
 Morchella elata Fr
Tremellaceae
 Pseudohyphnum gelatinosum (Fr) Karsten
 Auricularia auricula (Hook) Underwood
 Dacromyces palmatus (Schw) Bres
Clavariaceae
 Clavariadelphus borealis Wells & Kempton
 " *subfastigiatus* Wells & Kempton
 " *ligula* (Fr) Donk ?
 Clavulina cristata (Fr) Shroet

Polyporaceae

Cryptoporus volvatus (Pk) Hubbard
Phaeolus schweinitzii (Fr) Patouillard
Spongipellis unicolor (Schw) Murrill
Pycnoporus cinnabarinus (Fr) Karsten
Ganoderma applanatum (Pers) Patouillard
Polyporus picipes Fries
 " elegans Fries
 " arcularis Fries
Coltricia perennis (Fr) Murrill
Heterobasidion annosum (Fr) Bref
Fomes pinicola (Fr) Cooke
 " formentarius (Fr) Kichx
Gloeophyllum saepiarum (Wulf ex Fr) Karsten
Daedalea confragosa Fries
 " unicolor Fries
Tyromyces albellus (Peck) Bondarzew & Singer

Boletaceae

Suillus brevipes (Pk) Kuntze
 " granulatus (Fr) Kuntze
 " lakeii (Murr) Sm & Thiers
Leccinum scabrum (Fr) S F Gray

Lycoperdaceae

Lycoperdon perlatum Pers
 " pyriforme Pers
 " umbrinum Pers
Geastrum quadrifidum Pers

Nectria cinnabarina (Tode ex Fr) Fr

HIGHER PLANTS

Cougar Canyon falls within the Interior douglas-fir dry forest zone. Sub-division according to vegetation within this zone is relatively consistent the whole length of the reserve in that cross sections drawn would vary very little from one place to another, apart from the lakes not being continuous.

In broad terms vegetation can be divided with typical assemblages as follows:

1. north-west facing slopes - predominantly Pseudotsuga menziesii; Acer glabrum var. douglasii and Populus tremuloides where damp; Shepherdia canadensis, Pachystema myrsinites, Corylus cornuta (low down), Calamagrostis rubescens, Hieracium album.
2. south-east facing slopes - mixed P. menziesii and Pinus ponderosa; Arctostaphylos uva-ursi, Balsamorhiza sagittata, Lomatium geyeri, Juniper communis and J. scoparium, Agropyron spicatum, Calamagrostis rubescens, Carex deweyana, Selaginella wallacei; merging into
3. south facing slopes (mostly mouth of canyon at south end)- P. ponderosa, Agropyron spicatum, Rhus glabra, Festuca sp.

4. valley bottom, south end - *Betula papyrifera*, *A. glabrum* var. *douglasii*, *Salix* sp., *Cornus stolonifera*;
5. valley bottom, middle section - *B. papyrifera*, *Thuja plicata*, *C. stolonifera*, *Pyrola asarifolia*;
6. valley bottom, north end - *T. plicata*, *B. papyrifera*, *Athyrium filix-femina*, *Lysichitum americanum*, *Alnus incana*, *Equisetum hyemale*;
7. ridge top, wooded pond - *Populus tremuloides*, *Salix* sp., *Alisma plantago-aquatica*, *Sium suave*, *Leptodictyum riparium*;
8. ridge top, grassy openings - *Calamagrostis rubescens*, *Stipa nelsonii*, *Poa pratensis*, *Antennaria umbrinella*, *Ranunculus glaberrimus*, *Lithophragma parviflora*;
9. valley bottom, lake fringe - *Salix* sp., *Carex* sp., *Phalaris arundinacea*, *C. stolonifera*, *Potentilla palustris*, *Lysimachia thyrsifolia*;
10. valley bottom, lakes - *Scirpus acutus*, *S. maritimus*, *Typha latifolia*, *Utricularia vulgaris*, *Ceratophyllum demersum*;
11. valley bottom, altered - (either side of lake #11) *Cirsium vulgare*, *Melilotus albus*, *B. tectorum*, *Centaurea diffusa*, and typical farm weeds;
12. ridge top, altered - (along PLR road) *Filago arvensis*, *Conyza canadensis*, *Centaurea diffusa*, *Medicago lupulina*, and typical roadside weeds;
13. scree - *Cryptogramma crispa*, *Woodsia scopulina*, *Poa fendleriana*, *Dicranum* sp., *Stereocaulon* sp.

