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Provincial Parks Branch
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Please find the attached report entitled: **Development Considerations for Wells Gray Park.**
The writer wishes to acknowledge the ideas and aid of C.W. Shook, R.W. Ritcey, and R.Y. Edwards in compiling this.

Yours very truly,

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**DEVELOPMENT CONSIDERATIONS FOR WELLS GRAY PARK
F. H. HARTMAN**

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Summary

PRESENT STATUS

Park Classification

Wells Gray Park was established as a Class "B" Provincial Park on November 28th, 1939. Following subsequent extensions of its boundaries, the park now comprises an area slightly greater than 2,000 square miles (1,300,854 acres).

This area, made up of the upper Clearwater watershed, lies in the interior wet belt and encompasses a section of the Columbia Mountain Range. The topography is characterized by a wide valley in the south west section of the park, encircled to the north and west by mountain systems. The park has been heavily glaciated and extensive glaciers still exist in its northern half. Topography has largely isolated Wells Gray Park from exploration. Hence its naturalness has been preserved and the same factors would aid in its future protection as a park.

Very briefly, it is an area dominated by the atmosphere of extensive wilderness, of which the main features are scenic waterfalls and large mountain lakes against a background of rugged mountains and glacier topography. Wells Gray is rich in game and fish, resources which are concentrated mainly in the southern half of the park. Generally wet and cool climatic conditions prevail. About 13 inches of rain and 60 inches of snow falls each year. The Mahood Lake area to the west is drier and the eastern side of the park is slightly wetter. A generous description of the country may be found in the report by Lyons (1941).

Personnel and Buildings

The administration and protection of Wells Gray Park has been carried on by five men. Protection of park interests and maintenance of the rather limited developments have been their main function. Wildlife reconnaissance and research have occupied a permanent research assistant, with summer help, for the past ten years. This work has been aided valuably by other personnel in the park during slack seasons. Table I categorizes the present labour force in Wells Gray Park.

Table 1: Personnel Employed in Wells Gray Park

Position	Name	Work Headquarters	Residence
Park Superintendent	C.W. Shook	Hemp Creek	Private home, Upper Clearwater
Research Assistant	R.W. Ritcey	Hemp Creek	Parks residence
Field Assistant	(hired annually)	Hemp Creek	Parks log cabin
Tech. For. Assistant	D.E. Green	Hemp Creek	Rented home
Patrolman	R.G. Miller	Murtle Lake	Parks log cabin
Patrolman	J.C. Norman	Clearwater Lake	Parks prefab cabin
Assistant Ranger	C.E. Gaglardi	Mahood Lake	Parks cabin

Special Services: For the past two years, Provincial Gao Forest Camp crews, totaling about 50 men, have performed a valuable service, working on road improvement, trails, campsites, moose range improvement, etc.

Few of the buildings in the park are of a permanent nature because of the lack of an organization plan. Building locations are indicated on Map 1, and listed below:

1) Headquarters Station at Hemp Creek
Office - prefabricated cabin
Laboratory - prefabricated cabin
Tool shed and sleeping quarters - log cabin
Residence - home used by research assistant

2) Patrolman's Station at Clearwater Lake
Patrolman's residence - prefabricated cabin
Cache - prefabricated cabin
Guide cache - log building for boat storage
Boat house - log building at the Horseshoe

3) Patrolman's Station at Mahood Lake
Patrolman's residence - small cabin
Office and cache - imitation-log cabin

4) Patrolman's Station at Murtle Lake
Patrolman's residence - large log cabin
Murtle Lake Lodge - six-man log cabin

5) Fire lookout and research cabins
Battle Mountain Lookout - prefabricated cabin
Azure Mountain Lookout - log cabin (poor condition)
Track-line cabin - log cabin
Battle Mountain cabin - log cabin
Stevens Lakes cabin - log cabin

ACCESS

Main Roads:

1. Clearwater (town) to Clearwater Lake. The Public Works Department maintains 23 miles of road from Clearwater to the Hemp Creek Parks Office. This is a single-lane gravel and dirt road that is slowly being improved. It is kept open all winter. The Parks Branch maintains another 20 miles of single lane dirt road in the park, which continues from Hemp Creek to the south end of Clearwater Lake. One man (with many other duties) maintains this road in fair condition using a Huber-grader and truck. The first six miles (to Dawson Falls) are snow-plowed during the hunting season. The park has just recently obtained a Caterpillar tractor, which will greatly aid in access improvement.
2. Mahood Lake Junction on the Little Fort - 100 Mile House cut-off to the west end of Mahood Lake. Thirty-five miles of single-lane, gravel surface road is maintained by the Public Works Department into Mahood Lake. Two miles of park road continue along the north side of Mahood Lake to Lot 4141.

Jeep Roads:

The BC Power Commission has built two jeep roads in the park, to aid in their hydro-power exploration surveys. One road leads along the Murtle River trail for four miles, to a point on the Murtle River just north of Pyramid Mountains. The other is about two and one-half miles in length

and runs from park road near the Murtle River trail, south and west to a point on the Murtle River near Helmcken Falls. The former is generally impassible.

Trails (Map 1):

A lack of good trails is one of the major problems of the park. Trails are classified as good, fair, and poor in Table 2. Poor trails should not be advertised for use by the public.

Table 2:

Name	Length (miles)	Condition	Use
1. Lower Clearwater River (Mac's)	9	good for first 4 miles	river fishermen and guided fishermen* (MacDiarmid)
2. Table Mountain	6	fair - poor	hunters (limited)
3. Battle Mountain	6	first 2 1/2 miles very good, remainder fair	research, fire protection, hunters & hikers
4. Herman Valley	7	poor	guided hunters (Ludtke) & foot hunters
5. Stillwater (Murtle Lake)	24	good - fair	guided hunters (Helset), research, foot hunters
6. Green Mountain	2 1/2	good	hunters and fire protection'
7. Placid Lake	2 (2)	good to Placid Lk poor thereafter	fishermen and foot hunters
8. Murtle River	5	good (Jeep Road)	guided hunters (Helset) foot hunters, research
9. Helmcken Falls	3	good	summer visitors
10. Helmcken Falls to Clearwater River	2	poor	fishermen (limited)

11. Pyramid (to Gauge Hill) (Two Adirondack shelters located on this trail, one at Pyramid Mt., and the other at Pyramid Lake)	8	good	foot hunters, guided hunters (T. Helset)
12. Deer Creek	3 1/2	good - fair	guided hunters (Lean) and foot hunters
13. Five-finger Lake	2	good	hunters
14. Falls Creek	1	good	hunters and summer visitors
15. Cranberry Lake	3	good	hunters
16. Clearwater - Azure Lakes portage	1/3	good	very little
17. Clearwater Lake to Lickskillet Creek	3 1/2	poor	very little
18. Quesnel Lake portage	5	fair - poor	nil
19. Donkey Trail	10	poor	nil
20. Sylvia & Goodwin Falls	2	fair	fishermen, summer visitors
21. Tommy Archie and Pendleton Lakes	5	good	fishermen
22. Blue River	17	good - fair	fishermen, hikers
23. Mobley Mt.	6	fair	research, protection

* Name of the guide most commonly using the trail.

River Cable Crossings

Five cable crossings have been built by various survey crews and one by the Parks Branch (Table 3). The cable cars are usually locked to one shore of the river or the other, and people wishing to cross must obtain a key from the park office. Park visitors practically never use these crossings.

Table 3: List of Cable Crossings in Wells Gray Park

River Crossing	Location (Map 1)	Built By
1. Clearwater	2 miles above Mahood River outlet	Parks
2. Clearwater	4 miles below south end Clearwater Lake	P.F.R.A.
3. Clearwater	1/4 mile below south end Clearwater Lake	Dominion Water Res.
4. Clearwater	Between Azure and Clearwater Lakes	Dominion Water Res.

- | | | |
|-----------|-----------------------------------|---------------------|
| 5. Murtle | 1 mile upstream from Dawson Falls | Dominion Water Res. |
| 6. Mahood | outlet of Mahood Lake | Dominion Water Res. |

Aircraft Landing Areas

Aircraft are normally allowed to land only on: Clearwater Lake at the south end; Mahood Lake at the south shore on the west end; and Murtle Lake on the south side in the vicinity of the patrolman's residence. Aircraft owners must obtain permits from the Parks Branch, Victoria, for authorized landing on other lakes in the park, except Tommy Archie and Pendelton Lakes -- permits to land on these lakes may be obtained at Mahood Lake parks station.

Boat Launching Sites and Wharfs

Boats may be launched at the end of the two part-entrance roads: at the south end of Clearwater Lake and the west end of Mahood Lake. Continued boat travel from Clearwater to Azure Lake is possible with a reliable motor. Many summer visitors find this wilderness boating trip unique.

Campsites

There are only two developed camping areas in the park. The first is at Clearwater Lake, where a 75 unit site is being built, and the second is at Dawson Falls, where there are seven camp and three picnic units. There are four toilets at Mahood Lake for the use of beach campers. Most camping is on unimproved sites which deteriorate rapidly with camper use.

