

**LAND USE IN WELLS GRAY PARK
WITH
SPECIAL REFERENCE TO WILDLIFE**

R. York Edwards
November 1953

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Wildlife management, like any field concerned with land use, is a theoretical unit for convenience, but in practice is part of the whole land use concept. This does not mean that compromise is always right but rather that its full consideration is always necessary.

INTRODUCTION

We in the Wildlife Section cannot work a miracle of management. What is undone by other development is undone with finality.

Given high priority in our work we are convinced that, while we can produce no miracle, we can accentuate and exhibit a miracle already present.

What we can accomplish depends upon the decision with reasonable finality as to what Wells Gray Park will be, not only in the near future, but in the far future as well,

We only know what we can make it. Our vision is a need to the world, yet the degree of its attainment is fully out of our hands.

We need lands dedicated in some measure to experimenting with the wildlife resource. There will always be game in British Columbia, just as there will always be trees. Perhaps, in both cases, this will be in spite of man. Hundreds of square miles of glaciers and peaks, of deep canyons, fearsome slopes, and high plateaus cold with the breath of winter even in August cannot be reduced entirely to the smoke, rubble, noise and dizzy rush to nowhere that characterizes our civilization. There will always be some wildlife, perhaps abundant wildlife in some remote areas throughout the Province, but is this enough? There will always be trees, but that is not enough. Wildlife, if not managed, will consist of but a few aggressive species. There will be pheasants in the fields and deer in the far hills and squirrels in the trees. There will be trout where we put them and songbirds aplenty and weasels seeking mice through the meadows but this is not enough.

We can have wildlife in abundance and variety. We can preserve and, perhaps lightly harvest the vanishing grizzly bear, mountain caribou, mountain sheep and sharp-tailed grouse. We can have deer, goats, moose and black bears where they would not otherwise be. With management there can be a harvest of food from otherwise idle lands; there can be life to delight the eye for people like watching animals, there can be preservation of forms that will not exist if present trends continue and, perhaps by far the most important, we will not easily lose valuable species from the ecological wheel whose turning shows that our wild lands are alive. Without life in land, there can be no human benefit from it.

We can produce food on wild lands, meat in a world where, as the human populations mushroom alarmingly, even now over half its people have never tasted meat and probably never will. Meat, the harvesting of which will draw men into the hills where they can cease being the machines their modern life demands and learn what it is to be man.

We can have animals to look upon because they have beauty; to think about because their lives are full of drama, romance and meaning in the understanding of life. If these have no value, then our artists, our writers, our craftsmen, are parasites upon our progress and let them go with the grizzly bear.

We must preserve vanishing species. If a man destroyed a Rembrandt, or burned all copies of the music of Bach, or dynamited the simple stones of Stonehenge, his name would be damned through centuries to come, yet let an animal vanish from the earth and it is soon forgotten. An animal is a work of art, started almost when time began and moulded through the eons that followed. It possesses the most mysterious, most valuable thing on earth—life. If history has value, so too have animals, for they have all come through uncounted centuries, shaped by every force that existed on this changing earth. If beauty has value, so to have animals. You know this or you are very poor. If human life has value, so too has wildlife. We cannot make a caribou, or an earthworm, or even simple vive scree—they have gone from each. Who can say that the future of our Arctic does not rest in a new livestock—caribou? Who can say in what form life lays the answer to the riddle of cancer, or polio, or even the common cold? Lowly mice and rats have saved continuous lives, perhaps yours and mine, for they teem in cages in the laboratories of the world. If wild cattle had not roamed the moors of Europe, would our history and present living conditions be the same? To let any form of life vanish forever is a reckless extravagance that a world only beginning to see the first glimmerings of knowledge cannot afford, under any circumstances.

Wildlife management is new, newer even than forest management. Wildlife management, like true forestry, is strong in theories, ideas and paper plans but it needs perfecting grounds and outdoor laboratories. If it is to be of use in augmenting the harvest of our lands, its procedures must be tried before given wide application. Areas like Wells Gray Park can give the knowledge that is needed and produce at the same time whether the product be food, recreation, insurance against an uncertain future, or knowledge alone.

Wells Gray Park can serve admirably as one such wildlife testing ground. It has diversified topography and vegetation and, hence, diversified wildlife. It is fairly accessible to man and its location suggests increased accessibility in the future. It contains many wildlife species considered important throughout British Columbia's southern interior. Wells Gray Park should be a Wildlife Management area from which intensive work will enable ideas, proven methods and sound principles as to the pace of wildlife and lend use to spread throughout the interior of southern British Columbia.

The place that wildlife will play in Wells Gray Park depends upon the priority given to it. In one extreme this park can be wildlife famous if other land uses are suppressed here, modified there, in favour of wildlife. In the other extreme, we can hold a rich wildlife until other land uses have their effect then deal with the few, common, aggressive species that are left.

