February 17, 1958.

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To:

Mr. H.G. McWilliams,
Director,
Provincial Parks Branch,
Department of Recreation and Conservation,
Victoria, B.C.

Dear Sir:

The attached report entitled "PREDATORS IN WELLS GRAY PARK 1950 - 1956" is submitted, herewith, for your approval.

Yours very truly,

R.Y. Edwards.

R.Y. Edwards,
Biologist.

APPROVED in accordance with attached addenda.

H.G. McWilliams

H.G. McWilliams,
Director,
Provincial Parks Branch.

Date: 18/4/58

ADDENDA

An interesting report and a good basis for further research. In the meantime I concur with the recommendation on Page 20 until more information is available to substantiate or refute this policy.

Ford

ADDENDA

PREDATORS IN WELLS GRAY PARK 1950 - 1956

by

R.W. Ritcey

1958

Wildlife Section Report No. 60

Project W.G. 9

Department of Recreation & Conservation,
Provincial Parks Branch,
H.G. McWilliams, Director.

Victoria, B.C., 1958.

TABLE OF CONTENTS

PREDATORS IN WELLS GRAY PARK 1950-1956

I. INTRODUCTION

This report summarizes data collected on predators in Wells Gray Park in the years 1950-1956. Where data exists in previous reports these are referred to by report number to economize on words. Some repetition is necessary in the interest of continuity.

Information has accumulated through the efforts of park personnel, local residents, the writer, and his various assistants. I have attempted to record all data received but have used in this report only that which appeared reliable. Some observations were questionable at best.

Additional data is being received at the time of writing and there is no guarantee that conclusions drawn from the past will be valid in future. Both summer and winter field work must be intensified before a full understanding of the effects of predation can be obtained.

II. TIMBER WOLF

The timber wolf is the most important predator on the game animals of the park. It alone of the predators is capable of killing any of the adult hoofed game through the year. It also appears to be the only commonly occurring park predator which needs large game in order to survive the winter.

(a) Numbers

A wolf census of an area is complicated by the animal's wide ranging habits. Estimates of wolf numbers (Table I) have been made for the area bounded on the north by Azure Lake, on the east by the height of land constituting the park boundary, on the south by Grouse creek, and on the west by the Clearwater River to Mahood Lake and north along the mountains forming the western park boundary. These boundaries offer no substantial barrier to wolf movement. However, the wolves under study appear to spend most of their time within the region described. Ingress from other areas is believed small.

TABLE I. NUMBERS OF WOLVES IN SOUTH-CENTRAL WELLS GRAY PARK 1949-1956.

Year	Known Minimum	Estimated Number	Recorded Kill
1949	16	30	16
1950	4	14	4
1951	7	14	4
1952	12	12	
1953	10	12	3
1954	9	12	3
1955	13	13	1
1956	7	13	-

The above figures for estimated numbers are probably accurate within 25 per cent. They are arrived at chiefly from observation of winter tracks. In the early years, they are derived from the kill and estimates of wolf abundance made by local people.

These estimates may be too low for travel conditions make

it impossible for a small number of workers to cover an adequate sample of the range simultaneously. It is possible that wolves may occasionally invade the study area from the north and not be recorded. However, the data at hand suggests that if such movement occurs it rarely reaches the Murtle River area which is the main source of wolf information.

It is noted that there has been a decrease in wolf numbers since the late 1940's. A total of 34 were killed in and near the southern part of the park in 1949. Of these, at least 14 were believed to range the same territory as the present 13. The heavy kill decimated the population which has not since returned to its former abundance. Since 1952, the first year for which extensive data is available, wolf numbers have shown remarkable stability.

(b) Productivity

The following data on production of young are minimum figures. Years in which no pups are recorded were not necessarily pupless.

TABLE II. KNOWN DATA ON WOLF PRODUCTIVITY WELLS GRAY PARK 1950-1955

1950	no known surviving pups.
1951	3 adults seen, no known surviving pups, one female killed with 5 foetal pups (F. Ludtke)
1952	at least 3 pups produced
1953	at least 3 pups produced, two of which were killed,
1954	no known pups
1955	at least two pups, one female killed in May was not pregnant.