Park Use

At present about 5,000 people visit the park annually, of which between 1,000 and 1,500 are hunters. The primary attractions for summer visitors are fishing and the enjoyment of scenery (photography, etc.) (Taylor 1959). The wilderness atmosphere of this park is of major importance. In general, public use increases by about 10 to 15 percent each year.

Summer Visitors

Park use is summarized by regions for 1958 and 1959 (Table 4). Clearwater Lake includes those visitors entering via the Hemp Creek station and possibly visiting any of the attractions along this route and on to Azure Lake. Mahood Lake appeals to family groups more than other parts of the park. In general, Wells Gray attracts a greater number of experienced campers than other BC parks (Taylor 1959).

Table 4: Number of Registered Visitors, 1958 and 1959, excluding hunters*

Area	Number of Visitors		Av. Length of Stay (approx. days)		Fish Taken 1958
	1958	1959	1958	1959	
Hemp Creek (Clearwater Lake)	1,729	--	4.1	3.1	--
Mahood Lake	1,223	1,526	4.7	4.7	8,868 trout** (657 char)
Murtle Lake	100	108	--	--	1,258 trout
total:	3,052				

* summarized from report by C.W. Shook (1958 & 1959)

** includes rainbow trout taken from Mahood, Pendelton, and Tommy Archie Lakes

Hunting

This park is noted for its fine moose hunting to the point of being overlooked as an area to hunt deer, caribou, goat, and grizzly bear. Rough estimates put the present moose population at between 1,500 and 2,000 animals (see wildlife reports by R.W. Ritcey). The moose alone are a million dollar resource (Edwards 1953).

Between 1,000 and 1,500 hunters enter the park each season. Early season sportsmen travel to Clearwater and Azure Lakes as well as other areas of the park. With more severe winter conditions, they concentrate in the southern part of the park. Table 5 summarizes use and success for this type of recreation during the past three years (Ritcey, 1957, 1958, 1959).

Table 5: Hunter Use of Wells Gray for the Years 1957, 1958, and 1959

	1957	1958	1959
Number of hunters:	1,221	1,266	1,536
Game killed: moose	242	284	209
deer	36	36	98
caribou	7	8	7
bear	6	2	12
goats	1	--	4
ducks	4	4	40
grouse	30	325	96
geese	--	4	5

Research and Surveys

For the past ten years, fairly intensive wildlife research has been carried out in Wells Gray Park. The knowledge learned and published thus far is the major contribution made by the park to date. With increased recreational enjoyment of the area, the relative importance of research will be challenged. However the use of this park as a research area should certainly not decline. In 1959, seven persons visited Wells Gray to make observations on the natural flora and fauna.

Resource surveys have been common the park. In 1959, the BC Power Commission continued making surveys of the hydro-power resources. A topographic land survey crew camped on Hobson Lake, and one geologist spent one to two weeks prospecting in the park. The Dominion

Water Resource Branch has water recording equipment on the Murtle, Clearwater, and Mahood Rivers.

Forest Protection

Detection of, and initial action against, fires is the responsibility of the park personnel. Reserve equipment and action comes from the BC Forest Service. The park maintains radio contact with the Provincial Forest Service network. There is a radio dispatch from the Hemp Creek Station to the three outlying patrolmen and a daily contact with Forest Service at Kamloops. Aircraft patrol is available when requested.

The park has a fire-fighting equipment cache adequate for 75 men. The prison crews of the Provincial Forest Camp represent a 50-man reserve.

Lookouts

Only one primary lookout (a cabin lookout manned during periods of high hazard) is presently equipped in Wells Gray Park. This station, on Battle Mountain, give useful coverage over much of the park as well as a large area outside of its boundaries. Three secondary lookouts (used to check local areas and obtain bearings on reported smokes) have trails and lookout locations.

1. Green Mountain: A trail leads to a lookout tower. This is a useful lookout because of its location near the Hemp Creek office.
2. Clearwater Lake: A prominent hill on the edge of Clearwater Lake across from the outlet of Daniel Creek gives coverage of the west side of Clearwater Lake, as well as the Kostal Lake and Ivor Creek country.
3. Pyramid Mountain: The Pyramid Trail leads to the base of this open hill.

Other secondary lookouts that should have trails built to them are: Squaw Mountain, Centre (Ramsay) Mountain, and Cook Mountain. At present there is no patrol or adequate lookout coverage of the Hobson Lake region.

Guiding Services

Ten hunting and fishing guides have park use permits to operate in the park. Some do very little business and are difficult to assess. No guiding regions are designated; however, unwritten agreements and location of guides' residences dictate a sort of zoning. As a result, those guides who have established on good territories do well, with effort, while others operate very little either due to having marginal territory or because they lack the ambition for the enterprise. It is difficult, consequently, to get guided parties into some areas that should obtain at least limited use. It is also difficult to determine the type and amount of service given by respective guides.

The following list summarizes guides and services holding permits in Wells Gray Park. (For cabin locations see Map 2.) The "territory" given is that region in which the guide usually works.

1. P.U.P. Guiding No. 2 - Marion Higgins
Class A guide
Location - Bridge Lake
Service - hunting
Territory - Mica Mountain and west side of park
Equipment - 15 horses; packing equipment

There is some confusion concerning this permit. Marion Higgins has done little guiding in the park in past years. His guiding license (issued through the Game Branch) allows him to guide in the

Machet Lake region, which is set apart from the park. Most of his work is done in the vicinity of Machet Lake, outside the park.

2. P.U.P. No. 4 - Jacob Archie

Class A guide

Location - Canim Lake

Service - hunting and fishing

Territory - Mahood Lake

Equipment - pack horses and equipment

No guiding has been done in the park to date.

3. P.U.P. Guiding No. 9 - William Barron

Class B guide

Location - Blue River

Service - fishing

Territory - Murtle Lake

Equipment - 1 boat (Murtle Lake); 1 cabin (Murtle Lake)

Mr. Barron brings about 4 to 5 parties to Murtle Lake each year. He is employed by the railroad and therefore cannot guide as a business. It seems probable that Barron's parties are mostly friends and little of his guiding is done for profit.

4. P.U.P. No. 247 - T. Helset

Class A guide assisted by R. Helset

Location - Hemp Creek

Service - hunting and fishing

Territory - Murtle River and Murtle Lake

Equipment - 12 horses and packing equipment; 3 boats, Murtle Lake; 2 boats, Stillwater; 2 boats, Hemp Creek residence; 3 guide cabins; 2 cabins, Hemp Creek; 1 cabin and pasture on privately held land on the Murtle River

Mr. Helset operates for a full season, guiding moose hunters and fishermen. This normally includes 2 to 3 fishing parties and 9 to 10 hunting parties each year. His success rate is very high.

5. P.U.P. No. 249 - nil

T.B. Lean formerly held this permit, but after requesting cancellation the permit was cancelled on October 22, 1959. Gerry McTague was supposedly going to apply for this permit but has not yet done so. He formerly assisted T.B. Lean and had a rather low success rate.

6. P.U.P. No 250 - G.G. McDiarmid

Class A guide assisted by Wm. Petre

Location - Upper Clearwater

Service - fishing (very limited hunting)

Territory - Clearwater River

Equipment - 8 horses and equipment; 1 rubber boat; 2 cabins and 2 shelters (lower Clearwater River); 2 cabins and lodge at residence

G. McDiarmid operates an efficient service for about 4 to 6 parties per year.

7. P.U.P. No. 251 - L. Ludtke

Class A guide assisted by F. and C. Ludtke

Location - Upper Clearwater
Service - hunting and packing
Territory - Herman Valley and Battle Mountain

Equipment - 6 horses and equipment; 1 guide cabin; 2 rubber boats; 3 cabins at residence
Mr. Ludtke usually takes out 5 to 6 parties per year, hunting moose, grizzly, and occasionally caribou. The conditions are said to be slightly rough and rugged, but success rate is good.

8. P.U.P. No 270 - Dave Archibald

Class B guide
Location - Upper Clearwater
Service - fishing and hunting
Territory - Clearwater and Azure Lakes

Equipment - 3 boats and motors (for rental on Clearwater Lake); 2 cabins at residence
Mr. Archibald's major service comes by way of boat rental and transport of fishing parties up Clearwater and Azure Lakes. This guide is getting old and consequently guides few or no hunters now.

9. P.U.P. No 293 - T.B. Lean

Class A guide assisted by G. McTague
Location - Upper Clearwater
Service - fishing, hunting
Territory - Deer Creek, Clearwater Lake, and Table Mountain
Equipment - 8 horses and equipment; 4 boats (rental), 3 at Clearwater Lake and 1 at Shadow Lake; 2 guides cabins

Mr. Lean takes out 3 to 5 parties per year and does some packing.

10. Four other guiding permits, numbered 245, 246, 264, and 286 are open for option. Attempts are presently being made to find qualified guides to use these permits.

