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ECOLOGICAL INVESTIGATION IN KLUANE NATIONAL PARK
YUKON TERRITORY

C.W.S. Contract No. WR 0 72/73 #127

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Summary

It is estimated that about forty-four hundred sheep and eight hundred fifty goats utilize ranges in Kluane National Park at least at certain times of the year. The areas of the Kluane Game Sanctuary, which are at present not included in Kluane National Park, are for the most part only summer ranges of these ungulates. It is estimated that about 95% of the numbers listed above spend the winter - or up to nine months of the year - inside the Park boundaries, and about 80% of the numbers listed above are year-round residents of the Park. A small, undetermined, percentage spends the winter outside the Park boundary and moves into it in summer.

Moose

Kluane National Park will be well-known for its sheep, goats and grizzlies, but not for its moose. With the exceptions of a few areas (Map #6a, 6b), the moose habitat in the Park can only be described as marginal compared to other areas in the southern Yukon. There are a number of good moose ranges in the Shakwak Trench, but unfortunately only a very short section of this trench is presently included into the Park. Besides the areas outlined on Map #6a, there are additional good moose ranges in the northern portion of the Shakwak Trench (Donjek, Koidern, White River areas). I can only describe two small areas in the present Park as exceptional and two more areas as average to fair.

The best moose habitat is located in the valley between Dezadeash Lake and Mush Lake along Alder Creek. This area has some excellent marsh communities and also some of the sidehills have had forest fires not too long ago. I estimate this area of prime moose habitat to be not more than 30 square miles. Using a strip census method we counted twenty-four moose in this valley. The terrain is difficult to census because dense willow patches alternate with spruce and aspen stands, meadows, burned areas and many dead trees. We assume that we only counted half the moose, mainly those that bothered to get up as we flew by. Therefore the winter density in this area may be as high as two moose per square mile. The other good moose area is located along the upper Duke River, approximately from the

mouth of Dickson Creek down river almost to the "Duke River Butte". The prime habitat is probably not more than 20 square miles. We counted twenty-one moose in this area on March 1st, 1973. Even in this sub-alpine shrub zone, some moose that were bedded down in the tall willows will have been overlooked. Therefore this density also may approach two moose per square mile. This area also has a high density of moose throughout summer. For some reason moose stay in this area all year, while most other moose move down out of the sub-alpine shrub zone into valleys in mid-winter. Part of the Shakwak Trench which is included in the National Park, between Haines Junction and Kathleen Lake as well as the area around Sockeye Lake are fair moose habitat for this area. Part of this can be attributed to a fairly extensive sub-alpine shrub zone in these areas as well as fairly recent fires. I estimate the size of these two areas to be about 80 square miles and the year-round moose density at one moose per square mile.

Total wildlife habitat in the National Park was estimated at 2800 square miles. About 800 square miles will be alpine habitat above the elevation of tall shrubs (or the 4500 to 5000 foot contour). Even though the odd moose has been observed at alpine elevations, most moose do not go higher than the shrub zone. From the point of view of altitude we have therefore about 2000 square miles of "potential" moose range. However these 2000 square miles include scree slopes, steep walls, boulder fields, grasslands, mudflats as well as dense, sterile, spruce forests; - all habitat types of little use to moose. I estimate therefore that, except in the good areas outlined above, the moose density in the Park is very low, most likely as low as one moose per ten square miles. This would mean that there are probably not more than 300 to 350 moose in Kluane National Park.

The best area for visitors to see moose is along the trail that leads from Dezadeash Lake to Mush Lake. Most moose move up into the sub-alpine shrub zone in early summer, but there are some moose along the Mush Lake road that feed on aquatic vegetation and stay in the valley all year.

Grizzly Bears

Grizzly bears are found in suitable habitat throughout the Kluane Park and Reserve areas. They are particularly abundant in the Dezadeash - Alsek River valleys, the Sockeye Lake area, and along the valleys of the Klukshu and Tatshenshini Rivers. Dr. Art Pearson, Canadian Wildlife Service, has studied bears in this area for seven years and he should be consulted throughout the planning stages of this Park whenever bear questions are considered.