(c) Mortality

Human predation is the only mortality agent known to seriously affect the park wolves. Table I gives the recorded kill of wolves within the park in the years 1949 to 1956. Outside the park the Game Department maintains an active predator control campaign. Poison baits (1080) are dropped on lakes and rivers which are suspected or known to be wolf routes.

The following information from C.A. West, Supervisor, Predator Control, B.C. Game Department in a letter to R.Y. Edwards dated June 26, 1956 indicates the scope of poisoning operations near the park borders:

(i) Lower Clearwater Valley, 4 - 1080 baits (2-1954, 2-1955)
(ii) Raft River Valley, 3 - 1080 baits (3-1954, 0-1955)
(iii) Thompson Valley from Wire Cache to Pyramid, no baits
(iv) Vicinity Canim Lake, 8 - 1080 baits (all in 1954)
(v) Vicinity Crooked Lake, 3 - 1080 baits (all in 1954)
(vi) Vicinity East Arm Quesnel Lake, 3 - 1080 baits (0-1954, 3-1955)
(vii) Mad River, 3 - 1080 baits (1-1954, 2-1955)

Unfortunately few carcasses are found as there is little or no checking on baits after they are dropped. Mr. West believes the program to have a great effect on the park wolves: "The wolves in Wells Gray Park are in a very vulnerable position as they appear to have very well defined roads of egress from the park and as these are on range or farm areas they are complained of at once and baits are placed to intercept the wolves."

The presence of an apparently stable wolf population in the southern park would indicate that the poison program has been less effective than believed. The "very well defined roads of egress" are probably used only occasionally and baits placed at these points are not necessarily taken by wolves.

(d) Distribution and Movements.

Through early summer wolf sign is seldom encountered. They seem relatively sedentary through May and June possibly being occupied with the raising of young. No denning site has yet been found but suspected locations are McLeod Hill and the area south of French meadows.

As summer progresses, tracks of wolves are encountered in widely scattered areas. Wolf sign has been observed in most areas visited on summer reconnaissance with no special habitat preference being noted.

Murtle Lake is often visited by wolves and they are frequently heard or seen there by the Miller family in July, August, and September. These wolves appear to range south and west through the Murtle River Valley to the headwaters of Blackwater Creek and to the area south of Clearwater Lake. They also travel to Indian Valley, South Plateau, and McDougal Lake for their sign or voice has been noted in each of these places during summer.

A second group appears to summer west of Clearwater Lake but their wanderings are not so well known.

When autumn snows force moose from higher elevations, wolves invade early winter moose range. Here they remain for most of the winter. Occasional wandering to higher or lower elevations may occur but the center of activity is north of highest winter moose concentrations (Fig. 1). This pattern of distribution is valid for winters commencing in the fall of 1952 through 1955. Apparently wolves habitually invaded lower areas where deer were abundant in previous years.

Daily movement in winter is largely dependent upon snow conditions. With properly crusted or packed snow, 12 - 15 miles may be covered in a day. Three observed examples are Stillwater to Pyramid, south end of Clearwater Lake to east of French Meadows, and a route from Murtle River near Pyramid, north to French Meadows and foot of Kilpil east along Gage Hill.

It is difficult to conceive of a circular route being followed by wolves in winter in times of unsettled snow. River ice is usually followed where possible and the route is usually best described as a back and forth trail with side routes to kills or hunting areas. Game trails are followed for hunting as well as for best routes of getting from one place to another.

The circuit described by Martin (2) does not exist at present and probably in the past was only partly completed by wolves, the other part being supplied by local imagination.

In late winter and early spring, wolves range widely and little pattern has been found in their movements. This is partly because tracking conditions are often very difficult. The sun may permanently erase sign in a couple of hours or wolves may travel on a hard crust leaving no sign of their passing.

All data at hand suggests that wolf distribution in winter tends to be governed by moose distribution in deep snow areas and possibly secondarily be deer distribution. Our limited data from the caribou range suggests that wolves seldom invade the caribou inhabited areas in winter. Further study may invalidate these findings as most winter reconnaissance to date has been on moose range; more time spent on deer and caribou ranges may reveal more wolf activity there than suspected at present.

(e) Food Habits.

Food habit studies of carnivores usually take one or more of the following forms: analysis of droppings, analysis of stomach contents, direct observation of the animals feeding, or observation of sign.