As is pointed out in sections to follow: highways and grizzly bears cannot mix; marten need mature forests; caribou demand over-mature forests; moose need forest land growing willow, not timber; and many shy species just cannot tolerate too frequent disturbance by man.

We would like to see wildlife given high priority. Our dream is that soon we will have an area wherein wildlife is given top priority; then we can show to the full what it is possible to do for wildlife, for people in parks and for the people of the Province.

THE VALUE OF RESOURCES

Wildlife Management is a form of land use. It yields a crop, whether as meat or as adventure, or as beauty to be looked upon. The intensity with which it can be practiced entirely depends upon the priority given to it over other land use practices upon the same area.

Too often the value of wildlife is not fully realized, and wildlife is regarded as an unimportant yield, produced incidentally to other land products. However, as a wild land crop, wildlife compares favourably in value with forests, minerals and water power, and I use the term "value" in its broad sense, although its monetary value alone can be shown to be high.

In many areas wildlife is a more valuable crop than are the trees therein. Forest managements, and I here refer to forest cropping and not to forest mining, yields annually in pleasure, water control and weather influence, but only at long, economically unsound intervals as a wood producer to the mills. Any reasonable calculation using compound interest will show that growing forests yield surprisingly poor annual returns upon investment. (Reference: T. W Dwight, *Forest Finance*, Lecture Notes, Faculty of Forestry, U. of T.) By contrast, wildlife yields an annual crop in units that mature rapidly, and compound interest calculation, with the time period use comparable to the time required to produce harvestable wood, who properly utilized wildlife to have an impressive monetary value, in many areas far greater than that of the trees themselves.

Mining, in the long view of the importance of the resources of this land, is a resource momentarily productive, but incapable of perpetuity. As a resource it, for it is not renewable. All utilization inescapably eats into capital. It is thus no different from other resources that there is some argument for not calling it a reserve at all.

Water is a product of the land. Its uses are many but in wild lands its management consists of controlling flow and of producing power. The first is accomplished efficiently and most economically through modifying other land use practices. The last, where power in large quantities, serves to process other products of the land, hence, has little value itself. Industrial power has no value unless there are industries based on other natural resources to use it. Industrial power is a service, not a product.

Perhaps our ideas of the relative value of the resources have not been very clear in the past. Good land use seems to require:

- (1) an ethical consideration for the future;
- (2) an impartial evaluation of the relative value of the crops;
- (3) some integration of diverse interests.

These three considerations are not very evident in our past our present attitude towards resource use.

It has been said that every true resource is capital bearing interest, or in other words, every true resource is alive and reproducing. If the use of any resource is to be perpetual then the annual crop from that resource must, in the long run, equal its annual investment or borne interest. How could it be ever be otherwise? It follows that if a forest puts on wood at 8% per annum, then 2% is the gross profit from forest investment. Few resources bear higher interest. But such does not appear to have been the monetary profit from any resources. Capital liquidation in agriculture, whaling, fisheries, forestry and trapping for fur has swelled returns which only appear to be profit. This maltreatment of soil and its products and the products of the sea as well, has given to many people an exaggerated idea of the value of most resources, and the use of water for industrial power, growing as the capital liquidation of other resources grew, is looked upon in the same light, when it would seem that its high value has resulted from a kind of resource banditry in other land use fields.

In this muddle of misconceptions, the value of the wildlife has not fared well in the public mind. This is because wildlife values have been difficult to determine and the wildlife resource is not easily liquefied the grand scale possible in other resource use fields. But figures are now appearing, some of them of startling proportions, which show clearly that wildlife, like other resources feeds the minds and mouths and pocketbooks of men.

In 1947, before 900 delegates at the North American Wildlife Conference in San Antonio, Texas Newton D. Drury (1947) Director of the National Park Service, Washington, D.C. said: "Wildlife business in the postwar America will account to between There and four billion dollars." "If wildlife is to remain big business, it must be managed as big business."

The previous year, Charles E. Gillam (1946) stood before the conference of the same organizations in New York City and declared that Americans will spend \$3,644,000,000. On recreation in the postwar year: that sports equipment is a \$122,000,000 industry of which 50% is spent on firearms, ammunition and fishing tackle: that golf is the only near rival to the category – a mere 26 millions and that guns and ammunition alone account for 59% of the national sports equipment bill.

A. H. Carhart (1951) writing in *American Forests*, states that wildlife in the U. S. National forests has an annual commerce creating value of 45 million dollars, as compared to 51 Million for the 1950 stumpage value of timber harvested from the same area. He states further that the forage requirements of three deer are comparable to those of 5 sheep or a two and one-half year, 1000-pound steer. With sheep worth \$50 per head, each deer worth \$125, and the steer worth \$50 a hundredweight, three deer, five sheep and one steer are worth \$375, \$125, and \$500, respectively. From these figures, clear utilizing wild land are more valuable than sheep or cattle.