In the following species list a number of determinations were made by Dr. C. Brayshaw (notably sedges) and Mr. L. Pavlick (some of the grasses) to whom thanks are due. Observations are listed by date giving a rough phenology which could be refined by additional in-fill observations. In this regard it should be pointed out that the 1983 season was early by approximately 2 weeks at the outset after a mild winter, gradually losing this advance by mid-summer. It was notable that Cougar Canyon appeared to be at first about half a week later in flowering date compared with Kalamalka Lake Park. The notation RC refers to species reported by Rob. Cannings not seen during 1983 and LM to a list made by Lynn Mills on 13th May 1982.

		Apr 1982				May				June				July				Aug				Sep				Nov				
		4	18	10	20	4	27	17	29	15	22	20	25	13	Rep'd															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14															
Lycopodium annotinum L															X															
Selaginella densa Rydb															X															
" wallacei Hieron															X															
Equisetum arvense L															X															
" hymale L															X															
" scirpoides Michx															RC															
Botrychium lunaria (L) Swartz															RC															
" virginianum (L) Swartz							X																							

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	4
Athyrium filix-femina (L) Roth														x	
Cryptogramma crispa (L) R Br														x	
Cystopteris fragilis (L) Bernh														x	
Dryopteris austriaca (Jacq) Woyнар														RC	
Polypodium hesperium Maxon														x	
Polystichum lonchitis (L) Roth														RC	
" munitum (Kauf) Presl														RC	
Pteridium aquilinum (L) Kuhn														x	
Woodsia oregana D C Eat														x	
" scopulina D C Eat														x	
Juniperus communis L														x	
" scopulorum Sarg														x	
Thuja plicata Donn														x	
Pinus ponderosa Dougl														x	
Pseudotsuga menziesii (Mirbel) Franco														x	
Populus tremuloides Michx														x	
" trichocarpa T & G														x	
Salix bebbiana Sarg					x									x	
" rigida, mackenzieana (Hook) Cronq														x	
" scouleriana Barratt					x									x	
Alnus incana (L) Moench														x	
Betula occidentalis Hook														x	
" papyrifera Marsh														x	
Corylus cornuta Marsh														x	
Parietaria pensylvanica Muhl								x	x						
Urtica dioica L								x	x						
Eriogonum heracleoides Nutt					x	x									
" umbellatum Torr															LM
Polygonum achoreum Blake							x								
" amphibium L						x	x								
" aviculare L						x					x				
" coccinium Muhl										x	x				
" convolvulus L															RC
" douglasii Greene						x	x	x	x						
Rumex acetosella L							x								
" crispus L							x								
" occidentalis Wats					x										
" maritimus L								x							
Chenopodium fremontii Wats					x			x							
" hybridum L															x
Claytonia lanceolata Pursh	x	x													
Montia perfoliata (Donn) Howell		x	x					x							
Arenaria serpyllifolia L		x	x			x	x	x				x			
Lychnis alba Mill											x				
Stellaria americana (Porter) Standl							x			x	x				
Nuphar polysepalum Engelm					x		x			x					
Ceratophyllum demersum L															x