The scat analysis has limited value but can usually tell us the species which supply the predator with its chief foods through the year. There are numerous biases due to differences in permanency of various remains in droppings. A scat composed of undigested berries may persist for only a few weeks where one made up of hair and bone may last for months or even years. More-

over it is difficult if not impossible to separate the role of scavenger and predator by scat analysis. The chief advantage of the method is that a large amount of data can be obtained with comparatively little effort.

Stomach analyses have the advantage of working with less digested and more readily identifiable material. This advantage is outweighed by the difficulty in obtaining large numbers of stomachs for analysis. It also has the obvious effect of decimating the studied population.

Direct observation of predators and their sign is the most accurate way of determining predator food habits and their effect on the prey population. Collecting such data is a slow process where much of the country has heavy cover and wolves are seldom observed. The following paragraphs involve some speculation as well as actual direct evidence.

In summer a wide variety of food is available to wolves and they apparently take advantage of the many species available to them. Young ungulates are eaten as shown by hoof fragments found in scats collected. The importance of wolf predation on young game in the park is unknown. However, certain negative evidence has accumulated. The height of the calving period for moose has been observed for six seasons at Stillwater. Stays by wildlifers varied from a week to two days. No wolf was seen or heard during

any of these trips in the region. A large number of moose calves are born in the Stillwater flats and surrounding hills. The event should attract wolves if they habitually fed on newborn moose calves. Our experience with a single dog shows that the moose mother could easily defend her young against a single canine attacker. Several wolves would probably be able to kill a young calf easily even in the presence of the cow.

Little information is available on caribou calving in the park. However, caribou appear to be widely scattered at elevations above 5,000 feet at calving time in early June. Small mammals are not plentiful or easily available to wolves in the high country at this time and other game is at lower elevations. It is unlikely that wolves are present on caribou range at the time when calves are born, so wolves probably have little effect on the survival of new born caribou.

Deer fawns are born at widely scattered elevations in the park. Newborn fawns have been observed at all elevations from the Clearwater River Valley near 2,100 feet to Mount Huntley about the 5,500 foot level. The wolf range in early summer includes much of the fawning area but the overall effect of wolf predation on the very young in deer must be small due to the wide dispersal of the deer population.

Small mammals are present in both uplands and lowlands in great abundance by mid summer and probably form a large part

of the wolf diet at this time. A Labrador retriever observed in the field in summer easily finds mice, young rabbits, ground squirrels, and pursues marmots unsuccessfully. Roy Helset saw two wolves which appeared to be hunting for mice in a meadow at Shadow Lake on May 31, 1952.

Birds are taken when available. On September 14, 1950, I interrupted a wolf which attempted to pounce on a convey of willow grouse. Evidence of feeding on ducks, probably carrion, was noted at Murtle Lake by Roy Helset, in September 1953.

As small mammals become less available in fall, the wolf diet becomes largely restricted to ungulates with the varying hare being an alternative food source in years of abundance. No other food is available in sufficient quantity to be of importance.

The fall hunt provides carrion. In some cases kills may be fed on before the hunter has taken his share of meat. Despite this fact and that there have been a total of approximately 2,500 hunters in the past five hunting seasons, only one wolf has been shot by a hunter.

Carrion from the hunt is used until spring when other food is difficult to obtain. The carrion food source is apparently quite important to park wolves and may help sustain them through winter. At least 100 pounds of digestible foods would be available to carrion eaters from the remains of each hunter killed

moose. There are over 100 moose kills made in the park each fall so at least 5 tons of food are available from this source. After the hunt of 1956 there was 12 tons of such food available. Competition by other mammals and carrion eating birds decrease the amount available to wolves but much remains to be dug out of refrigeration in winter.

(f) Effect of Wolf Predation on Moose Population.

Half of moose kills (other than hunter kills) which have been classified as to cause of death were believed to be predator kills (Table III). Half of all kills found were not able to be classified as to cause of death. Unless the carcass has been found soon after death there is often little to indicate what killed the animal and speculation is seldom justified. For example a mature bull moose was found dead in early April, 1955 at the east end of Murtle Lake. It had been fed on only by birds and small mammals; the carcass was largely intact. Gelatinous marrow showed the animal to be in very poor shape when it died. The skull showed impaction of food at the base of the molars and it was obvious that the animal had not been able to masticate enough food to keep body and soul together. He was in the middle of a rich stand of willow. When the carcass was revisited a month later only hair, bits of bone, and some of the stomach contents remained. Tracks of a large grizzly were at the scene and a wolverine had also eaten

there. If only this evidence had been present at the first visit, one may have concluded that this was a grizzly kill since the animal had died in the midst of plenty.