Dr. Pearson estimated that the Dezadeash and Alsek River areas have densities of one grizzly per ten square miles. While this density may also be found in the Sockeye, Klukshu and Tatshenshini areas, bear observations and indirect evidence in the form of tracks and scats indicate that densities in the northern half of the Park may only be around one grizzly per twenty square miles. Perhaps the great densities of bears in the south are to be attributed to a better food supply. Dr. Pearson considered Shepherdia berries and Hedysarum roots as very important bear forages. These plants are much more abundant in the Dezadeash and upper Alsek valleys than in other parts of the Park. The above mentioned plants are pioneer and early successional species which occupy the bed of a large post-glacial lake, whose last stage only retreated a hundred years ago. Several stages of this lake came into being through consecutive advances and retreats of the Lowell glacier, which in turn dammed up the Alsek River above its terminus. As succession advances to the White spruce climex of the area, these forage plants will become less abundant and bear density will decrease.

Bear concentrations along the Klukshu and Tatshenshini Rivers can be attributed to the salmon runs of these streams. Bears have on a number of occasions been observed to feed on dead salmon along their shores. I have so far not observed this in the Sockeye Lake area; nevertheless, the area does have a great number of grizzlies. There are some "older" reports (Kindle, 1953, Dezadeash map area, Yukon Territory, Geol. survey of Canada, Mem. 268; and Clarke, C.H.D., 1945, Biological reconnaissance of lands adjacent to the Alaska Highway; Parks Service, umpubl. M.S.), of "Brown Bears" in this southern-most portion of the Kluane area. The relationship of grizzlies to brown bears is ill-defined to say the least, and different authors have different opinions. It is a fact, though, that

the bears along these salmon streams are bigger than the bears seen around Kluane Lake.

I estimate the wildlife habitat within the present boundary of Kluane National Park to be around 2800 square miles. Using Dr. Pearson's bear density estimates for the south and my own for the north, it can be assumed that up to two hundred fifty grizzlies are found in Kluane National Park at least at certain times of the year. This takes into account that some bears (particularly boars) may move in and others may move out at certain times. Grizzlies have been observed to cross the Alaska - and Haines Highways into hunted territory at a number of locations, but most frequently south of Dezadeash Lake down to the British Columbia border. This can be explained by the proximity of the Klukshu and Tatshenshini Rivers to the Haines Highway. Compared to wolves, grizzlies have a very low reproductive rate. Any hunting of "Park bears", when they cross the highway, will effect the population in the Park much more severely as wolf hunting would effect the wolf population, which has the capacity to build up again in a short time. The establishment of a protected zone along the Shakwak Trench is therefore even more important to the grizzly.

Black Bears

Black bears are found in the spruce zone throughout the Kluane Park area. Within this zone they appear to be more abundant than grizzlies. About 80% of "trouble bears" around campsites and garbage dumps, which were trapped and transplanted by Game Branch personnel, have been black bears. Campsites and dumps in this area are all located in the spruce zone of the Shakwak Trench. However, it is known that black bears take to campsites and dumps much more easy than grizzlies, and therefore the proportion of these two species among the trapped bears may not necessarily reflect the proportion of those in the wild.

Either by preference or through displacement by grizzlies the black bears appear to be confined to the forests. I have never seen one in the sub-alpine shrub zone or in the alpine zone. Even within the forested zone, which extends to an elevation of about 4000 feet, large openings in

the form of grasslands, marshes and floodplains appear to be used much more by grizzlies than by black bears. It is very difficult to estimate the number of black bears in the Kluane National Park. No work has been done on black bears in the area, and air counts are not possible in the forested zone. We can therefore only venture an educated guess.

The total area of spruce forest or black bear habitat is probably not more than 1000 square miles in the Kluane Park area. This figure may in the long run prove inaccurate, but until good vegetation maps are available for the park, we have nothing better to go by. An "optimistic" bear density would be one black bear per ten square miles. This would mean that less than one hundred black bears are in the Park. Most good black bear habitat is within the Shakwak Trench, of which only a small portion is at present included into the National Park. Black bears move back and forth across the Alaska and Haines Highways more often than wolves and grizzlies, since their prime habitats more or less parallel these highways. The proposed predator protection area would therefore be of great benefit to them.