In 1949 Hunter and Yeager of Colorado wrote a paper in big game management in their states. They note that for Colorado's 100,000 square miles there are 24 trained biologists working on big game alone. Ten percent of the state population hunts big game and each spends \$45.70 annually. They state: "Any resource worth one-sixth of a Billion Dollars in a single state is worthy of the highest form of husbandry, if for no other reason than the money value involved."

In 1949, the writer undertook a study of the value of fur from these registered trap lines within 16 miles of Fort Nelson, B.C. Fur values were made comparable to returns from management-grown forests by using a compound interest calculation for a conservative 100-year, normal forest rotation period. Using the modest interest rate of 5% the fur on this small area is worth nearly 8 1/2 Million Dollars. This calculation is probably far too conservative. Under more probable rotation period for this latitude and the industrially obtainable 5%, the figure becomes a startling \$35,012,780.00.

The wildlife has a high value despite its underestimation in the past and it can return higher interest than some resources thought to be good fields for investment.

LAND USE IN WELLS GRAY PARK

Land use in Wells Gray Park can be divided for convenience into two categories. First, the park is a part of a greater unit – the Province – and what is done in the park will influence the whole. Secondly, the park may be regarded as a unit itself.

I. LAND USE AND THE PROVINCE

There are here three major considerations. These are: (1) recreating, (2) water and (3) serving as an experimental area and, eventually, an example, to similar areas throughout the Province.

1. As to recreation little need to be said here. The place of parks in providing recreation for the Province and its visitors is well understood in principle.

2. Water is abundant in British Columbia, yet there are large areas in this Province nearly desert from the lack of it. Any lowering of the water table in the grasslands of our dry interior would further reduce the low productivity of these lands. What little water these receive in the summer comes to them largely from the snows of the surrounding mountains. It must never be forgotten that the highlands about our dry valleys, are primary factors in providing what little moisture the dry areas receive. Mountains of bare rock are not good conservers of water. Wells Gray Park and similar areas in B.C. are the birthplaces of our rivers. Rivers influence our water tables and, homes, our agriculture. Wise water conservation through sound forest management in the highlands can be a major contribution to agricultural productivity and flood control in areas far away.

Irrigation can supplement a water table, but it is folly to regard irrigation as a substitute for a damaged water table. Irrigation can be contrary to the principles of good soil husbandry. It is upon our hills and not upon our pipe factories that our dry valley agriculture depends, for the soil was built under one system but is frequently ruined under the other.

3. It has been stated that Wells Gray Park can serve the rest of the Province as an example of the wise valid 2nd use. This does not mean that 2nd use is necessarily 2nd development. The best use for many wild lands can quite easily be to leave them as they are. Land use in the park is treatment of the area as a self-centered unit, the consideration in the remainder of this report.

II. LAND USE IN THE PARK

It is most unwise for one person to dictate the land use policy for a large area. All individuals have their biased opinions, neutralized only through reconciling these with others. The following is provided as a framework for future thoughts.

Land use in the park lies potentially in the fields of water power, forestry, wilderness reserve, grassland agronomy, recreation its many forms, mining, wildlife and perhaps, a restricted agriculture. Grassland agronomy and agriculture are no considered here, the present park policy to reduce alienated lands within the parks tends to exclude agriculture and, since there is no grazing in our parks (with no exception), is well to continue this practice as far as possible.

The six remaining resources require priority examination. This is not an easy task. These resources are inter-related. One, recreation, is composed largely of parts of the rest and, another, wilderness values, depend upon the degree of development in the others. Since recreation must be in high priority in a park and wildlife is an integral part of such recreation and forests are essential to both in this area, these must be our main concern. The place of wilderness, which affects the degree of artificiality in these three, must be considered. Mining and waterpower are in low priority in any park concept and the place they have in each case of development must be examined in the light of the reduced value inevitably inflicted upon other resources.

1. Zonation:

In Wells Gray Park it is here suggested that land use intensity and priority should be governed by three zones which are carefully chosen, well-defined and rigidly adhered to. These zones should consist of one most developed or "improved", a second but slightly so and a third very close to absolute wilderness. As a suggestion these areas could be as follows:

1. Most development about Mahood Lake, Southern Clearwater Lake, along the Clearwater River and in the vicinity of Hemp Creek or, south and west if a line drawn from Crestel Lake (outside the park) east to Ray Mountain, then south through Kilpil Mountain to the Murtle River, then south (excluding Battle Mountain if in the park) to the Park boundary.

2. Some development in other areas south of Azure Lake and Azure River, but no major developments, leaving Murtle Lake a visited but secluded Lake.