TABLE III PROBABLE CAUSE OF MOOSE DEATHS DETERMINED FROM 33 REMAINS WELLS GRAY PARK 1951 - 1956

(a) Probable predator kills: (8)

Calves 5	Adults 3
(Healthy 2 Poor marrow 1 Unclassified 2)	(Healthy 1 Unclassified 2)

(b) Death probably due to malnutrition: (8)

Calves 1	Adults 7

(c) Cause of death not known: (17)

Calves 4	Adults 13
All unclassified as to condition	Healthy 3 Unclassified 10

Note that five of eight predator kills were calves. The sample is small but this is probably representative. Calves are much more helpless than adults during deep snow periods when much predation on moose occurs. Many chases of cow and calf through deep snow on snowshoes show that the calf is first to tire. This is due to much shorter legs of the calf as well as its generally poorer physical condition. However, there is a short period in late winter when calves can sometimes travel better than adults. During this period they can run atop the crust while the adults break through. Once, at such a time, a calf defended its mother

against a dog which was worrying her. The cow was helpless in this case and the calf could run freely.

On the basis of the small sample, malnutrition appears to kill as many moose as predators. Malnutrition is seldom simply the result of lack of available food. It is usually due to the moose being unable to masticate its food because of teeth loosened by bone rot. Impacted food appears to make chewing so painful that the animal slowly dies.

It is impossible to make an intelligent estimate of the number of moose kills made by wolves on the basis of the small number found. It may be stated however that hunter kills are encountered at least twice as frequently as all other kills. There is probably bias here in that hunters kill in relatively accessible areas.

The indirect effect of wolf predation may be important by forcing northern parts of the moose winter range to remain uninhabited. Murie (1944) found that wolves in Mount McKinley National Park limited sheep to suitable escape terrain. Most of our evidence to date suggests that snow depth is the primary, if not the sole factor, limiting moose distribution in areas where food is adequate.

Moose track counts to date suggest a static moose population through the past three years. Hunting and predation together

have been insufficient to completely free the range of old animals and some die yearly from causes due to or contributed to by sinility.

III. COYOTE

Coyote predation on park game is largely limited to deer. Most deer carcasses found on winter range are fed on by coyotes. They probably kill many deer but data to date suggest that ranges are overstocked and most deer killed represent surplus stock which could not be carried by the limited range.

Coyotes scavenge widely on moose carrion but are incapable of killing any but very young calves. They have been observed playing among moose on a frozen lake while the moose did not even appear to notice their presence.

Like other flesh eaters, coyotes may force wolves to kill oftener by eating carrion which would otherwise be wolf food.

Coyote populations have been down since the winter of 1952-1953. Part of the decline may be attributed to the 1080 poison program but the continued low is probably due to low populations of rabbits.

IV. COUGAR

Cougar are so scarce at present that they are of little importance to any of the ungulate populations. Apparently the pop-

ulation was once relatively high (#2). Deer appeared to be their chief winter food but residents tell of them habitually hunting mountain goat and caribou as well. It is unlikely that they could live on goat or caribou populations entirely. Moose are seldom preyed on by cougar and predation on moose was relatively rare even at the time when the cats were abundant.

Park deer ranges can support so few animals at present that a cougar population of any size is quite impossible.

V. BLACK BEAR AND GRIZZLY BEAR

Sign of black and grizzly bear is often inseparable and the habits of the two animals are so similar in many respects that they will be dealt with together in this discussion.

Both animals appear to be unimportant as predators of large game in the park. In seven years of field work we have no direct evidence of bear having killed any adult game animal in the park.

Grizzly and black bear feed on moose in the spring (51). Much of this is carrion feeding but grizzly undoubtedly kill some moose which attempt to winter in river valleys of deep snow areas. Numbers involved are small, however, and even if bear predation were severe on moose which winter in these areas it would have little effect on the overall moose population.