Trap Lines

Thirteen traplines are present on, or partly on, Wells Gray Park. This type of use is even more difficult to assess than the guiding done in the park. Only one-half of the trappers registered as using the park for trapping reported taking any fur in 1957 - 1958. Most of these reports indicated a low catch and little of this is expected to have been taken in the park.

The low fur prices and a trend away from this type of work results in a low fur catch. However, the country is quite rich in fur-bearing animals. The species making up most of the catch include: marten, beaver, mink, fisher, squirrel, and weasel (Annual Reports on Wells Gray Park by R.W. Ritcey). A few otter, muskrat, lynx, and wolverine are caught.

The very low activity of use of these lines has resulted in little or no upkeep of trapping cabins and trails.

The following list summarizes traplines located on the park at present (see also Map 2). Only the cabins on Wells Gray Park (and therefore government owned) are listed.

1. P.U.P. No. 3 - J.S. Hogue and J.A. Cober

Trapline - Azure Lake region
Cabins - 8
Present use - limited

2. P.U.P. No. 16 - R.G. Miller
Trapline - east side of Murtle Lake to Blue River
Cabins - 4
Present use - Previous to his employment with the Parks Branch, Mr. Miller was the most active trapper in the park.
3. P.U.P. No. 23 - A. McAndrews
Trapline - Upper Azure River and east of Hobson Lake
Cabins - 3
Present use - unknown
4. P.U.P. No. 31 - Previously held by Brewer and Bruce. This line covered the Angus Horne Lake region and should not be reissued because of a park zoning to be discussed later in this report.
5. P.U.P. No. 242 - F. Ludtke
Trapline - Battle Mountain region
Cabins - 1; 1 cabin used also by L. Ludtke for guiding
Present use - Fred Ludtke takes a fair catch, concentrating on the area close to his farm.
6. P.U.P. No. 253 - L.A. Ludtke
Trapline - Murtle and Anderson Lakes region
Cabins - 5
Present use - little or no use made of trapline
7. P.U.P. No. 254 - T. and R. Helset
Trapline - Murtle River north to Kostal and MacDougall Lakes
Cabins - 5; 3 used both for guiding and trapping; 1 privately owned cabin used both for guiding and trapping
Present use - do limited trapping on the southern part of their line
8. P.U.P. No. 255 - Messrs A., D., and R. Hamel
Trapline - along east side of Clearwater drainage from Hemp Creek to Ivor Creek
Cabins - 7; 2 used for both guiding and trapping
Present use - this permit has been recently cancelled and could be issued to anyone buying the line.
9. P.U.P. No. 256 - Glen Walters
Trapline - north Hobson Lake and Hobson Creek region
Cabins - 4
Present use - unknown. It is probably that Mr. Walters does not trap in the park.
10. P.U.P. No. 266 - A.G. Naismith
Trapline - west end of Mahood Lake
Cabins - nil
Present use - very little or nil
11. No P.U.P. held - R.W. Rosenau and C. Carlson (application for permit was made on May 10, 1960)
Trapline - Hobson Lake region, excepting the north end
Cabins - 4
Present use - unknown

12. No P.U.P. held - M. McLeod
Trapline - upper Clearwater River, north of Hobson Lake
Cabins - no record
Present use - unknown
13. No P.U.P. held - Archie brothers
Trapline - Mahood Lake and west side of Clearwater Lake
Cabins - 3 (plus)
Present use - unknown
14. No P.U.P. held - Ted McKenzie
Trapline - Clearwater River south of the junction of the Mahood River
Cabins - 1
Present use - some beaver trapping

Private Holdings

Very little private land is held within the boundaries of Wells Gray Park. Following lots are shown on Map 2.

1. Lot 3465 - Situated on the Murtle River and owned by T. Helset. This land is used for the site of a guiding and trapping cabin as well as for horse pasture.
2. Lots 2881 and 2882 - Situated on the west end of Mahood Lake. Attempts are presently being made to obtain this land. It would be a very useful piece of property if held as park land.
3. Lot 4141 - Situated on Mahood Lake and owned by A.G. Naismith. This choice piece of property is used for a private home site.
4. Timber license 5406P and T.L. 5416P each lie partly within the park boundary on the Blue River trail. These licenses are still held by Interior Lumber and Shingle Ltd., c/o E.C. Kaufman, 15035 Brengard Drive, Detroit 5, Michigan, U.S.A.
5. Helmcken Lodge - This lodge is not within the park boundary but it is situated on Lot 3188 in the Hemp Creek Valley. The development is mentioned here because it represents the main lodge service for this section of the park. It is owned by the Hammel brothers of California who have a manager to run the enterprise. They can presently advertise a lodge and three cabins, and a clearing a site for a new lodge.

PRESENT STATUS OF COMMERCIAL RESOURCES

The previous section dealt with resources and their utilization, of a recreational nature (excepting trapping, which is closely allied with guiding.) Because of the Class "B" status of Wells Gray, the potential of timber, hydro-power, mineral, and grazing will be reviewed.

Timber

Map 3 shows the major forest cover types in Wells Gray Park. The southern section of the park has been widely burned and the present stands are classed as immature (conifer) or as not satisfactorily restocked. The most severe fires occurred in 1927 and 1928 so that the regeneration has reached an age of about 30 years. The main exception is in the stand of immature bordering on the east side of the Clearwater River between Clearwater Lake and the Murtle River. This timber is 60 years old or more, with spruce and Douglas fir the dominate conifer species. In the

more recent burn, the cover is predominantly willow, aspen, and birch with scattered stands of conifer. The deciduous complex of immature and non-restocked areas has been the primary cause of a remarkable build-up of moose in this area. The stand is just now reaching an age where its moose browse productivity is dropping from its optimum (Ritcey 1960). There is good evidence to indicate that a perpetuation of the area as moose range would be more economical than a conversion to timber production purposes (Edwards 1953). Certainly the former use is more compatible with recreational use.

A total of 646 square miles of mature timber (Table 6) exists in the park. Assuming a conservative figure of 2,500 cu. ft. per acre, we arrive at a total volume of 1,033,600 M. cu. ft. for the park. (The average volume per acre was calculated for forest types in the Clearwater, Mahood Lakes region as being 2,900 cu. ft. per acre.) In general, much of this mature timber is over-mature to decadent. Roughly 60 percent is made up of associations of Engelman spruce, spruce-balsam, and spruce-cedar-balsam. The other major type, probably comprising about 30 percent of the volume, are associations of cedar-hemlock-spruce and cedar-spruce. The remainder is mainly Douglas fir, balsam, and lodgepole pine.

Table 6: Classification of Forest Types by Area

Type	Total Area (sq. miles)	Percent of Total
mature timber	646	31
immature timber	182	9
not satisfactorily restocked	128	6
non-commercial stands	71	4
non-productive land	938	45
water	107	5
TOTAL	2072	100

The most extensive blocks of mature timber are situated around the south half of Clearwater Lake and east to Kostal Lake, in the vicinity of Flourmill Creek, and to the south and east of Murtle Lake. Much of the mature volume borders lakes or rivers on extremely steep side hills. Forest inventory cruises indicate that roughly 14 percent of the park's mature forest is inaccessible. Natural flora along lakes is important to the recreational value of the park. Therefore, it becomes evident that if we consider the mature timber for possible harvest, only certain regions could be logged coincident with good recreational management. Further considerations with regard to timber harvest will be dealt with by zones, in a later section of this report.

The last major cover type classification is non-productive land, which comprises about 45 percent of the total area and lies mostly in the northern and eastern regions of the park.

Hydro-power

Hydro power surveys have been made on the Clearwater River system during the past several years. A general development plan is now available which calls for six major reservoirs within the

park and three on the Clearwater River between the North Thompson River and the south boundary of the park. Five power-houses would be within the park and three outside (Figure 1). The entire system would serve primarily as a source of hydro-power and secondarily for flood control for the Thompson and Fraser River systems.

The total installed capacity would be 900,000 Kw (Table 7). All of the lakes would have draw-down levels critical to recreational values, the most extreme being the Clearwater - Azure chain which would have possible draw-down of about 120 feet. All lakes but Murtle would be flooded, thus ruining their shoreline in this way. The tentative plan is to dredge the outlet of Murtle Lake to a depth of 20 feet, facilitating the draw-down without flooding.

Figure 1: Clearwater River proposed power and storage projects

Table 7: Proposed Hydro-Power Projects for the Clearwater River Drainage (BC Power Commission, 1959)

Site	Installed Capacity (Kw)	Maximum Draw-down (feet)
Hobson Lake	80,000	70
Clearwater - Azure Lakes	100,000	123
Pyramid Mountain	100,000	--
Flourmill Creek	150,000	--
Mahood Lake	30,000	80
Hemp Creek	220,000	--
Bear Creek	110,000	--
Clearwater	110,000	--
Murtle Lake	0	20
TOTAL	900,000	

In order to use Hobson Lake as a reservoir, a subsidiary dam would have to be built at Summit Lake pass between Hobson and Quesnel Lakes.

Water would be diverted from the Pyramid Mountain dam west to the Clearwater River, where the power house would be situated. This latter project, with the Murtle Lake reservoir, would be the first stage of the development.