3. The park north of Azure Lake and Azure River should remain as near wilderness, with Hobson a wilderness lake and acting as a wilderness highway into the area. Here, by wilderness, is meant, no forest cutting, no motor travel, but barest minimum of maintained trails, no buildings other than trapper and B.C Forest Service cabins, but with trapping, hunting and fishing allowed though, if necessary, controlled or restricted and recreational walking, riding or boating allowed up to volumes of traffic endangering the wilderness values of the area. With in these areas priority 2nd use should be as follows:

Area 1: Here general recreation has top priority. Wildlife and forestry have equal weight as second place. Wilderness values are next and of little importance since subordinated by the other 2nd uses. Mining and waterpower are last but any proposal should be evaluated.

Area 2: Here wildlife has top priority, recreation second, wilderness values third, forestry fourth, and mining and water power as above. In this area wilderness has a much stronger position than in Area1 because the two uses with priority over it need not seriously impair wilderness values.

Area 3: here wilderness has the highest priority. Wildlife and recreation have an equal footing in second place, since they will here be quite similar in practice. All others have equal powers below these three. Here it must be remembered that the proposal is to make wilderness nearly absolute so that first place is an extremely strong first with more weight than first place in the other areas.

The reasoning behind the above priority ratings are as follows:

The park is primarily dedicated to recreation. This is given top priority in accessible Area 1 where roads, concessions, etc. can be located because of a flat terrain. These flats have been recently burned with the result that forest management is here a problem of growing trees to the benefit of recreation. Wildlife species here are mainly moose, deer and black bear, aggressive species that will not be adversely affected by recreational use. Wildlife and forestry are, together, in second place because maintenance of wildlife requires some modification of forest management. The two can operate here, together, with only some modifications of minimum effort in each case.

In Area 2, wildlife is in first place because several shy, rare species occur there that could not do so under unmodified recreation as or forestry use. Wildlife must have priority here to ensure continuation of its present high value, but wildlife work will not be intensive and should not severely restrict a trail type of recreation. Most of this area is too high to provide good forest sites although virgin stands occur. These stands are needed for wildlife, particularly caribou.

From the proposal to meet the demands of wildlife, these demands are such that wilderness values fall, with no effort in placing them, into second place.

Area 3 is rugged terrain largely unsuited for forestry. Intensive wildlife management, under present conditions, would be difficult and unnecessary. Here, wilderness values are given first place, to provide wilderness recreation and wilderness wildlife use, both of which must be subordinate to wilderness itself, for this is the main issue, with the desired recreation and wildlife use following naturally.

It seems automatic that order must be put into park planning and in large units of recreational land, _____ation on a broad scale can be the first step towards achieving order.

2. **Forest Policy:**

The forest is basic to all other considerations in the park. Its proper management is essential to the park's success.

There can be no serious objections to some cutting in some of these forests, provided that those lands uses having priority over forest cutting are fully considered. It is impossible to get minimum use from forested lands dedicated, after intelligent consideration, to recreation if forest policy is directed towards best industrial use rather than recreational use.

Forest protection is essential to the interest of recreation including wildlife, although controlled burning can be an asset to both. Uncontrolled fires are the major enemy of Wells Gray Park and its protection facilities require improvement. However, just as forest cutting should be modified in the interest of recreation, so, too, should forest protection. If, in our goal, `to preserve the peace, quiet and solemn majesty of the forest`, we convert our forests into networks of jeep roads over which clank roaring jeeps and any other car whose owner can beg permission, we defeat our own purpose. Forest protection in parks should not necessarily follow blindly, willy-nilly, into the ways of protection given other forest lands.

Too often the desire to counteract fire unleashes a frenzied program of road building that, if continued, would allow a car to top-out on every major mountain. When it is possible to climb a mountain on a soft cushion, that mountain has most definitely lost something that is the very essence of the value of the park.

The measure of good park planning in all its phases is often not what is done, but what is found unnecessary to do.

In managing park forests and creating park improvements, it is not always realized that by so improving in one direction, another value is proportionally reduced. Oddly, this loss is often in the main value which first inspired the formation of the park.

In fire protection in parks, it is firmly believed that there is room for a critical re-examination of accepted methods. The caterpillar tractor is a case in point. Its value in this connection when properly used cannot be disputed, but too often it is regarded as capital investment to be used continually at all costs. The result is that it is often used for jobs which, in parks, should never see machinery.

There is good argument for looking again at the value of heavy tractors in park forests. To the modern addict to the tangibles it is a pretty thing to watch because of the tangibles it powerfully and quickly creates. It is not too much to say that there is also something of the awe and wonder in his eyes akin to that in a child's watching a steam-roller. Its use is said to be cheap. Maybe it is, but I doubt if such calculations have been taken account of:

1. The increased fire hazard in a forest because of a wide, smooth road through it.
2. The increased hazard created by the tractor itself in the tangle of vegetation, stones and earth thrown to either side of the road.
3. The cost of cleaning up such tangles.
4. Wood production for cropping is but one forest use. Parks are the result of recognizing other forest values. What is the loss to these resulting from wide, muddy road through forests.