Mule Deer

Mule deer are "newcomers" to the Yukon. They are now well established in a large burned area west and north of Whitehorse and scattered groups are known to occur as far north as Pelly Crossing and as far west as Kluane National Park. The writer has observed two groups of mule deer (three and two respectively) during the 1970 and 1971 summer near the Slims River delta. Another observation from Kluane National Park comes from Rod Tait of Haines Junction, who saw a mule deer near Kathleen Lake. These animals must still be considered as very rare in the Park.

Wolverine

Wolverine are found in suitable habitat throughout the Kluane National Park. I have observed wolverine in the following locations: Donjek River

C A R I B O U

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C A R I B O U:

Our observations and interviews with a number of people, familiar with the area, indicate that there are no resident caribou within the present boundary of Kluane National Park, even though the odd animal may cross into the Park at the height of the summer, when caribou seek snow banks at higher altitudes.

Within the Park and its immediate surroundings there are three potential caribou ranges. The only important one is the area north of the present Park boundary, which includes the Burwash Uplands, the Wolverine Plateau, and the area west of Tepee Lake. Caribou in any numbers have in recent times only been observed here.

The second area is at present only of historical importance. It is the southern most portion of the Park and - more importantly - the adjacent sub-alpine areas around the Chilkat Pass in northwestern British Columbia. According to old-time residents this area used to be the favoured caribou hunting ground of people from Whitehorse and other southern settlements in the late 1940's and early 1950's, after the Haines Highway was first completed. There are stories that the extermination of this herd was caused by "massive slaughters" of army personnel, who were involved in building and maintaining the Haines Highway. That caribou did exist in the area is supported by the fact that old antlers are picked up now and then. A few caribou have also recently been observed here. Jim Bowes, temporary warden with the Yukon Game Branch during the summer of 1972, observed three caribou on the mountain range south of Kathleen Lake (1) (see map for locations), while attending a bear trap at the Kathleen Lake campsite

the Park to include resident caribou would involve a smaller acreage of land than the inclusion of the Tepee Lake area, which is considerably farther away from the present Park boundary. For this reason I will limit the discussion on caribou observations and reports to those of the Burwash uplands.

The Burwash Uplands are here defined as the area of some five hundred square miles, bordered by the Donjek River in the west, the Alaska Highway in the north, Halfbreed Creek in the east and the present Kluane National Park boundary in the south.

During the summer of 1972 the largest number of caribou observed in this area was ninety-one, seen by photographer Wilf Gray and helicopter pilot Bob Dunbar (Trans North Turbo Air) on July 3rd, 1972 (3). Gray stayed with these caribou for a few days during which time they moved in a south-easterly direction, parallel to the Park boundary, but did not cross into it. On August 1, 1972 Dunbar again saw sixty of these caribou. They had by this time moved farther uphill and were making use of snow beds at the hot time of the day (4). They had not yet crossed into the Park. This large band of caribou was not seen again during 1972. Both pilots, Bob Dunbar of Trans North Turbo Air and Phil. Upton of the Arctic Institute were instructed to look out for caribou. Both flew the area many times subsequently but did not see these caribou again. During an intensive survey for the Yukon Game Branch by helicopter on September 13th, 1972, we only saw three caribou near Amphitheater Mountain (5). Earlier in the summer, June 27th, 1972, while hiking the Burwash Uplands, we saw three caribou in the headwaters of Quill Creek (6). Tom Cotrell and assistant, University of Waterloo graduate students, saw three caribou in early June

of 1972 on the first mountain range going up Burwash Creek (7). One cow had just given birth to a calf. "Opportunity for Youth" members, who hiked many areas in the Park during the 1972 season, reported four caribou from the headwaters of the Duke River (8). This observation comes within the Park. However, I regard it as doubtful, since these hikers, who were Arts students and not naturalists, have on other occasion mixed up moose and caribou.

Besides these reports from the 1972 season two others should be mentioned, because of the large number of caribou involved. In late February of 1971 Peter Radford and other people of Destruction Bay counted over one hundred caribou in the headwaters of Halfbreed Creek (9), while on a snowmobile excursion. These caribou are reported to have been above timberline at that time of the year.