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Actaea rubra</i> (Ait) Willd			x	x										
<i>Clematis columbiana</i> (Nutt) T & G			x	x										
" <i>ligusticifolia</i> Nutt							x							
<i>Ranunculus aquatilis</i> L														RC
" <i>glaberrimus</i> Hook	x	x												
" <i>gmelinii</i> DC							x							
" <i>macounii</i> Britt					x									
" <i>pennsylvanicus</i> L														RC
<i>Berberis aquifolium</i> Persh			x	x										
<i>Corydalis aurea</i> Willd														RC
<i>Arabis hirsuta</i> (L) Scop						x								
" <i>holboellii</i> Hornem			x	x										
" <i>microphylla</i> Nutt		x	x											
" <i>sparsiflora</i> Nutt					x									
" <i>diversicarpa</i> Nels			x											
<i>Capsella bursa-pastoris</i> (L) Medic				x										
<i>Cardamine pennsylvanica</i> Muhl				x			x							
<i>Descurania sophia</i> (L) Webb			x	x										
<i>Draba nemorosa</i> L		x	x	x										
" <i>verna</i> L		x												
<i>Lepidium virginicum</i> L						x								
<i>Rorippa curvisiliqua</i> (Hook) Bessey														RC
" <i>islandica</i> (Oed) Borbas														RC
<i>Sisymbrium altissimum</i> L						x	x							
<i>Sedum stenopetalum</i> Pursh					x	x								
<i>Heuchera cylindrica</i> Dougl			x	x	x	x								
<i>Lithophragma bulbifera</i> Rydb			LM											
" <i>parviflora</i> (Hook) Nutt			x	x										
<i>Mitella nuda</i> L										x				
<i>Saxifraga bronchialis</i> L				x										
" <i>occidentalis</i> Wats		x												
<i>Tiarella trifoliata</i> L			LM											
<i>Ribes cereum</i> Dougl				x										
" <i>lacustre</i> (Pers) Poir			x	x										
" <i>viscosissimum</i> Pursh		x												
<i>Philadelphus lewisii</i> Pursh					x	x								
<i>Amelanchier alnifolia</i> Nutt			x	x						x				
<i>Fragaria vesca</i> L				x	x									
" <i>virginiana</i> Duchesne			x	x	x									
<i>Geum macrophyllum</i> Willd					x									
" <i>triflorum</i> Pursh				x										
<i>Holodiscus discolor</i> (Pursh) Maxim						x								
<i>Physocarpus malvaceus</i> (Greene) Kuntze														x
<i>Potentilla anserina</i> L														RC
" <i>argentea</i> Pursh											x			
" <i>glandulosa</i> Lindl			LM											x
" <i>palustris</i> (L) Scop					x	x	x							
" <i>recta</i> L						x		x						
<i>Prunus emarginata</i> (Dougl) Walp														x

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Rosa canina L														RC
" gymnocarpa Nutt					x	x								
" nutkana Presl					x									
" woodsii Lindl					x									
Rubus idaeus L					x	x								
" leucodermis Dougl					x	x								
" parviflorus Nutt			LM	x	x									
Sorbus scopulina Greene														x
Spiraea betulifolia Pall					x	x		x						
Astragalus miser Dougl				x	x	x								
Lotus denticulatus (Drew) Greene					x	x	x	x						
Lupinus sericeus Pursh					x									
Medicago falcata L							x							
" lupulina L						x	x	x	x		x	x		
" sativa L							x							
Melilotus alba Desr							x		x		x			
Trifolium pratense L						x		x			x	x		
" repens L					x	x	x	x	x	x	x	x		
Vicia americana Muhl					x		x							
Geranium dissectum L					x									
Rhus glabra L														x
" radicans L					x									
Pachystima myrsinites (Pursh) Raf	x	x		x		x								
Acer glabrum Torr var, douglasii			x											
Impatiens noli-tangere L														RC
Ceanothus sanguineus Pursh			x	x										
" velutinus Dougl														x
Viola adunca Sm				x										
" canadensis L				x										
" glabella Nutt			LM	x										
Shepherdia canadensis (L) Nutt	x	x												
Circaea alpina L								x						
Epilobium angustifolium L					x	x		x	x	x				
" glaberrimum Barbey						x				x				
" minutum Lindl		x												
" paniculatum Nutt							x		x					
" watsonii Barbey							x	x						
Myriophyllum spicatum L														RC
Hippuris vulgaris L			x											x
Aralia nudicaulis L			x	x										
Oplopanax horridum (Smith) Miq														x
Lomatium ambiguum (Nutt) Coult & Rose														x
" dissectum (Nutt) Math & Const					x									
" geyeri (Wats) Coult & Rose					x									
Osmorhiza chilensis H & A														RC
" depauperata Phil				x	x									
Sium suave Walt							x	x	x		x	x		
Cornus stolonifera Michx			x	x	x									