The damage done by such a development as outlined above would result in close to complete ruination of the park as a scenic area. The most scenic waterfalls, Helmcken and Dawson, would be lost. The river fishing, which is a major fishing attraction at present, would be lost. The effect of such a development on lake fishing is not known. The salmon run in this river would be lost. The scenic attraction of the lakes would not be of parks standard. Finally, the wilderness atmosphere of the entire area will have dissipated.

If past experience is an indication of progress of this sort, it is certain the first stage development would be one of the most damaging. Once such operations are initiated, the argument to develop the entire system is strengthened. To accept an alternative, and concede that the developments on the lower section of the river would not be incompatible with other park use, would also be unwise because the flood control function is only met with development of the lake reservoirs. Hydro-power development is probably the most damaging type of commercial use in the park. We need only look to the Nechako Dam of Tweedsmuir Park, Buttle Lake of Strathcona Park, and the Hetch-Hetchy of Yosemite National Park, U.S.A., for proof.

Mineral

The geology of Wells Gray Park reported here is largely a review of a report made by N.F.G. Davis, 1929.

In general, the geology of the upper Clearwater drainage is of Precambrian origin. The history of the area has seen extensive sedimentary deposition, mainly quartzite, folded grossly over practically all of the area, and metamorphosed to mica-quartz schist, gneiss, quartzite, etc. The anticline - syncline strike is generally north 70 degrees west. An old volcanic batholith south of Azure Lake, as well as dykes, sills, and stocks apparently tend from the Azure Lake region to the east. Volcanic basalts (largely olivine basalt) overlay much of the main valley in the south. This is especially apparent at Helmcken Falls and the canyons.

Most of the topography results from the effect of mountain glaciers in the form of U-shaped valleys, cirques, tarns, and over-deepened lakes. The most extensive glacial deposit is on the north-west side of Clearwater Lake.

More recent volcanic action has created Ray Mountain and an 8 1/2 miles lava flow south to the Clearwater River. An eruption has also occurred at the east end of Kostal Lake.

Economic Geology

Most of the park is poorly consolidated rock - sediments that have undergone metamorphic action. Mineralization has occurred mainly around batholiths, dykes, and sills of volcanic origin, in association with quartz intrusion. Most interest to date has been directed at gold and silver bearing rock, though recently some investigation has been made in the park for other more eagerly sought minerals.

A number of areas have been claimed or worked as a result of mineral interests (Table 8). Most of the exploration was done in the early 1900s. The only claims still held lie on the south boundary of the park, in the Trophy - Table Mountain pass.

Table 8: Mineral Properties Recorded in or near Wells Gray Park

Property Name	Mineral Type	Location
1. Summit Group	lode gold and silver	4 1/2 miles south of head of

2. War Colt Group	lode gold and silver (lesser chalcopyrite, galena and sphalerite)	Azure Creek just east of Summit Group
3. Hobson Creek	placer gold	2 miles upstream from mouth of Hobson Creek
4. Blue Ice Group	gold and silver	head of Hobson Creek
5. Mica Mountain Mine	mica	Mica Mt., west of park boundary
6. Trophy-Table Mountain	lead, silver, and zinc	pass between Table and Trophy Mt. at park boundary (1956)

Due to a lack of modern surveys, it is impossible to assess the mineral potential of the park. Unlike other resources, gross surveys do not reveal the value of the resource. Therefore, it seems advisable to recognize the possibility of a mineral resource and deal with the cases individually.

Grazing

In general, Wells Gray Park has a very low value as grazing land. The low elevations provide little forage except in the meadows. Because of the marginal value of this land for stock, and the detrimental effects to the game ranges by cattle, it does not seem advisable to allow much use of the range by domestic stock. However, the needs of local ranchers must be recognized, as those of the Upper Clearwater are surrounded by park land. It would be advisable to limit grazing to south of MacLeod Hill and a maximum of 100 cattle or horses.

Higher subalpine meadows offer apparently unlimited forage for sheep and cattle. But one has only to visit the meadows of Trophy Mountains to see the harmful effects of grazing about 750 sheep on the subalpine meadows of that mountain each summer. Grazing may not alter the abundance of alpine annuals unless the area is badly over-grazed, but the plant composition is very soon altered by grazing to the point of being detrimental to scenic values.

Extensive subalpine meadows exist on Mica Mountain and some on Battle Mountain. In the only range survey made in the park, Pendray (1951) concluded that Battle Mountain was poor cattle or sheep range, and those meadows would sustain only about 750 ewes with lambs during a short summer season. Little knowledge was obtained on the Mica Mountain range.

FUTURE DEVELOPMENT CONSIDERATIONS

INTRODUCTION AND PURPOSE

Wells Gray Park lies just on the fringe of land conquered by man. Its history tells of trappers, marginal homesteaders, fruitless mining developments, and efforts to move machinery to the heart of its timber land. For some reason or another, all have fallen back. Not because the land was non-productive, rather because here exists a combination of climatic and geologic conditions not suited to easy conquest. Development of the area as a park will lack harmony if this wilderness and rugged quality of the land is not reflected in its development as a park.

In every consideration of park use, we must ultimately decide how to manage for the greatest use of the area at present, coupled with preservation of natural qualities for future generations. Very

often, if we simply justify holding an area as a park by passing a maximum number of people through it, we soon lose the original purpose of the park. Our responsibility is very largely to future generations, both as present society affects them and by the type of recreational areas we pass on to them.

A second major concept that should be reviewed before launching into the considerations of Wells Gray Park is the relationship of this park to the Province and to other Provincial parks. The development here should be unique for the Province. Our large parks are samples of certain ecological units exemplifying flora and fauna of their respective regions. The Province as a whole can only afford to maintain a certain part of its area as park land, and each major life zone should ideally be represented in the different parks.

But further too, than being a representative of its life zone, it should present a theme of use not common to many, if any, of the other large parks. Preservation of the true wilderness is only recommended here realizing that this theme should probably be secondary in most other areas. More precisely, access to many principal areas of Wells Gray Park should be limited often to hiking or boat travel. This is undoubtedly the most significant single way of preserving the true wild land quality.

In the past, there seems to have been no clear recreational purpose stated for Wells Gray Park, other than its designation as a Class "B" park. Consequently, the utilization of any of its natural resources would be considered and recognized if they are found consistent with recreational purposes of the area. For the most part, the evolution to date spells the purpose of Wells Gray Park. I hope that this outline will best organize the recreational development as well as guide in other natural resource utilization.

To date, a certain park philosophy has evolved concerning this park, at least in the minds of the personnel in the park itself. The abundance of game and fish has resulted in a great deal of hunting and fishing as a form of recreation. Wildlife investigations (reconnaissance and research) have taken paramount importance in the park's functions. In this respect, invaluable knowledge and data have been amassed for the area. Edwards (1951) hoped that wildlife would be given top priority in land use considerations, and recommended strict control of road access. To the visiting public, the park is getting to be known as a wilderness area. The campers are more and more people with better than average camping experience who are willing to leave many of the normal conveniences behind and become more a participant and less a spectator in outdoor recreation. To alter the present trend would, I feel, be unreal and unwise. The wilderness atmosphere should be maintained and the research program continued. The major purpose of Wells Gray Park should be to preserve, in its natural state, a part of the Columbia Mountain Range, maintaining especially for public enjoyment the hunting and fishing, the scenic waterfalls, the large mountain lakes, and most of all, the atmosphere of a wild, expansive country and prolific wildlife.

ZONE FORMATION

It is immediately apparent that the entire park cannot homogeneously function in satisfying its principle purpose, and also that if resources other than recreation are to be used, it will require a specific unit breakdown. In considering Wells Gray Park, Brooks (1954) wrote: "It seems then that in the past fifteen years, the Forest Service has been attempting to administer as one park what is essentially a group of parks, each of separate policies based upon the logical purpose of each park."

Before defining a system of sub-parks, it seems essential that we examine the climate, topography, and outstanding features of the park with respect to access, recreational and

commercial resource potential. The overall conditions which have guided my design of the park result from a realization of the geographic transition from foothills in the south-west to alpine in the north-east. Intensive public use in the south-west should change to extensive use in the north-east, essentially coincident with the above transition.

The Mahood Lake area is markedly affected by the ecology of the central Douglas fir section of the Montane forest region (Haliday 1937), (Figure 2, Band 1). In this first band, Mahood Lake is warm enough for swimming, the most spectacular waterfalls are located, and the forest type is influenced least by the "wet belt" effect common to the Columbia Mountains. Douglas fir and even lodgepole pine forest types predominate. Correspondingly, family groups find this area most attractive and this region could best withstand and warrant intensive public use. Also, road access at points A and B (Figure 2) now exist, and dictate where the shock of public use must be absorbed.