It is suggested that fire protection on parks should consist of more horse patrol and the use of horses to get the equipment and men to fires. Horse patrols can fit nicely with caring for people in parks.

It is also suggested that it is economically and esthetically unsound to ignore the possibility of using large lakes as routes to transport men and equipment, especially in areas where lakes so nicely zone an area, as in Wells Gray Park.

3. Recreational Developments:

The following general treatment of developments in Wells Gray Park follows from the proposal to zone the park.

It has been suggested the aim of development should not be to provide impressive structures alone but rather such development is a necessary undesirable, necessary to lure people into the a park that is theirs and to enable them to enjoy the park with only the necessary minimum of civilization and its fixtures. The aim of parks should not only be to meet public desires in furthering recreational areas, but also to entice a timid public, step by step, away from one way of life towards another, although a gradient from civilization towards wilderness which gradient may exist in one park, or through a series of dissimilar parks. The man who wants in a park solitude freedom fern the throb of engines and the necessity to have a clock, and who is incensed when he sees more than a few people during his holiday in the park, is the man getting the most out of a park. The more such people who can learn that radios, wheeled vehicles and slick can-openers are not essential to life and that relief from them is a strengthening, inspiring, restful experience, the less parks will have to consist of developed areas.

The parks is there in all its natural beauty and needs no gilding, but roads, building and a host of other things are needed to attract many people away from their everyday life, if only for a short distance. ``Roughing it` is a relative term. I know some people think a tent and bread are unnecessary outdoor luxuries while others talk of an outdoor holiday in the wilds, where they order T-bone steak in a thrilling atmosphere of expensive rustic furniture. These are the extremes. I suppose parks should cater to all. But if parks are something different and are the antidote to our civilized scramble, the more people lured away for T-bone standards towards boiled rice in a sooty pot, the more parks are fulfilling their purpose and the less they are just giving everyday life under a thin disguise.

(a) Evaluation of Potential

It has been stated that investigation before development in any park should consist of:

- (1) Evaluation of condition or potential of area, and
- (2) needs of people.

Regarding the first of these, often from necessity, personal opinion must be the basis of all proposals and resulting actions. However, in Wells Gray Park, it is hoped that effort will be directed towards obtaining a somewhat firmer basis for thinking. Surely, in all the parks of this Continent, there are spectacular successes as well as failures in recreational 2nd use, the observing of which will take some of the guesswork out of development.

In the last analysis we must decide whether our task is to throw wild areas open to the public, which is easily done, or is it rather to accomplish the much more difficult task of successfully combining people and wild land. Surely the latter is our aim, for the former is like fishing in Ontario, for fishing there, like wild land here, will continue to march steadily further away from the populace centres. There are lessons to be learned from Alp lands that have already been heavily used, lakes heavily fished, areas long camped in and trails long trodden in other parks and recreational areas. The more we can supplement guesses with probabilities and facts, the surer is our success.

(b) Roads

The place of roads for automobiles in Wells Gray Park seems to be limited. The completion of the roads to Clearwater Lake throws open a large area made accessible to Clearwater, Azure and Hobson Lakes. These lakes themselves appear to render unnecessary any further road development in their vicinity.

It is to be hoped a road never encroaches upon the solitude of Murtle Lake. Here, a beautiful lake with surroundings rich in old forests and retiring, spectacular wildlife species requiring a measure of solitude, is reached by easy walking or riding (on horses) and the distance to it by much travel is just sufficient to ensure about the proper degree of human use.

Access to Murtle Lake from Blue River by road would be a regrettable development. It would doom the wild tranquillity, perhaps the ancient forest, probably the caribou and, certainly the grizzly bears for which this area is famed. Administrative difficulties are to be considered. There is an administrative, economically optimum numbers of ways of easy access to a large park and there is a danger in Wells Gray Park from the potential number of such entrances that could result.

A through, major highway anywhere in the park is a regrettable situation. Wells Gray Park's rugged terrain from such an inglorious fate. Perhaps I am biased, but after seeing the results of Manning Park's highway, where heavy trucks thunder through the night and cars flash by enjoying the nature at 60 miles per hour, the thought of a similar situation in Wells Gray Park is most disturbing. Manning Park is now, in reality, two parks separated by the highway and its influence area. The wildlife of Wells Gray Park, and I am convinced that wildlife is this park's greatest asset, could not withstand such a drastic encroachment without entirely losing its two most valuable elements, grizzly bears and caribou.

(c) Concessions

When the need arises, concessions will undoubtedly be a part of the park. If a zoning plan is adopted, concessions should be confined to the one zone of heaviest use and so situated that the sphere of greatest influence is confined to that zone.

It is re-emphasised here that a concession of any kind on or near Murtle Lake would drastically reduce the high wildlife value of the park.

Many people using the park will use the services of guides and be provided with accommodation by these local people. At present there is probably room for a concession providing rooms and meals by Clearwater Lake. It is suggested that since local people on the edge of the park will undoubtedly provide economical, plain accommodations, that the services of the concession in the park could well aim at superior, but not luxurious, service.