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Arctostaphylos uva-ursi (L) Spreng			x	x										
Chimaphila umbellata (L) Bart						x								
Pterospora andromeda Nutt						x								
Pyrola asarifolia Michx					x	x								
" chlorantha SW					x	x								
" secunda L						x			x					
Dodecatheon pulchellum (Raf) Merrill				x										
Lysimachia thyrsoiflora L					x									
Apocynum androsaemifolium L					x	x								
Cannabis sativa L														x
Microsteris gracilis (Hook) Greene														
Polemonium pulcherrimum Hook														
" micranthum Benth														
Phacelia hastata Dougl														x
" linearis (Pursh) Holz				x	x									
Hackelia deflexa (Wahlenb) Opiz								x		x				
Lappula redowskii (Hornem) Greene														x
Lithospermum ruderales Dougl														x
Myosotis micrantha Pall														
Lycopus americanus Muhl									x	x				
Mentha arvensis L Michx							x			x	x	x		
Prunella vulgaris L						x		x						
Scutellaria galericulata L						x	x	x		x				
" lateriflora L							x							
Teucrium canadense L										x				
Solanum dulcamara L					x					x				
Castilleja hispida Benth			x	x	x	x								
Collinsia parviflora Lindl		x	x	x										
Mimulus guttatus DC								x		x				
Penstemon fruticosus (Pursh) Greene			x	x										
Verbascum thapsus L							x			x		x		
Veronica americana Schwein												x		
" arvensis L						x						x		
Utricularia vulgaris L					x	x	x							
Plantago major L						x		x						
Galium aparine L			x	x										
" bifolium Wats										x				
" boreale L						x	x							
" trifidum L							x	x						
" triflorum Michx					x									
Linnaea borealis L					x	x								
Lonicera utahensis Wats														LM
Sambucus cerulea Raf														x
Symphoricarpos albus L						x	x	x						
Triodanis perfoliata (L) Nieuwl						x								
Achillea millefolium L				x	x	x	x	x						
Antennaria anaphaloides Rydb					x	x								
" dimorpha (Nutt) T & G														x
" microphylla Rydb														x
" racemosa Hook				x	x									x
" umbrinella Rydb			x	x	x									

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Arctium minus (Hill) Bernh							x							
Arnica cordifolia Hook			x	x	x									
" latifolia Bong				x										
Artemisia frigida Willd														x
Aster ciliolatus Lindl									x	x	x			
" conspicuus Lindl							x	x	x	x	x	x		
" modestus Lindl														
" occidentalis (Nutt) T & G										x				RC
Balsamorhiza sagittata (Pursh) Nutt		x	x	x										
Bidens cernua L									x		x			
Centaurea diffusa Lam						x	x	x						
Chicorium intybus L								x						
Chrysopsis villosa (Pursh) Nutt						x								
Cirsium arvense (L) Scop											x			
" undulatum (Nutt) Spreng						x								
" vulgare (Savi) Tenore							x							
Conyza canadensis (L) Cronq								x		x				
Crepis atrabarba Heller					x	x								
Erigeron compositus Pursh				x										
" philadelphicus L					x	x	x	x						
" pumilus Nutt						x	x							
" subtrinervis Rydb var. conspicuus					x	x	x	x						
Filago arvensis L						x	x	x						
Gaillardia aristata Pursh					x		x							
Hieracium albiflorum Hook					x	x	x							
" canadense Michx							x	x						
" cynoglossoides ARV-Touv						x	x	x						
" scouleri Hook						x								
" umbellatum L								x		x				
Lactuca biennis (Moench) Fern								x			x			
" serriola L							x			x				
Matricaria matricarioides (Less) Porter						x								
Microseris nutans (Geyer) Schultz-Bip				x										
Solidago occidentalis (Nutt) T & G										x				
Sonchus arvensis L							x			x				
Taraxacum officinale Weber			x	x			x					x		
Tragopogon dubius Scop					x		x							
" pratensis L														x
Alisma plantago-aquatica L								x						
ELODEA CANADENSIS Rich in Michx														x
Najas flexilis (Willd) Rost & Schmidt														x
Potamogeton diversifolius Raf														x
Juncus articulatus L							x							
Carex amaroides Spreng					x									
" bebbii Olney														
" comosa Boott					x									RC
" concinoides Mack		x												
" deweyana Schw								x						
" lanuginosa Michx					x									
" feta Bailey							x							
" retrorsa Schw					x									
" rossii Boott				x										
" rostrata Stokes					x									
" stipata Muhl					x									