Figure 2: Geographic and Public Use Transition

Band 2 becomes more mountainous and, at low elevations, the Douglas fir is often replaced by cedar - hemlock stands. Much of this area is burned over and productive as moose range. Clearwater Lake has less attractive shoreline than Mahood Lake and serves more as a fishing lake and access route than as an attraction in itself. Limited, intensive public use areas should be maintained. This band lends itself well to intensive game management coupled with timber utilization and, at the same time, acts as a buffer to more extensive use areas to the north-east.

In band 3, the superlative scenery, the cold glacier fed lakes, and the general ruggedness of the country lends best to extensive public use and should be protected from most commercial development. Trail and water access from the south-west and trails at points A and B (Figure 2) should continue to provide the only type of access to insure extensive utilization and maintenance of the qualities for which the area is best suited . . . wilderness.

The north-east side of the park (Band 4) comprises mostly mountains and glaciers. This is an important natural boundary, making up background and protecting the central parts of the park. The area is not commercially valuable and will not be demanded for such use in the foreseeable future.

In general, the park seems best suited to the above described transition of intensity of utilization. Logically, we must now define the units which are necessary for proper administration and protection of such an overall plan. In accordance with the considerations set down by Brooks (1954), Wells Gray Park should be divided into a number, possibly four, sub-parks, each administered with separate policies designed to best utilize the specific area. Further, as stated by Brooks, reservation of sub-parks for their primary use must be permanent, by act of Legislature, or at least made inviolate over 20 year periods.

DEFINITION OF SUB-PARKS

1. Multiple-use Park (Park Classification - B): Areas providing special or local recreational attraction or situated so as to act as buffer zones to more pristine adjoining parks. Intensive public use on all or part of this type of park should be encouraged. These lands should also be managed to furnish wildlife, timber, water, forage, and mineral, where these uses are congruous with recreational demands. Functionally, these parks should always be established as Class B parks to formally limit intensive commercial resource development and exclude expansive scenic areas where protection is of prime importance.

2. Wilderness Park (Park Classification - B): This type of park should be managed to preserve the natural environment, both flora and fauna, and at the same time invite adventure and extensive public use. It allows a skeleton road system or the possibility of access by water routes. Ideally, such parks should be rugged and barren with respect to commercial resources, thus decreasing the chance of conflict with resource interest.
3. Roadless Park (Park Classification - B): Parks where the natural scenic beauty is best protected for present and future use by strict control of access. Trails and water routes should be the only type of access in order to limit travel on the area. Motor powered conveyances (boats included) should be kept to a minimum, and automobile and aircraft travel should be restricted completely. Any road access established out of necessity for fire protection, etc., must be of a temporary nature and let revert to the natural state after the crisis is over. Future generations of mankind are considered very important when justifying roadless parks. Commercial resource use should be kept to a minimum. Scientific research should be an important function of such areas.
4. Primeval Park (Park Classification - A): Primeval park classification should allow for the complete protection of a topographic unit. No commercial land use, and only extensive recreational use should be allowed. No development, even such as blazing a trail, should be allowed. Such a park would have a high scientific and cultural value.

DEVELOPMENT OUTLINE BY SUB-PARKS

Mahood - Clearwater Lake Multiple Use Park

Location: In general, this park includes Clearwater and Mahood Lakes, and the moose winter range (Map 4). The boundary within the park would run along the height of land north of Lickskillet Creek and south along the Clearwater River, and thence along the height of land between Azure and Clearwater Lake, and the headwaters of File Creek. The boundary then follows File Creek to within about three miles of Murtle Lake, at which point it swings to follow the height of land over the Kilpil Mountain to a point on the Murtle River locally referred to as Stillwater. From here the boundary of the area is more poorly defined, being a line approximately following the 3,500 foot contour along South Plateau and Battle Mountain to Phillips Creek, thence east along Phillips Creek to the west fork of the Raft River, and the main park boundary. The Table Mountain area between Grouse and Phillips Creeks acts as a buffer zone to the roadless area to the north.

Access: A good system of roads is essential in the multiple-use park, both for public use and commercial resource management. However, main roads should always be just a means of getting to points of interest, never recreational attractions. Roads in Wells Gray Park should not function as scenic drives. The main roads should conform with the following specifications:

- (1) Two lane, gravel surface roads.
- (2) Roads should follow the contour of the country, with a minimum of cuts and fills.
- (3) Long straight sections should be avoided.
- (4) The right-of-way should be kept to a minimum width, sufficient only for a good ditch and where sunlight needs to be let in to dry road, the stand should only be thinned.
- (5) Turn-outs should be common.

Proper administration of the park necessitates the connection of Mahood Lake with the Clearwater Lake road. This connection is completely necessary if the park is to form a well-balanced unit. The other main park road envisioned would lead from near the south end of Clearwater Lake to Kostal Lake (Map 4). The lava flow at the east end of Kostal Lake forms a natural barrier past

which the road must never be allowed. A trail from here would serve as access to the Murtle Lake Roadless Park (to be outlined later). It would also allow for public use of Kostal and MacDougall Lakes, and is well situated as a starting point for trail access to the Goat Peaks and Azure Mountain region.

Both of the above mentioned roads would open to timber that could foreseeably be harvested. A further access to timber should lead north from the Mahood - Clearwater Lake road at Donald Creek.

Game management roads (jeep roads) are presently started and should eventually form an extensive enough system to allow access to all of the moose winter range in the southern section of the park. The connection of jeep roads onto main roads should be concealed as well as possible. The primary function of these roads is to facilitate range management. It has been pointed out by the park biologist that better herd management involves a more widely distributed harvest, thus certain of these roads might be open for public use if hunters can be better distributed by doing so. This use should be strictly controlled. Natural deterrents such as extremely steep grades need not be avoided. Gates should be constructed and locked to prevent public use if necessary.

Park Headquarters: The present Hemp Creek headquarters station is poorly located, being both a poor building site and initiating a trend to invade farther and farther into the park with man-made improvements. Also, the present location does not allow for checking park use to the south of Hemp Creek station. The hunting public, especially, is apt to abuse park privileges in the area south of the present station. A site on Moul Creek has been reserved and it is recommended that future headquarter developments be located on this new block of land. The present site near the residence building could be expanded as a service area, but to develop the park entrance here would be to divorce attention of park land to the south.

Recreational Management: Mahood Lake should obtain early consideration in providing public camping areas. Both the north and south sides of the lake offer excellent sites for development once access is obtained. Boat access campsites should be available on beach areas not reasonably reached by road. This is especially true of the east end of the lake where good trail access is also necessary to improve access and view-points at Sylvia and Goodwin Falls. As soon as adequate land is available, the development of the west end of Mahood Lake should obtain first priority.

There are interesting Indian paintings at two places on the rock cliff shores of Mahood Lake. Although these hieroglyphics are not advertised, they could be found and lost to some unreasoning tourist who might deface them. For this reason, early consideration should be given to safeguarding these works of art.

It is felt that Helmcken and Dawson Falls warrant expanded camping and viewing facilities. The spectacle of Helmcken Falls should be easily accessible to all of the public entering Wells Gray Park. Parking within about one-half a mile seems more reasonable than the present three mile hike required to see the falls. The development should be planned now, but need not obtain priority in park development.

A 75-unit camping site is presently being developed at the south end of Clearwater Lake. I feel that attractions here do not warrant such a big development, and that the area should not expand beyond about 40 campsites for now. Development of smaller sites along the Clearwater River would be more desirable to serve river fishermen. Sites on the shores of Clearwater Lake should be developed as boat travel on this lake is becoming increasingly common. Suitable sites for

development are shown for Clearwater and other lakes on Map 4. Most lakeshore developments need only clearing and garbage and toilet facilities.

With the access to Kostal Lake, a camping area will probably be required there also.

The multiple-use park offers a number of other possibilities which would broaden the scope of recreational enjoyment in the area. With increased public use, the following features could be developed:

- (1) A nature museum, with special emphasis on the interpretation of big-game species and range conservation. A suitable site might be the John Ray farm which has historic interest also.
- (2) Development of the old John Ray farm as an historic site, featuring the life of the early homesteader and trapper. It is recommended that the old farmhouse be given protection now, until the problem can be investigated, and secondly, that any of the original homesteading and trapping equipment be stored and historical notes be collected as they become known. This could be expanded to include also the history and writings of Angus Horne.
- (3) The mineral springs east to the Ray Farm would be of considerable interest if interpreted and made easily accessible.

Game and Fish Management: Game and fish are an integral feature of Wells Gray Park. Probably no other single area in BC has experienced such a thorough wildlife investigation leading to the good understanding of game conditions and problems. The multiple-use park lends itself well to such intensive study. Here the more primitive surrounding lands, along with the multiple use park, make up the inseparable combination of summer and winter game range. For this reason alone, the multiple use park is a necessary section of the entire park, although scenically the moose range is not attractive. The lack of all-season range is a deplorable problem in many large parks of the world. To mention only two, both Yellowstone and Olympic National Parks of the U.S.A. lack adequate winter range for well-balanced big game herds.

Continued research and management of the wildlife in Wells Gray Park would add much to the function of the land. Hunting as a form of recreation resulting from intensive management is justification enough for such a program. The contributions of scientific findings to the wildlife management field have even greater value.