Local guides can provide horses for pack trips, so there seems little need for similar services within the park at this early date.

Boats should be available on Clearwater Lake, in numbers complying closely to recommendations concerning desired pressure on available fish.

As to the type of building and service provided, it is here suggested that something of the atmosphere provided by Yellow Point Lodge, Near Nanaimo, would be ideal, though the prices of that place may be high.

(d) Trails

Main trails should provide easy access to all parts of the park and other trails should scale the heights into the major Alp Lands. Trails should be the basis of fire protection and recreational development throughout the park.

An excellent trail should exist between the Ranger Station and Murtle Lake. The present one is in poor condition, although justifiably so from the little use in the past.

An excellent trail with good bridges should allow quick access to the area west of the Clearwater River connecting with either end of the Clearwater Lake Road within the park.

An excellent trail (or possibly a road, if other values are not depreciated too much) should connect the Clearwater Road with Mahood Lake.

Good trails should connect Clearwater Lake with Murtle Lake, overland, with branches to Kostal and McDougall Lakes, and radiate from the shore of all five large lakes, which could all have superior facilities on them to transport fire protection, men and equipment. All of these trails should be laid, not just as is economically sound to lay trails between two points, but as is necessary to give maximum protection to the forest.

There should be a good, wide, smooth trail between Azure and Hobson Lakes along the river between the two with the aim of having any equipment transportable upon Clearwater and Azure Lakes available to the country about Hobson Lake. It may be, however, that the terrain is too rough to enable construction of such a trail. I am not an engineer. I am schooled only in the theories of fire protection. As a result, while I could be very wrong, the topographic features of this area appear to offer ideal conditions for ingenuity and imagination in perfecting an efficient fire protection system, perhaps involving heavy equipment, using the lake-highways already existing; 50 miles of navigable waters in Clearwater, Azure and Hobson Lakes.

Here is ample opportunity to make an original contribution to park planning, through thought and, perhaps, a healthy re-evaluation of the convention, in protecting park areas from fire, yet maintaining park values unimpaired. Trails and waterways could so combine in Wells Gray Park.

(e) Cabins

Small forestry cabins could be scattered throughout the park to assist in patrol, for the use of survey parties and for bases in various studies. These need be neither large nor costly.

(f) Aircraft

The present restrictions are timely and adequate. An increase in air traffic will probably take place in the next year. Reports in a Kamloops paper this summer tell of a "reconnaissance man" for a large widely-read American sporting magazine being so enthusiastic about fishing in Clearwater Lake, that he declared it was the best he has seen, that he had fished almost everywhere and, therefore, it was, "the best fishing in North America." This man sent a five-page telegram to a friend and that friend flew to Clearwater Lake the same week from Texas. There will undoubtedly be an over-enthusiastic outburst in the magazine in question, and there could easily be an increase in aerial visits to the lake which should be watched with care.

4. **Wildlife**

(a) Wildlife Personnel

Permanent: A biologist should be stationed permanently within the park. Results from his work will not only benefit Wells Gray Park, but be a contribution to good land use in other parks and on wild lands throughout the Province.

This type of man required is unique. He must be content to live in secluded areas, he must be a good woodsman capable of travelling in wild, rugged country under all weather conditions, or failing this, one quick to learn this art, he must have a capacity to conduct research with a minimum of aid and he must have an attitude in harmony with wildlife management and not just with game management. We can find many men willing to travel and hunt while on payroll but these qualities must be combined with an appreciation of the elements of research and the uses and values of the animals as animals, not just as meat alone.

Temporary: There will be need for temporary assistants to the biologists. Many wildlife jobs just cannot be done alone. Experience elsewhere has shown students to be, in the long run, the cheapest and most reliable assistants. These students chosen for summer work can be valuable or just company for the biologist, depending on their attitude, experience and education, in that order of importance.

Much wildlife work cannot be done in the summer. It would be of interest to investigate uses of good men between fire seasons, in assisting in wildlife and other park work. Consensus, game bag checks, enforcement of hunting regulations and other such tasks are the basis of management yet these cannot be done outside of the university year except under special circumstances.

Student Research: Other wildlife programs have found that often their best information comes from graduate university students studying for advance degrees and doing thesis research on wildlife problems. It has been found that modest help to such area brings results out of all proportion to other expenditure.

I would recommend serious consideration of co-operation with U.B.C. in aiding students to do wildlife work in Wells Gray Park or any other park wherein we want information, provided that such work fits well with the park's wildlife programme, that we can give direction and assistance (if only with experience and ideas) in the field and that we are provided with reports and results as desired.

(b) Wildlife Cabins

A biologist in the park must have a place to live near the present Ranger Station. It should be decided if such a building will be provided or if it is up to the biologist to so provide. The former is recommended, i.e. situated barley within the park, a cabin of several rooms for a married man.