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Eleocharis palustris (L) R & S					x		x							
Scirpus acutus Muhl							x							x
" maritimus L														x
Agropyron spicatum (Pursh) Scrib & Sm	x				x									
Agrostis alba L var, stolonifera (L) Sm						x	x							
" scabra Willd								x						
Alopecurus aequalis Sobol					x									
Apera interrupta L				x										
Bromus japonicus Thunb							x							
" mollis L						x								
" tectorum L							x							
Calamagrostis canadensis (Michx) Beauv			x	x	x	x								
" rubescens Buckl						x								
Dactylis glomerata L				x		x								
Deschampsia elongata (Hook) Munro						x								
Echinochloa crus-galli (L) Beauv											x			
Elymus glaucus Buckl						x								
Festuca campestris Torr				x		x								
" occidentalis Hook					x	x								
Glyceria striata (Lam) Hitchc								x						
Hordeum jubatum L							x							
Koeleria cristata Pers				x	x									
Oryzopsis asperifolia Michx					x									
Panicum capillare L											x			
Phalaris arundinacea L					x	x	x							
Phleum pratense L						x	x							
Poa annua L								x						
" compressa L			x	x		x								
" fendleriana (Steud) Vasey			x											
" juncifolia Scribn				x	x									
" interior Rydb ?					x									
" pratensis L				x		x								
" scabrella (Thurb) Benth					x									
" secunda Presl			x	x										
Stipa occidentalis Thurb var. minor						x								
Trisetum canescens Buckl					x									
" spicatum (L) Richter					x									
Vulpia octoflora Walt			x	x										
Sparganium emersum Rehmman								x						
Typha latifolia L						x	x							
Lysichitum americanum Hult & St John	x	x												
Lemna minor L														
Spirodela polyrhiza (L) Schleid														x
Asparagus officinalis L														x
Calochortus macrocarpus Dougl					LM		x	x						x
Disporum trachycarpum (Wats) Benth & Hook														x
Fritillaria lanceolata Pursh			x	x										
Lilium columbianum Hanson					x									
Smilacina racemosa (L) Desf			x	x										
" stellata (L) Desf				x										
Streptopus amplexifolius (L) DC														
Zygadenus venenosus Wats.			x	x										

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<i>Sisyrinchium angustifolium</i> Mill					x									
<i>Calypso bulbosa</i> (L) Oakes			LM											
<i>Corallorhiza maculata</i> Raf						x								
" <i>striata</i> Lindl														x
<i>Goodyera oblongifolia</i> Raf								x						
<i>Habenaria elegans</i> (Lindl) Boland								x						

Seen nearby - *Crataegus columbiana* Howell (specimen with very little thorn development), *Salix exigua* Nutt, *Prunus pennsylvanica* L. (reported by LM).

On the list provided by LM I have not included a sighting of *Betula glandulosa*; *Arabis lemmonii* has been changed to *A. microphylla*, and *Eriogonum umbellatum* has been retained although possibly should have been *E. heracleoides*.