Immediate attention must be given to the improvement of moose winter range if the excellent moose hunting available in the past is to be maintained. No other problem in Wells Gray Park is as pressing as this, because (Ritcey 1960) reports that the productivity of the range is beginning to decline now. Ritcey has outlined a plan to burn a section of the range which should, I feel, obtain prompt approval and action.

Is it the responsibility of the Parks Branch to actively carry out research and manage game for hunting purposes? Game is not easily assessed as a commercial resource; however, it can be done. The BC Game Branch (1959) values each head of game at about 130 dollars based on expenditures made by hunters obtaining the game. Edwards (1953) calculated the meat value of moose at about 180 dollars per head. If we are to manage the multiple use park for its best use, it is easy to see that game management is economically sound. Furthermore, hunting fits better into the recreation picture than do the more industrial enterprises.

Secondly, I should say that it is definitely someone's responsibility to carry out research and instigate management practices. Of necessity the Parks Branch is concerned with those aspects

of natural history in parks and therefore wildlife justifies attention in Wells Gray Park because it is unquestionably a dominant feature of the park.

Provincial parks represent the most suitable areas of the Province in which to carry out research. I feel that, eventually, a widely-recognized function of large parks should be to serve as study areas for those organizations and institutions involved in scientific research. The Game Branch should be invited to take part in the research program at such time as they organize a division whose prime function is to do wildlife research. Cooperation should be given to the universities interested in carrying out investigations in the area.

Fisheries research should be encouraged and a survey of Kostal and MacDougall Lakes made as they become accessible, in order to determine

- (1) whether Kostal Lake will support a sport-fish population if stocked.
- (2) The management procedure that should be carried out to best utilize the fish in MacDougall Lake.

Forest Management: The harvest of certain blocks of timber on the multiple use park can probably be well integrated with other use. Utilization of most allowable timber for harvest stands on compartments 30, 31, and 32 (Map 3) (Table 10). (For individual compartment maps, see Appendix Maps compartments 21 and 25 to 33 inclusive.) The mature volume on compartments 21 and 30 will probably be first cut as the Clearwater - Mahood Lake road should pass through here.

Table 10: Timber Volumes by Compartment and Forest Type on Multiple Use Area

Compartment	Forest Type	Area Total	Acres corrected	Av.Vol./ac. Cu. Feet	Total Vol. Total	M.Cu.Feet *corrected
21	SP1	130	130	1,198	156	156
	FH	770	0	--	--	0
	PISB	4,610	3,650	691	3,185	2,522
	FC(Pw)	1,920	1,920	2,970	5,702	5,702
25	FSC	2,430	1,340	7,511	18,252	10,065
	FS(C)	5,760	3,970	3,638	20,955	14,443
26	SB	6,910	6,910	1,826	12,618	12,618
	CHS	1,660	1,660	3,389	5,626	5,626
	FS(C)	450	450	3,638	1,637	1,637
28	SB	11,780	1,930	1,826	21,510	3,506
	S(B)	320	0	4,449	1,424	0
30	FS(C)	9,340	3,900	3,638	33,979	14,188
	PISB	9,410	9,020	691	6,502	6,233
	CH(S)	5,500	4,540	2,129	11,709	9,666
	C(S)	380	380	4,892	1,859	1,859
	S(B)	10,050	10,050	4,449	44,712	44,712
	SC	960	0	3,487	3,348	0
	SB	1,150	1,150	3,450	3,967	3,967

	SHS	3,710	3,710	3,389	12,573	12,573
	SB	700	700	1,826	1,278	1,278
31	SB	4,610	4,610	3,450	15,904	15,904
	CH(S)	7,680	3,900	2,129	16,351	8,303
	B	6,400	6,400	882	5,645	5,645
	SB	1,280	1,280	3,752	4,803	4,803
	PISB	640	640	691	442	442
	S	1,220	1,200	4,449	5,428	5,428
32	SB	7,870	7,870	1,826	14,370	14,370
	CHS	2,620	1,470	3,389	8,879	4,982
	CH(S)	10,240	8,380	2,129	21,801	17,841
	SCB	9,920	9,920	3,487	34,591	34,591
	SB	4,740	4,480	3,665	17,372	16,419
33	CH(S)	10,240	6,660	2,129	21,801	14,179
	B	1,660	1,660	882	1,464	1,464
	SB	2,300	2,300	3,450	7,935	7,935
	S	8,510	8,510	4,449	37,861	37,861
TOTALS		157,870	124,700		425,639	340,918

Utilization: 11.1" dbh and over, close utilization (1' stump and 4" top) and net volume less decay, Taken from BC Forest Surveys Inventory data.

* Corrected area represents area of mature timber not including strips of timber one mile wide along lakes and one-half mile wide along rivers and established roads.

The total of 247 square miles (157,870 acres) of mature timber is estimated to yield 425,639,000 cubic feet of wood (Table 10). Tentatively, I have reduced this volume by subtracting all the timber within one mile of large lakes and one-half mile of major rivers and established roads. The resulting available volume equalled 340,918,000 cubic feet, which more closely approximates the volume available for harvest. However, even that figure is believed to be a maximum because some of this timber would be inaccessible or non-commercial. A good deal of the timber is over-mature to decadent.

The species composition is largely spruce - balsam (125,512,000 cubic feet) and cedar - hemlock - spruce associations (&3,170,000 cubic feet) (Table 11).

Table 11: Timber Volumes by Forest Types

Forest Type	Volume (M. Cu. Ft.)	
	Total	Corrected

FH	0	0
FC(Pw)	5,702	5,702
FSC	18,252	10,065
FS(C)	56,571	30,268
CHS	27,078	23,181
CH(S)	71,662	49,989
CS	1,859	1,859
S	42,289	43,289
SB	99,757	80,800
S(B)	46,136	44,712
SC	3,348	0
SCB	34,591	34,591
SFI	156	156
B	7,109	7,109
PISB	10,129	9,197
TOTAL	425,639	340,918

The areas harvested should be closely regulated and silvicultural treatments should, in most cases, result in the improvement of game ranges. Seldom, if ever, should good coniferous regeneration be an objective.

The regulations and harvest procedures should recognize all possible recreational functions of the land.

(1) Timber Sale: Applications for cutting permits would first go to the Park Branch to determine limits of area to be cut. Cruising, appraisal, and sale of timber should be done by the Forest Service with final approval being required of the Minister of Department of Recreation and Conservation.

(2) Buffer Zones: Adequate buffer zones should be left untouched near lakes, rivers, roads, and points of interest. Preferable, this should screen both visual and auditory signs of commercial utilization from the public.

(3) Access: Access roads should, if possible, serve both as public and as logging roads. It may be necessary to control access into individual sales where no recreational attraction exists, and machinery is being used.

All roads should be located by park personnel and built to park specifications. "Pushing" roads in with a caterpillar tractor must be avoided. Main roads would require direct supervision by Parks Branch engineer. The Correctional Institution labour may be used to clear right-of-ways, and if such special work had to be done by the logging operator, extra costs would be accounted for in the stumpage appraisal.

(4) Season: Whenever possible, logging operations should be most actively conducted in seasons when the public is not using the park area intensively. It would be conceivable to limit hauling operations during July and August.

(5) Silvicultural Treatment: As pointed out before, the principle aim of the silvicultural treatment should be to produce moose winter range. Since no research has ever been done in the Province on removing coniferous stands to produce deciduous growth, the best methods are by no means clear. However, experience shows that the following should be considered first:

1. Clearcut and slashburn on ridges and elevated ground where upland willow has come in after wild-fire on similar areas.
2. Selectively cut spruce swamps where red osier dogwood is prevalent. Often opening such stands completely results in pure alder growth which is less palatable than dogwood.
3. Clearcut, but avoid burning, where lodgepole pine predominated.

Hydro-power Development: As outlined on the section assessing the hydro-power potential, it was generally concluded that any development of this resource would be incongruous with recreational use. Every effort should be made to oppose the inundation of the waterways in this park, and the damage associated with the construction of such installations.

Reservoir shorelines are not recreational shorelines. The Tennessee Valley Association Reservoirs for example, are lauded for their recreational value. This is so only because they are located in areas lacking water. Flooded shores at high water and the long silt-covered shorelines after drawdown are not of park quality and therefore not compatible with best park use.

Mineral Development: Mineral claims within the multiple-use park should be considered individually with regard to development. Most mining developments could, it seems, be regulated sufficiently so as not to detract from the recreational use envisaged for this park. Access restrictions should be imposed similar to those outlined for logging developments.

Grazing Development: The only areas of grass are found on MacLeod Hill, and the south end of Green Mountain. Due to the low value of this park as grazing range, and the probability of competition between domestic stock and wild game, it is recommended that increased grazing should not be allowed. The continued low use by local ranchers should not be denied. The only possible exception may be on Mica Mountain where there is, reportedly, a considerable area of sub-alpine meadow range just outside the park boundary. This, in conjunction with the land inside the park, was not properly assessed. Special examination and consideration would be required should application ever be made for grazing on that area.