Grizzly bear occasionally attempt to take adult moose in fall. R.G. Miller observed sign of a grizzly pursuing a large adult moose at the outlet of Munter Creek in October, 1956. The bear followed the moose into the lake at a gallop; undoubtedly the moose escaped once in the water.

Bear scats found on calving grounds show that bear eat moose calves but again separating carrion from bear killed animals is difficult. One instance of caribou calf in a bear scat is recorded (#51). However percentage wise the total amount of animal food consumed by bear in summer is small. Of 206 bear scats examined in three summers (1951, #9; 1953, #35, 1955, field notes) only eight were found to contain mammal remains.

Bear predation on cattle is a problem at the F. Ludtke ranch. Mr. Ludtke averages a loss of about one head of stock yearly which represents a large drain from the profits from his small herd. Part of his trouble lies in the fact that the farm lies in good bear habitat but the situation is aggravated by careless husbandry and careless shooting of bear.

VI. WOLVERINE

This animal is definitely not a large scale killer of big game. It is primarily a scavenger and most of its food is the product of another's hunting. The wolverine is relatively plentiful in the park and competes with other predators by eating a

large share of available carcasses.

Beaver are habitually hunted so the wolverine must be successful often enough to stimulate the interest. Like the wolf, the wolverine rarely passes a beaver lodge without investigating it. He often digs at the top of the lodge in an attempt to break through.

One beaver was killed by wolverine at Murtle Lake, April 15, 1955. This animal was apparently surprised a few feet from the water. Sign at Blackwater Creek on April 24, 1955 strongly indicated that a beaver was killed in shallow water (R.G.M.).

Wolverine sometimes follow in the tracks of caribou but this does not necessarily mean that they are hunting. On occasion they follow human trails but are not called man killers for the fact.

In summer small mammals of the alpine areas probably make up much of the wolverine diet and they are then less dependent on carrion than in winter.

VII. LYNX

The lynx is a potential predator of young deer and is considered to be important as such where no larger predators occur. However in the park there is no evidence that they have any influence

on the deer population. Their chief food appears to be the varying hare. They also appear to prey on beaver when available.

VIII. FISHER

This animal appears to depend on varying hare for a large part of its diet. Grouse are also taken on occasion. The fisher cannot be considered a predator of importance on game or fur bearers due to its small size and relatively low abundance.

IX. MARTEN

From field sign, varying hare is the most important item in the diet of marten. Possibly hares are not as important as indicated and mice may be the main food of marten. Marten are numerous enough to be a possible competitor of wolves and bears in carrion feeding. However their food intake may be so small that the competition is slight. Some research on quantity of food eaten per day is needed in the case of the marten and indeed with all of the flesh eaters.

Other mammalian predators including weasel, fox, bobcat, mink, and otter by virtue of their small size, scarcity, or specialized food habits have little or no effect on the ecology of game or fur populations in the park.

X. AVIAN PREDATORS

The golden eagle is sometimes considered a predator of the

young of game animals. This bird, though widely distributed in the park's alpine areas, is so scarce that it can affect no game population with the possible exception of goat. We have no evidence that the eagle eats park game animals other than as carrion.

The goshawk and horned owl appear to limit the winter abundance of grouse in areas of poor cover in the southern part of the park. These birds appear to take more willow grouse than all other predators combined.

XI. SUMMARY AND CONCLUSIONS

Data on predation in Wells Gray Park from 1950 to 1956 has been gathered from all available sources. Of occurring park predators, only timber wolf, black bear, and grizzly bear are plentiful and large enough physically to affect the moose population. The coyote may have some influence on mule deer numbers.

The wolf is considered to be the most important predator in the park. Both black and grizzly bear appear to be primarily vegetarian, secondarily carrion eaters, and only rarely predacious.

The wolf population has been static during the study period and numbers around a dozen animals in the area concerned. Poisoning campaigns near the park border and a light kill of wolves in the park have failed to reduce wolf numbers though they may be

a factor in holding the population in check.

The main prey of the wolf is moose with mule deer being secondary. Wolves seldom frequent caribou range in winter.

The moose population appears to be static in the face of wolf predation and a high hunter kill. Malnutrition appears to kill as many moose as does predation, while hunters may kill more than both combined.

Wolverine appear to be important beaver predators. This predation is probably beneficial in that it is a factor preventing overpopulations in undertrapped areas.