Overall there were no really startling finds. Two specimens, both confirmed by Dr. Brayshaw, were rather out of range - *Carex feta* is given by Hitchcock as being found west of the Cascades and *Stellaria americana* he shows as a plant of mountain talus in south-west Alberta and Montana whereas in Cougar Canyon it was growing in damp stream-side soil. In certain aspects it resembled *S. aquatica* (L) Scop. Other plants not common in this area were the two *Botrychium* and two *Polystichum* ferns, *Pteridium aquilinum*, *Arabis diversicarpa*, *Potentilla argentea*, *Hackelia deflexa*, *Teucrium canadense*, *Aster occidentalis* and *Hieracium scouleri*.

The plantation of about 400 plants of marijuana was set out in groups of 4, staked and with a central watering hole to each group. Some timber clearance at the side of lake #10 had been made by the cultivator to provide light and a certain amount of bush removal took place later by police to allow helicopter access for removal of the cut material. Up to the present this has been the largest seizure in the Okanagan and at current prices would have run into six figures in total making this one of the most productive ecological reserves in the system.

INSECTA

Initial good intentions included listing this huge field however its daunting size and the specialized knowledge required quickly disabused the writer from this course after the first two visits.

ARACHNIDA

Acarina

Dermatocentor andersonii

Araneae

Little systematic study has been made of the spider fauna

in the Okanagan. Several experts in the field have made collections at various times while visiting or passing through the area and these lists are available. As part of the project to inventory Kalamalka Lake Park a collection was made there and this has been supplemented by work elsewhere in the north Okanagan with a view to complementing similar studies by another student in the south part of the valley. The following list adds to this work.

In all cases species determination has been made by Dr. C.D.Dondale and Mr. J.H.Redner of the Biosystemics Research Institute, Ottawa, to whom thanks are due. Mostly where identification is made only to genus level the specimen had not reached maturity; in other cases the group is in flux and subject to revision.

CLUBIONIDAE

Castianeira walsinghami (Pickard-Cambridge)

GNAPHOSIDAE

Gnaphosa muscorum (Koch)

PHILODROMIDAE

Philodromus cespitum (Walckenaer)

THOMISIDAE

Xysticus sp. (*X.emertoni* Keyserling ?)

Misumena vatia (Clerk)

DICTYNIDAE

- * *Dictynia subpinicola* Ivie
- " *annulipes* (Blackwall)

AMAUROBIIDAE

Titanoeca sp. ?

ANYPHAENIDAE

Anyphaena sp. (*A. pacifica* ?)

AGELENIDAE

- Agelenopsis potteri* (Blackwall)
- * *Cicurina intermedia* Chamberlin & Ivie
- * *Cybaeota* sp.

LYCOSIDAE

Pardosa mackenkiana Keyserling
" sp., *groenlandica* complex
Lycosa frondicola Emerton
Schizocosa sp. (*S. mccooki* (Montgomery)?)
Trochosa terricola Thorell

SALTICIDAE

- * *Pellenes sansoni* Emerton
- Evarcha falcata* (Clerk)
- Phidippus johnsoni* Peckham & Peckham
- Metaphidippus* sp.

THERIDIIDAE

- Theridion differens* Emerton

ARANEIDAE

- Nuctanea patagiata* (Clerk)
- Araniella displicata* (Hentz)
- Metellina mimetoides* Chamberlin & Ivie
- Cyclosa* sp. (*C. conica* (Pallas)?)
- Tetragnatha versicolor* Walckenaer

LINYPHIIDAE

- Pityohyphantes* sp.
- Neriene radiata* (Walckenaer)
- * *Leptyphantes intricatus* (Emerton)
- " *zebra* (Emerton)
- Linyphiidae* sp.

ERIGONIDAE

- Ceraticelus fissiceps* (Pickard-Cambridge)
- Symmigma minimum* (Emerton)

ULOBORIDAE

- * *Hyptiotes gertschi* Chamberlin & Ivie

Those species marked with an asterisk were retained in the National Collection as being of special interest.