Land Acquisition: It is recommended that Lot 3465 be purchased from T. Helset. The use of this private land within the park is not incongruous with the park atmosphere at present, but Helset has

been offered money for this property, and it is probable that any new owner would want an obtrusive development on this scenic stretch of river edge.

AZURE - HOBSON LAKES WILDERNESS PARK

Location: This sub-park includes the northern section of Wells Gray Park. It borders the multiple use park to the south as far east as MacDougall Lake. The boundary then follows up a branch of File Creek and on to the headwaters of Fleurbaix Creek to Angus Horne Creek. Thence up to the height of land north of Angus Horne Lake, where it continues north-east to the main park boundary.

Access: Azure and Hobson Lakes constitute the major access routes in this area. At present, boats can travel from Clearwater to Azure Lake. A good portage trail is a necessity between Azure and Hobson Lakes, and it is felt that this should follow the east side of the river. In time, public use should warrant building a good trail over the old portage between Hobson and Quesnel Lakes.

In general, wilderness areas might recognize a single road access, but this sub-park cannot feasibly be entered by a road. Trail systems to many regions of the alpine is of prime importance, and should be sufficient to allow public access to most of the alplands. Initial trail work should include the construction of the Azure-Hobson Lake trail, and a trail to the alplands west of Ovis Creek.

Recreational Management: The wilderness sub-park was chosen to include much of the very rugged yet scenic country that consequently had little foreseeable commercial resource value. The country is best suited to wilderness recreation.

Visitors should be able to move into the area by boat and camp along the lake shores at moderately sized campsites (Areas marked on Map 4). A small number of tables may eventually be required at the mouth of Angus Horne Creek, but most lakeshore developments require only a toilet and garbage pit. Hobson Lake would probably support a concession of about two boats at its south end, so that people could hike in and move up the lake to reach the north end of the park. Very little formal development would be required on Hobson Lake for many years to come, with only trail access to its shores. (A rail portage was considered, that might move private boats between Azure and Hobson Lakes, but it appears uneconomical. The portage car would certainly have to be powered, and also the terrain is fairly broken, resulting in rather high construction costs of such development.)

It is recommended that trail systems be planned as a main recreational feature of this park. Glaciers and alpine meadows are easily reached from the lakes if good trails are available. It is felt that cabins and shelters should be available on these trails so that heavy camping equipment should not be necessary in order to spend nights in the mountains. These structures should, in all cases, be not closer than about a three to four hour hike from the lake. Thereafter, they should be spaced regularly or located at points of special interest.

Tents and equipment can be carried along the lakes on boats but few people are willing or able to pack heavy equipment into the mountains to camp. However, I am certain that many people would enjoy and profit from going on mountain camping trips. Trail cabins with rough, heavy equipment such as a stove, cots, axe, and a minimum of cooking equipment provided, would cost little and probably suffer little damage. These cabins could be either very open, three-walled, or closed and locked. Good instructions and especially the necessity of requiring a key should reduce the possibility of damage and abuse. It seems that in no other way, except these sort of "wilderness

hostels” can we properly satisfy the needs of that segment of the public who would enjoy the mountains.

Michigan State Parks Division has 14 trailside cabins in the Porcupine Mountains Park and other areas. They report a use by 1,555 people in one summer. These cabins are, however, more easily reached than would be the proposed trail cabins in Wells Gray Park, but the method in general has proved workable.

Other Uses: The wilderness park find its main use as a recreational area largely as a result of the low value of commercial resources there. Hunting, fishing, guiding, and trapping do not seem inconsistent with recreational use in the area, and therefore should be continued practices. It may become evident with further investigation that the Hobson Lake area should be closed to hunting. Hunters apparently make no use of the area at present.

Hydro-power development is not compatible with use in this sub-park.

The mineral resource here, as in other parts of the park, cannot be assessed and therefore it is felt that mineral applications should be considered individually.

MURTLE LAKE ROADLESS PARK

Location: The roadless park includes the south-east portion of Wells Gray Park, being adjacent to the multiple use and wilderness zones north as far as the headwaters of File and Fleurbaix Creeks. From that point, it follows the height of land, north-east along the south side of Angus Horne Lake to the main park boundary (Map 4).

Access: By definition, the roadless park does not allow road access. Aeroplane access is similarly incongruous with proposed use and should be limited to landing for protection and administration purposes only. It is proposed that there be three trail access routes at least. A trail from Kostal Lake should lead to the outlet of File Creek. The present trails via the Stillwater, Murtle Lake route and the Blue River should be maintained. Preferably, it should always be at least a four mile walk into the lake, although this may be reduced on the Blue River trail as the Forest Service protection access roads may come to within two miles of the lake. The use of this latter route should not be encouraged.

At present, there are forest protection roads opened to a point near Richie Creek on the Raft River and MacRae Creek on the Blue River. The Protection Division plans to continue these roads to the park boundary and join them at or near TL 5406 and TL 5416 (Figure 3). The best route apparently will run inside the park boundary south of the above timber licences.

As TL 5406 and 5416 are still held and in due consideration of the importance of protection access, it is recommended that protection road access be allowed, but that all efforts be made to see that such a road stays as far from the lake as possible and does not develop into a common public road.

Attempts should be made to obtain TL 5416 and the west half of TL 5406 for park status. The owners should be notified of park interest in these blocks. This timber area is one of the more important caribou migration routes of the park, as well as being strategic in protecting the desired roadless status. The purchase or trade to obtain these blocks would be desirable. This point of access is one of the most critical in the park. There will continue to be pressure for road access from Blue River. This must be deterred if organization and proper use of the park is to be maintained.

Recreational Management: Previous plans have always reflected Murtle Lake as a major attraction and most suited to intensive development. This seems unwise in light of the fact that the trend is to open up all lakes for road access. With such a widespread tendency, it is evident that, if our parks are to be truly unique areas, we should look to limited access in certain park lakes. No one can deny that a road followed by intensive use takes away the atmosphere of solitude which is such an important parks feature. After considering all aspects of Murtle Lake, I am convinced that it would become only mediocre if opened to the motoring public and developed for intensive use. If protected as a roadless area, and therefore in its present state, it will remain an unique attraction.

Murtle Lake has certain qualities which detract from intensive use. It is seldom warm enough for swimming, being fed by cold mountain streams and lying at an elevation in excess of 3,000 feet. The most striking and expansive beaches are backed by lowland, often swampy areas, that flood annually. Such ground is not well suited to expansive development. Fishing tends to be good in local areas only, especially at File Creek, Ted's Pond, and just at the lake outlet. Only 22 percent of the lake area is considered productive and practically all of this is confined to the west end of the lake (McMynn 1954). Intensive use could not be distributed well over this lake.

With only trail access to the lake, there should be an adequate boat rental service provided. Lakeshore shelters should be grouped at strategic points on the west arm to permit overnight camping sites for hikers. Sites must be picked which offer low fire hazard, and it is suggested that they be primitive in nature with toilet and garbage facilities, and low split-log benches to act as both tables and benches in front of fireplaces.

The park patrolmen should be authorized to give limited aid in moving people to various points on the lake by power boat.

Game and Fish Research and Management: A primary function of the roadless park should be to serve as a research area. Institutions interested in scientific studies should be encouraged to do so. The lodge at the west end of Murtle Lake is especially suited to such use.

The protected forest stands in the area could function valuably as a site for ecological forest units, as part of the system proposed by the Canadian Institute of Forestry.

Hunting and fishing should continue to be a part of the recreation of the area.

Other Uses: Development of the roadless part for the production of timber, hydro-power, mineral, and grazing are generally incompatible with the best recreational use. Again here it does not seem advisable to firmly oppose mineral utilization until the type of development is known. However, more strict regulation would be required here than in any of the previously discussed areas.

ANGUS HORNE LAKE, PRIMEVAL PARK

Location: The primeval zone lies between the roadless and the wilderness park in the vicinity of Angus Horne Lake. As a topographic unit, it includes the Angus Horne Creek drainage above Fleurbaix Creek.

Access: No access of any type should be put into this area. In the future, no works of man should be allowed and the signs of trappers should be left to deteriorate and disappear.

Recreational Management: Entrance into the primeval park should be under permit only and visitors wishing to travel into this part of the park should be given instructions before entering. The primeval zone should serve primarily as a culture and scientific area.

Other Uses: All future commercial development should be disallowed. The only use presently in effect involves the traplines in the area, and these are not normally trapped. The trapline covering most of this area (P.U.P. #31) was recently cancelled and should not be reissued. It is recommended that steps be taken to reduce the area of P.U.P. #3, where it extends east into the primeval park. No hunting parties should travel into the area.

FOREST PROTECTION FOR WELLS GRAY PARK

The thesis of fire protection in Wells Gray Park should differ from that in forest land over the rest of the Province. Since logging is not of major importance, protection of conifer cover is not a primary function. Wild fire is a natural phenomenon, resulting in a variety of successional stages and this is a healthy floral condition. Subclimax, predominantly deciduous, cover is often the most productive game range. In fact, it is evident that controlled burning as outlined by Ritcey (1960) is one of the only ways to properly manage the moose winter range. In this case, fire is a useful tool. Climax forest is necessary only where it has scenic or scientific value, or serves as habitat for game such as caribou and certain of the fur bearing species.