K. Squirechuk and J. Loutchan, Yukon Game Wardens, collected two caribou for museums from the Burwash Uplands in mid-November 1969. After an intensive search by helicopter the caribou, which at this time are in the rut and thus congregated, were located in the Tatamagouche Creek valley (10). These game wardens counted between two hundred twenty-five and two hundred fifty animals.

There are a number of other reports involving fewer caribou, and - very important - there are numerous reports of people who worked in the area or flew over it, and did not see any caribou.

Our observations and interviews indicate that there is great fluctuation of caribou numbers between different times of the year and between different years. Perhaps detailed surveys at regular intervals will clarify the picture, but at present I believe that the Burwash Uplands

are only part of the range of this herd of caribou, which numbers possibly two hundred fifty to three hundred animals. We do know that caribou leave the area across the Shakwak Valley into the Ruby Range; we do not know whether they come back. Guides and hunters using the Ruby Range northeast of the Burwash Uplands report that caribou have been increasing steadily over the past few years in that range. A single cow was observed during the spring of 1972 in the village of Burwash "coming down from the Park" (11), and a hunter, Rod Wilson, shot a caribou from the Alaska Highway during the fall of 1972, while seven or eight animals crossed out of the Park. The hunter reported to have seen tracks of "many more" (12).

So far we have no reports of caribou crossing into the Park. Since both sexes are subject to hunting when crossing the Alaska Highway to the northeast, it is possible that there is a constant "drain" of caribou into hunted areas from protected areas. This, however, is at present pure supposition. Reports on caribou in the Tepee Lake region also vary considerably. The possibility exists that there may also be exchange of caribou between here and the Burwash Uplands across the Donjek River.

With respect to possibly including the Burwash Uplands into the Kluane National Park with the aim to have resident caribou in the Park, I can at present only say this: The Burwash Uplands would add to the Park several hundred square miles of good caribou range - sub-alphine plateaus of an extent, not found in the Park at present. It would add <u>some</u> caribou on a year-round basis. Whether or not it would add to the Park a resident herd of one hundred fifty to two hundred animals, we do not know at present. Our surveys indicate that the Burwash Uplands are only part of a larger range of this herd, in other parts of which these caribou are subject to hunting.

d) It can at a later date be extended south along the Kaskawulsh River to the Sugden Creek trail.

e) The view of the Kaskawulsh glacier will be much better.

Another trail in the Slims River valley extends from valley floor to alpine elevations of the "Bullion Plateau". This trail leaves the old Alaska Highway along the north shore of the Slims River, between Sheep Creek and Bullion Creek and climbs to an elevation of about 6000 feet. After spring runoff, it can be used by a 4 x 4 vehicle. This trail should be improved. It gives the hikers the opportunity to see the three major vegetation zones (boreal, sub-alpine, and alpine) and most of the larger wildlife species found in the Park (sheep, goat, moose, grizzly and black bears). However, none of these animals are very abundant here, and therefore neither the trail nor the visitors would cause great "critical habitat" destruction or disturbance of animals (see photographs).

Besides the general remarks made earlier, I cannot recommend any special location for trails or roads to avoid bears in the Slims River area (critical Area B). Preferred food plants are nowhere concentrated. Therefore it cannot be predicted, where bears will be found.

The Steele Creek area (critical Area C) is fairly remote from existing highways and roads. It is a well known staging point for mountain climbers, which are flown in by helicopter or ski-equipped, fixed-wing aircraft. Few bears have been observed in this area. I cannot see great conflicts here, if food and garbage are looked after in the way described earlier, and if permanent, overnight campsites are fenced in, or better yet, if a large mountain hut is built for the climbers. Conflicts in this area are much more important in relation to sheep, as will be discussed.

B. Conflict arising through ungulate winter range destructions by development

Kluane National Park has the densest sheep and goat populations of any area in the Yukon. These ungulates spend anywhere from six to ten months of the year on winter ranges. In some of the populations looked at, the ratios of acreages of winter range to summer range is 1:5 to 1:10. In other words, even though the winter range makes up only 10% to 20% of the total range available to populations, they are forced to spend more than half of their time on it. The range use, which could be expressed as animal units

per acre per year, is therefore ten to twenty times as high on winter range compared to summer range.