Further, if intensive wildlife work is to be done in the park, for financial reasons and convenience, it would be expedient to build a cabin in a central location to be used as a base of operations. Accommodation in the south of the park is already economically available. It is recommended that a cabin of moderate size, capable of proving space for laboratory work and writing, be built by Clearwater Lake, at or near the mouth of Archer Creek. This cabin will be centrally located for fisheries research and research involving mountain goats, grizzly bears, fur-bearers and, to a lesser extent, moose and caribou. Intensive moose and deer work will centre about the Ranger station.

Working on caribou and some other forms involves winter work about Murtle Lake and it is recommended that present cabin facilities in this area be explored and that at a future date a third wildlife cabin situated in this area would result in three strategically located bases from which to cover all but the extreme north and northeastern parts of the park.

These cabins might be rented to guides when not in use by park personnel.

(c) Wildlife Research and Management

Guides and Trappers: The present conditions of both guiding and trapping in Wells Gray Park should be allowed to remain as they are for several years while present conditions are thoroughly assessed, while possible future changes are thoroughly evaluated and until usable map becomes available.

In the meantime, our work will be furthered by establishing ways and means of keeping guides and trappers informed as a group of what we are doing, how we are helping them and how they can help us. There will be similar exploration into methods of promoting harmony in these groups, possibly through an annual meeting, at which grievance and adjustments can be made. Good wildlife management is, to a large degree, good public relations and the degree of goodwill and co-operation from these men can determine the extent of our success.

Wildlife Itself:

The following section outlines the work in progression on, and recommendations and management now envisioned for, the more important wildlife species.

Moose

Moose constitute the main source of hunting in the park. The vast burn there is entirely the cause of the high moose population in the southern part of the park. The perpetuation of moose in this area depends upon perpetuating to some degree the large areas of willow now found at low elevations. More moose management is largely willow management, purely and simply.

The work to date has consisted of the following:

1. Determining the extent of winter range
2. Assessing its condition in a very general way.
3. Assessing moose distribution in the from pellet group counts
4. Obtaining an idea of numbers from spring ground census
5. Recording the kill in the fall.

This work has been informative but a much more intensive approach has been initiated and should expand next year. This, we hope, will consist of the following:

1. Annual spring ground census as taken in 1950, in which better information will be gathered in the sex, age and condition of moose.
2. An annual aerial census of the same area at about the same time as the ground census (Requirements, two flights if conditions are good, more if necessary.)
3. The establishment of four range study areas in the Hemp Creek moose range, each a square mile in area. These are to be located at (1) the junction of the Clearwater River and Hemp Creek, (2) near the Ranger Station on Green Mountain, (3) on the Blackwater near Najerus Falls, and (4) in the Deer Creek area.

On these areas we will determine – doing an adequate sample:

(a) number of moose using each square mile.

Method: pellet group count.

(b) degree of use given to the range.

Method: twig measurements on bushes measured and tagged in the fall. These four plots will be the basis for further work concerning the balance between range and moose numbers.

4. Willow plots will be established in which we will try to get basic information on willows. We want to know – will find out in these areas ---
 - i. What part of a willow bush is moose feed.
 - ii. How does browsing stimulate new growth.
 - iii. What are the details of forest succession in areas grown to willow. All data from these studies will be M_____ and, we hope, indisputable acceptable as accurate, carefully gathered data new to science.
5. An animal bag check is a necessity and provision for its taking will be established.
6. Mr. R. Hitcey hopes to study moose in Wels Grey as material for a thesis, paying particular attention to winter range, moose distribution there, range there and the factors (such as snow depths) affecting this distribution and use. It is a study basic to our needs and I recommend our fallout co-operation.

Moose work will be a major part of our of the wildlife program in Wells for many years. There is abundant opportunity to make major contributions to the understanding of a noble animal as yet poorly understood.

Future hunting regulations will depend upon the herd condition as revealed by the above studies.

Mule Deer

Work on deer will follow that as outlined under moose and can be carried out in conjunction with the moose studies with little additional effort.

Caribou

Holding caribou in this area seems to depend on whether we can hold the over mature cedar forest about Murtle Lake.

Caribou are going or gone throughout North America. In Wells Gray we have a wonderful opportunity of solving what has proved a baffling mystery in every place where there is concern over the decline of this animal.

The most important field of work must be done in winter for winter food shortages are probably the cause of decline.

Over mature, lowland Columbia forest, rich in Old Man's Beard lichen (*Usnea* sp.) seems to be necessary to successfully winter those caribou. Large areas of such forest have been burned in the past 30 years and, preliminary to any further work, the fire history of Wells Gray Park will be assembled from Forest Protection files and aerial photographs. This should be done this winter.

Lack of an accurate map has hindered our work.