The following should delimit protection policy:

1. Protection of scenic areas: falls, rivers, roadsides, lakeshores.
2. Protection of key caribou range.
3. Protection of mature timber which policy allows to be logged.

Areas which should not be protected if compatible with above:

1. Purely potential moose range and immature timber stands.
2. Stands of decadent timber.
3. Stands of mature timber for which there will be no demand in the near future, and which will make moose range.

It is concluded therefore that fire in Wells Gray Park is everything from enemy to useful tool.

Suppression measures at present are sufficient in many parts of the park. Early detection can be improved and will always be a necessity. The greatest forest protection is required in the Murtle Lake roadless park. Other zones warrant better control of the situation without all efforts being funnelled simply to stopping every fire that starts. For example, a fire in a mountain valley that can obviously not go into other areas can be controlled at its lower end and let burn up the valley. There is a real distinction between control and suppression. The future responsibility in this park should be to improve detection, control fires (and accept a certain amount), and attempt to reduce the responsibility of the Forest Service in the park.

1. A complete detection and initial action plan should be set up.
2. Protection fund should be started to carry extra costs over "fire year" and reduce the responsibility of the BC Forest Service Protection Division.
3. A Department of Recreation and Conservation aircraft should be purchased to serve a variety of needs, including fire detection and control.

1. Detection Plan by Zones: The general scheme of patrols at Mahood, Clearwater, and Murtle Lakes, with headquarters at Hemp Creek, is well-founded. Better access, a complete secondary lookout system, and aircraft assistance are the prime need.

2. Mahood Lake Zone: In general, the hazard is low in this region because the cover is largely second growth with a good deal of deciduous vegetation.

Although more help will be needed as other developments are put at Mahood Lake, the present one-man patrol is sufficient to detect fire in this zone. Cook Mountain is recommended as the only secondary lookout necessary. A good trail and lookout point should be made. Improved access, both trail and road to the Clearwater River, is a necessity.

Clearwater River Zone: The headquarters patrol, as well as the Clearwater, Azure, and Hobson Lakes patrol, are included here. The subalpine in this area is the most important cover to protect from fire, which means that practically all fires should be fought, since most would run to high country if left out of hand. However, burning over the low land will not be especially harmful and, in fact, would, in many cases, be beneficial. Controlled fire in the multiple-use park is necessary to continued wise land use and should be attempted.

The detection plan for this entire zone should include the Battle Mountain lookout, the headquarters patrol, and the Clearwater, Azure, and Hobson Lakes patrol.

Battle Mountain Lookout: This is the only primary lookout necessary in Wells Gray Park. Because of its value to the park as well as the surrounding country, the lookout should be manned every summer. The lookout man should be assigned trail cutting duties during periods of very low hazard.

The lookout presently built is sufficient after limited improvements have been made. The trail presently started needs completion as soon as possible.

Headquarters Patrol: Staff on duty should patrol the road and man secondary lookouts after lightning, storms, etc., as well as aid the efforts of out-lying lookouts and patrols.

Secondary lookouts in this area include Squaw Mountain, Pyramid Mountain, and Green Mountain. A trail from the proposed road access on the west side of the Clearwater River is required to the top of Squaw Mountain. Observation facilities could be improved at all these lookouts. Controlled jeep access to Green Mountain would aid protection as well as distribute hunters better over that country. The proposed jeep road to Sillwater would improve protection to the west side of the roadless park.

Clearwater, Azure and Hobson Lakes Patrol: Logging roads will give access to the west side of Clearwater Lake. Within the wilderness park, the only practical access will be lakes and trails. In order to protect Hobson Lake, the proposed portage between Azure and Hobson Lakes is a necessity. Boat, motor, and overnight cabin should be available on Hobson Lake. With the above improved access, one man should be able to adequately patrol these lakes.

Two secondary lookouts should be established, one to be on the hill at the south west side of Clearwater Lake, opposite Daniel Creek. The other, not yet defined, should be situated between Hobson and Clearwater Lake as coverage for this general region. The Azure Mountain lookout is poorly situated and probably not required in the future. However, the trail to this lookout should be

maintained and improved as it forms a link of a foreseeable trail route between Clearwater and Kostal Lakes.

Murtle Lake Patrol: Because of the "roadless" designation covering this zone, proper forest protection poses a difficult problem. However, the recreational advantages of such an area, especially in the future, far outweigh present disadvantages in protection. Undoubtedly technological advances in fire fighting from aircraft will greatly lessen this problem in the future.

The coniferous forest cover is important in the roadless park because of its scientific and aesthetic values, and also as a caribou winter range. On the other hand, it is advocated that no protection be given to the forest cover in the primeval park.

It must be recognized that, especially here, only limited assistance should be looked for from the Forest Service. Special park conditions result in greater park responsibility in maintaining these conditions.

The need for a protection fund and department aircraft will be outline later. It is felt that, even before such plans could be realized, a workable agreement should be drawn up between the Park Branch and the Forest Service, to clarify aims and duties. Such agreement should include the following:

1. That, following detection by parks patrol, a maximum of 10 men be moved in by Forest Service aircraft, if available.
2. That a maximum of 75 men, plus Correction Camp labour available, be moved in on foot.
3. That crews be supplied with pack horses or boat in all but the multiple-use park.
4. That no caterpillars be used on the roadless park except in special cases along the periphery.

It is felt that this is a fair plan to reduce Forest Service responsibilities. If the proposed protection fund and aircraft becomes a reality, the above described limits of protection could be greatly improved upon.

A secondary lookout on Ramsay (Centre) Mountain should be established.

FOREST PROTECTION FUND

It is recommended that a protection fund be set up to alleviate high costs during seasons of extreme hazard, and compensate for protection costs resulting from special park conditions of limited access not comparable to forest land protected by the Forest Service.

It is believed that the fund should be built up and allocated in the following way:

- The sum of 5,000 dollars should be set aside annually until the maximum of 25,000 dollars was built up. This fund should be available to the payable discharge cheques similar to the Forest Service organization.
- This money should be used only for fire suppression in the park, and special patrol or lookouts which become necessary during periods of extreme hazard.

Department of Recreation and Conservation aircraft: This report cannot urge too strongly the pressing need for an aircraft in this park, and other branches of this Department. Such a machine could probably best operate out of Kamloops. It would be extremely useful in forest fire control as well as other fields of work.

Rough estimates of present and proposed use should indicate adequately the value of such an addition, as based on the use of a Beaver aircraft.

	Present borrowed or purchased use (flying hours)	Estimated Use (flying hours)
Parks fire protection and administration	13 to 120 (50)	50
Parks wildlife program	10	50
Recreation Officer, Kamloops (1)		
Game Branch law enforcement Kamloops (2)		
Game Branch Regional Biologist Kamloops (3)		

Estimated flying times for the Kamloops office were obtained from T.R. Broadland (1), Len Smith (2), and Pat Martin (3), respectively.

There are other functions that an aircraft less easily estimated, but this much flying time alone indicates the value of an aircraft. At an estimated cost of _____ dollars per hour, the present use costs _____ dollars. An aircraft is necessary if we are to work in line with the present era.

SUMMARY

The principal features to maintain in Wells Gray Park are fish and game, and the primitive environment.

Recreational Development: In general, public-use facilities should be spread out and established with the aim of holding the people in the park for visits longer than “overnight” stays. Scattered, informal, and small camp sites should be available to road access, water access, and trail access. Roads should be limited both in quality and extent, and use of trails encouraged.

Intensity of use should be graded from a high at Mahood Lake and the scenic waterfalls, to moderate over the Clearwater, Azure, and Hobson Lakes areas, to a low over Murtle Lake region and, finally, to a very low, with primeval and scientific aspects being primary, in the Angus Horne Lake zone.

Resource Development: Timber cutting can be entertained in the multiple-use park, and silvicultural methods should result in improved game range.

Utilization of mineral resources should be considered on the basis of each case.

Flooding for hydro-power development in the park would be most damaging and must be opposed.

Priority Work Plan: The following should obtain immediate attention, in the order given, as a major part of the park development plan:

1. Moose range improvement. Complete jeep roads and expand moose range rejuvenation program by controlled burning/
2. Plan and develop camping accommodations at Mahood and Clearwater Lakes.
3. Land acquisition. Purchase Lot 3465. Purchase or trade to obtain TL 5406 and TL 5416.
4. Plan Helmcken and Dawson Falls areas. Locate road right-of-way between Clearwater River and Mahood Lake, and also from Clearwater river to Kostal Lake.
5. Lay out and cut trails:
 - (a) between Azure and Hobson Lake
 - (b) upper section of Battle Mt. trail
 - (c) Helmcken Falls to Mahood Lake
 - (d) Ovis Creek

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