Any damage done to winter ranges through development will therefore effect an ungulate population much more severely than development on summer range.

Critical winter ranges have been outlined in another section of this report and on maps. As far as sheep winter ranges go, the following general remarks are appropriate. Sheep winter ranges are dry grasslands, which are usually found on exposed, wind-swept slopes and ridges, with a southern to western exposure. On occasion the exposure may be south - east, but never north or north - east. Altitudically these grasslands may extend from the valley floor through the boreal, sub-alpine to the alpine zone, with very little change in floristic composition. On Sheep Mountain, for instance, dry grasslands are more or less continuous in some areas from 2600 feet up to 6400 feet elevation. In these grasslands three communities have been identified in the Kluane Lake area. The most common one is dominated by Artemisia frigida, Agropyron yukonense and Carex filifolia, while Eurotia lanata, Artemisia rupestris, Pentstemon gormani, Erigeron caespitosus and a number of custose lichen species are important associates. Another community is very common in more moister, shadier locations close to forests. It is dominated by Calamogrostis purpurascens and Arctostaphylos uva-ursi. The third community is found at alpine elevations. The dominant plant is Artemisia hyperborea, while Oxytropis viscida, Totentilla hookeriana, Festuca brachyphylla and Poa glauca are important associates.

This floristic composition of winter range communities is found throughout the central and northern portion of the Park. In the southern portion of the Park, grasslands are less common, because of the moister climate.

Critical winter ranges have several additional characteristics. They are either very large and open, so that approaching predators can be observed for some distance, or - if they are small - they are always close to escape terrain in the form of rugged cliffs or steep canyon walls. Some of the most heavily utilized winter ranges fall into the latter category (Sheep Creek, Williscroft Creek, Bullion Creek, Vulcan Creek). They are often only narrow strips of grasslands following the sunny, exposed side of the creek down through the forest to its mouth.

In addition, good winter ranges are more or less continuous with one another and at higher elevations they are continuous with alpine summer

ranges. They can be separated by scree slopes, boulder fields or even shrub communities, but never by large tracks of forests. Sheep and goats in this area are reluctant to pass through forests any distance. Therefore some beautiful grasslands, which have the vegetation and the snow conditions of typical winter ranges, are not utilized by these ungulates. Examples of such "unused" ranges are found in several areas of the Slims River valley, particularly between Sheep Creek and Bullion Creek at lower elevations. In a few areas in the Park and in other areas of the Yukon invading mule deer appear to colonize this empty "niche".

In the central portion of the Park, where sheep dominate and goat populations are small and isolated, I could not see any differences in type of winter ranges between these two ungulates. However, goats appear to be found almost always near very rugged terrain; their smaller band size and the higher frequency of single animals also allows them to utilize very small patches of vegetation in canyons and cliffs. They appear to utilize shrubs much more than sheep do, and they can cope with deeper snow in winter. They are known to utilize conifers (fir and juniper), which sheep hardly ever do. This is perhaps the reason, why goats dominate in the southern portion of the Park and sheep populations "peter out". The country is very rugged there, more suitable for goats. Because of a moister climate grasslands are rare and shrubs are more common; snow conditions are much more severe, all factors in favour of goats.

Kluane National Park, as it stands at present, is only average to marginal as moose habitat compared to the other areas in the Yukon.

With the possible exception of perhaps the braided Dezadeash River near Haines Junction, the Alder Creek area, the Klukshu and Tatshenshini River valleys, and the upper Duke valley. I cannot call any area within the present Park boundary "critical" moose habitat.

Deer and caribou are only of "sporadic" occurrance in the Park and need not be discussed in this connection.