Grizzly Bear

At present we know almost nothing about grizzly bears in Wells Gray Park. It is suggested that there be special efforts to count and study them for a few weeks each spring when they are concentrated on high slides and that all other data be recorded as incidentally available.

There is good argument for closing grizzly bears in Wells Gray Park but since the annual kill is small, it is safe to delay such action for a year awaiting more information. In the meantime, Forest Service personnel, especially look-out men, must be requested not to shoot these scarce animals.

Black Bear

Black bears are plentiful in the park and, at present, are given no protection. Future policy must protect these animals within the park at all times except during open season for deer and moose, with one animal only allowed per person.

Mountain Goats

Work should continue to gather data on the location of herds, which have local distribution, preparatory to future light, controlled cropping. Here again, lack of a good map has hampered our work.

Wolverine

Wolverine should be protected within the park, with no exceptions. Those accidentally trapped should become park property with no remuneration to the trapper.

Otter

Recommendations for otter are exactly as for wolverines.

Beaver

Work should continue to locate and map active colonies. This work is delayed by the poor maps available.

Marten

These animals demand mature forest. Fires and logging doom marten. They are still plentiful in some areas and our work with them for another year should be limited to attempts to trap and tag them.

Weasels

Our main interest in these species lies in trapping and tagging for the present, at least.

Mink

Our present interest is the same as weasels.

Fisher

This species should be watched carefully. It is a most valuable species and is nearly exterminated everywhere in Canada but in British Columbia and a few preserves in Ontario. Its loss to B.C. could only be the result of negligence. The species is still fairly numerous in Wells Gray Park.

Predators

Wolves, coyotes and, sometimes, cougar, occur in the park. I cannot recommend too strongly that our desire and, if possible, our practise, should be to look with strong disfavour upon the killing of these animals for bounty in the park. The bounty system has proven a dismal, expensive failure everywhere in North America and it has no place in a sound management programme. However, enforcement might be difficult and opposition from people living near the park will be strong, for bounties are large and swell their annual income. As is the case for Game Wardens, no park personnel should be eligible to collect bounties.

Fisheries

Present fishing pressures are light relative to the well stocked waters, but the fishing trend must be watched closely and, inevitably, the service of a fisheries biologist will soon be needed to investigate some lakes in the park.

III. SUMMARY

This report has taken the broad view of wildlife management and is, therefore, largely devoid of details, rather, principles are examined.

The essence of the report is given below.

1. It is pointed out that the success of wildlife management depends largely upon other land uses.
2. It is hoped that there will someday be an area in B.C. wherein is given high to top land use priority.
3. The value of wildlife is popularity underestimated. Other land uses probably do not actually yield greater returns upon investment.
4. Good land use in Wells Gray Park will benefit the Province as recreation, regulating water flows and serving a good example to other similar areas.
5. Resource priority land use in the past is discussed and a general priority order is suggested.
6. It is recommended that Wells Gray Park be zoned into three areas with different land use priorities.
7. Forest utilization, producing wood, is recommended with reservation.

8. Fire protection is declared essential to all users, but it is suggested that its methods require thought, and, perhaps revision.
9. Before developing for recreation, it is recommended there be more thorough pre-evaluation of present conditions and changes that will result.
10. The place of roads and concessions are discussed and it is hoped these will be restricted more or less as outlined.
11. Trails are too few in the park and a new system of trails is recommended, based primarily upon the needs of fire protection. Some general locations are noted.
12. Forestry shelter cabins should be more numerous.
13. Aircraft traffic will probably increase and must be watched closely.
14. A permanent resident biologist is needed in the park.
15. A carefully chosen student should aid him each summer.
16. There should be examination of ways to provide other aid, if only at critical periods, in fall, winter and spring.
17. It is recommended that graduate students gathering thesis material can be the source of our best and cheapest information.
18. Two wildlife cabins and an eventual third cabin are recommended.
19. The greatest need of forest protection, park planning and wild life management and research is a good map.
20. No changes for several years are recommended in the present status of guides and trappers.
21. Moose depend on willow. Studies on moose and willow are outlined and recommendations made. This study will be intensive.
22. Office work this winter will lay the basis of a caribou study. This study is subordinate to moose.

23. After gathering further data, it might be found that grizzly bears should be closed in the park. In the meantime, Forest Service personnel should not take grizzly bears in the course of their work.
24. There should be a black bear season in the park coinciding with that for deer. One animal per person should be the limit.
25. Work on goats will consist of locating and counting herds whenever possible, as a low priority study.
26. Wolverine and otter should neither be shot, trapped nor taken in any other way in the park.
27. The work of locating and mapping beaver colonies should continue on an incidental study.
28. Martin, mink and weasels will be live-trapped and tagged as individual studies.
29. Fishers must be watched closely and closed, if necessary.
30. If possible, no bounties should be paid on wolves, coyotes or cougars within the park.
31. No park personnel should be allowed to collect bounties.
32. The services of a fisheries biologist will be needed in a few years.