Our studies reveal no relationship in the longrun between game abundance and predator abundance. We should continue to resist any efforts to invade the park with poisoned baits. Predators are a part of the wilderness that we are striving to maintain and should receive protection in our parks.

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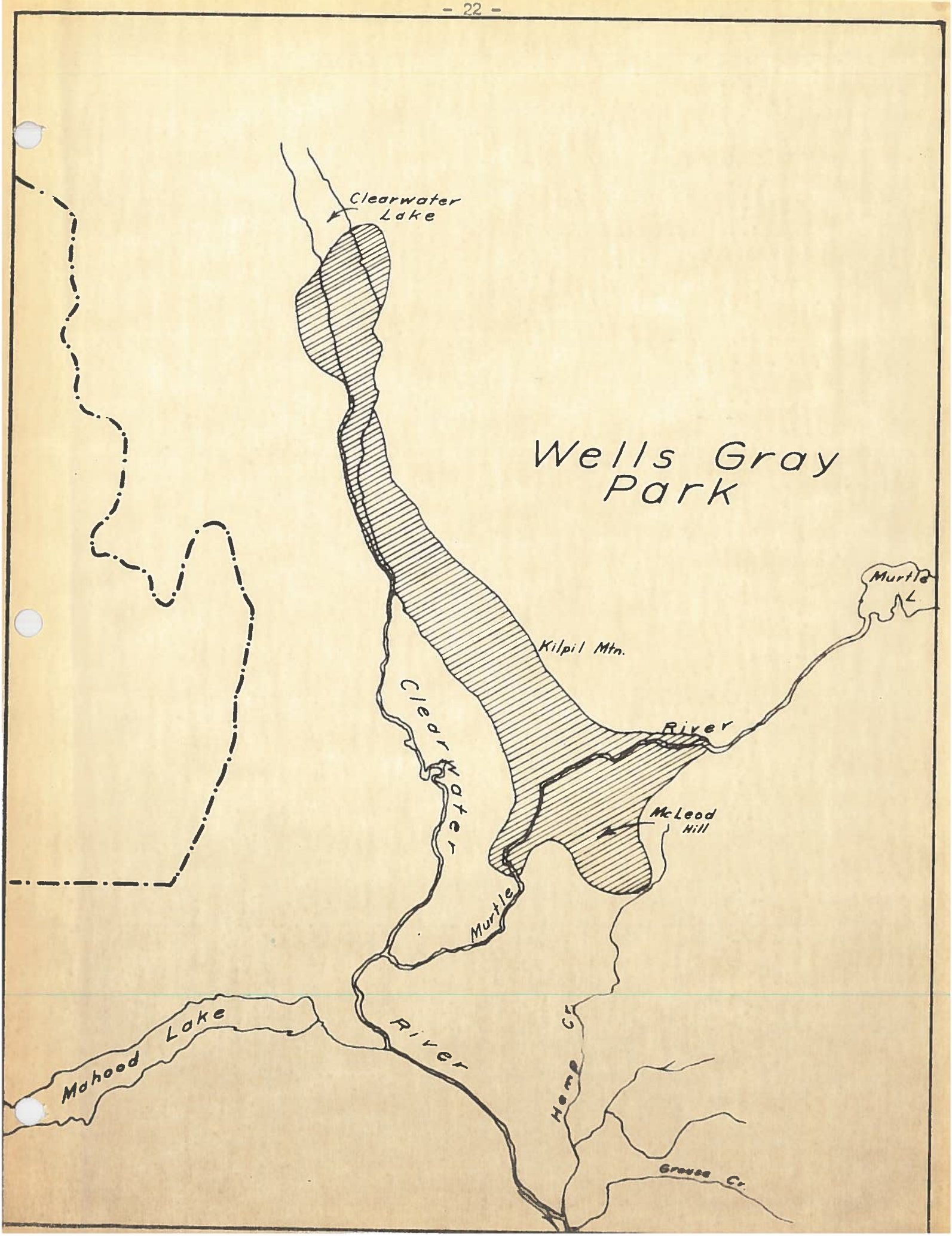
Clearwater Lake
Wells Gray Park
Murtle L.
Kilpil Mtn.
Clear Water River
McLeod Hill
Murtle
Mahood Lake
River
Home Ck.
Grouse Cr.