ADDENDUM

A short visit was made on 13th January 1984, as a result of which pine grosbeak and brown creeper should be added to the bird list. Pine grosbeak were in good number on this occasion; other observations were red-breasted nuthatch, raven, black-capped chickadee, Steller's jay and red crossbill.

Prints of coyote barely passed into the reserve indicating that in winter they tend to spend most time outside in more open country. Some grouse prints were seen and deer tracks were common in most types of environment except thick woods.

What appeared to be wood chips and gnawings of a very fresh nature were present among birch saplings on the ridge between lakes #10 and #11 where I had seen none during the summer. Earlier comments on the presence of beaver may therefore have been too pessimistic. There did not appear to be any noticeable activity around the nearby lodge which was

covered by snow.

CONCLUSION

In view of the nearness to Kalamalka Lake Park it is tempting to compare the two areas but first it must be admitted that Cougar Canyon is by far the smaller of the two and much less time has been spent examining it. With these provisos it is clear that the reserve offers less environmental variety as is suggested by the lesser totals for birds and higher plants, by about 50 and more than 100 species respectively. Nevertheless it holds considerable interest and further work would doubtless reveal localized ecotones with additional finds within them.

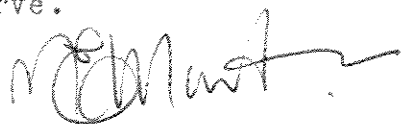
Perhaps its strongest point is paradoxically also its main weakness in that length of approach and difficulty in travel once in the reserve detract from one of the purposes of ecological reserves, that of availability for scientific research and education. On the other hand its location and configuration combine to give it value for the other stated purposes as little alteration or destruction is likely from either cattle intrusion or human visitation, particularly the further one goes from the two ends.

Greatest hazard must be from fire. All the old camp sites found included open fire places and the Okanagan is an area of summer electric storms. A small fire (less than $\frac{1}{4}$ ha, $\frac{1}{2}$ acre) did occur on the Pole Line ridge west of lake #1 in 1977 and in 1961 one exceeding 500ha. (1,235 acres) started at the level of Kalamalka Lake and entered the reserve west of lake #4. Far larger than either of these was a major fire some 60 years or more ago.

High slope angle, funnelling effect to southern and southwestern winds and wellcured condition of ground vegetation bespeak a high hazard rating: low volume of ground fuel, discontinuous crown canopy of tree cover (except on the southwest side) and visibility from Highway 97 across the lake are offsetting factors.

This reserve is not suitable for casual visits by those interested in ecological reserves. The fact that entry at the south end has to be through private property does not please the owner, Mr. Ken Ellison, who, I gather, has never been contacted by Unit personnel. Trespass has always been a worry and his main concern that creation of this reserve would lead to a large influx of visitors invading his domain has coloured his attitude to this Provincial facility. I have pointed out the purposes of ecological reserves and that although they are shown on Government publications on this subject they are not publicized or advertized on tourist information. His mind is more at rest now however an official letter would not be amiss thanking him for allowing access this past season and offering help should any difficulties arise which he considers stems from the presence of the reserve.

Malcolm E. Martin
January 1984



COUGAR CANYON E.R. 1028

In August 1988 a closer inspection was made of the aquatic vegetation in the most southerly lake in the system (CC 11). The following species were added to the flora previously identified -

Potamogeton epihydrus Raf.
" pusillus L. var. tenuissimus
" zosteriformis Fern.

In the 1983 report a listing of Stellaria americana (Porter) Standl. was included as being present in this area. At the time of collection it had been identified as S. aquatica (L) Scop. and sent to B.C. Provincial Museum for confirmation as this is quite uncommon. There it was corrected to read S. americana even though this is a species of high mountains, and therefore was submitted on the survey report as such. A detailed examination in 1988 gave a positive identification as S. aquatica, or Myosoton aquaticum (L) Moench in present usage, and the earlier report should be amended.

Water level had recovered from the low extreme of 1987 and in August 1988 was at a normal seasonal level. As this reserve is based on its covering one integral stream system a permanent water gauge should probably be installed in order to monitor depth on an accurate basis.

MEM
March 1989