Critical winter ranges have been mapped as part of this report. They are too numerous to describe individually. The following general considerations should be taken into account when planning trails, roads and other type of developments. The most sterile areas, from the wildlife point of view, are the dense spruce forest and northern and eastern exposures in the mountains. Whenever a choice can be made, it will be safer to disturb such areas compared to flood plains, grasslands, shrub communities and

southern and western aspects of mountains. As described above, not all grasslands are utilized. Whether or not they are, can be ascertained by checking for ungulate trails, tracks and droppings, and by comparing vegetation cover and composition of such areas with those of much-used areas. While I would strongly object to "major" developments on critical ranges in the form of roads and campsites, I cannot see anything wrong with having a few less-used ranges "opened up" through hiking trails. It should be remembered that ungulates use those ranges in winter, while tourists would hike them in summer. There will, therefore, be very little direct disturbance.

Critical Area A is primarily goat country and moose country, with the exception of the Auriol range. Some of these sheep, however, appear to move north in winter and spend it along the western portion of Mt. Decoeli range (see maps).

A number of trails and roads already exists in critical Area A. These should be utilized and improved wherever possible. There is at present access to Sugden Creek via Dezadeash valley, Sockeye Lake via Kathleen Lake drainage, Mush Lake via Alder Creek and there is also a long trail through alpine country from Sockeye Lake to Mush Creek. The trail to Sugden Creek via Dezadeash and Alsek valley leads through prime grizzly country. However it is over most parts fairly open. The trail to Sockeye Lake is often densely vegetated and can not be recommended for hikers. The Mush Lake trail leads through prime habitat of moose and furbearers.

It is obvious that the location of these trails is not the best with respect to avoiding conflicts between people and wildlife. However, these trails have been in existance for a long time and perhaps the animals have by now accepted them as part of their environment. The construction of new trails in undisturbed sites nearby may cause many more problems.

For the Slims River valley (critical Area B) it is recommended to build a road to the Kaskawulsh glacier terminus along the east shore of the river. This road could later be extended down the Kaskawulsh River to Sugden Creek. Here it would meet the already existing trail, and the "loop" back to the Alaska Highway would be complete. As already pointed out, it will not be possible to build this road without any disturbance to sheep winter ranges in such a densely populated area, but this disturbance would be kept to a minimum through the use of the already existing old Alaska Highway and the Sugden Creek trail.

The trail leading onto the "Bullion Plateau" could at a later date be extended along Congdon Creek and terminated at the Alaska Highway. A gravel road is already in existence along Congdon Creek for a few miles. The construction of a mountain hut is recommended somewhere near the divide of Sheep and Congdon Creeks.

Two more roads exist in the Slims valley. One leading into Bullion Creek. It has been used every summer by miners involved in placer operations. A great clean-up job is needed in this creek; but perhaps one old-fashioned placer set-up should be recreated and left as an outdoor museum display. Gold mining has always been of special importance in the Yukon, and such a display would certainly be an added tourist attraction.

The other road (a bad one) leads up to the mouth of Vulcan Creek from the old Alaska Highway on the southeast shore of the Slims River. I cannot recommend the "opening up" of the Vulcan Creek area. It is a very important migration route of sheep from winter to summer range and it also has a good number of grizzly bears.

The Steele Creek area (critical Area C) is at present only used by mountain climbers. If a trail should ever be contemplated along the Steele Creek and glacier it must most <u>definitely</u> follow the south side. The north side has a very dense sheep population, the densest I know of. This side has also very interesting geological formations, which should not be disturbed by trail constructions. The Steele valley is an important access route to climbers, since it opens up avenues to four very high peaks: Mt. Wood, Walsh, Steele and Lucania. With the creation of a new National Park a further increase of mountain climbing activity can be anticipated. If in any area in the Park, it is here that a good alpine lodge or mountain hut should be built. It could be built of native rocks and would fit beautifully into the alpine scenery. Such an establishment would also solve the bear - garbage problem.

C. Conflicts created through the introduction of horses

Horses on open range are a problem not only at Kluane but in many other areas of the southern Yukon. Many people own a few "hobby" horses in the Yukon, but it is mainly the outfitters who own large numbers, which compete for winter range with wildlife.

In the Kluane Game Sanctuary or adjacent areas the following outfitters own horses: Mr. Dickson in the White and Donjek River areas; Mr. Temple in the Duke River area; Mr. Hassard at the southern end of Kluane Lake near Cultus Bay as well as the Slims River flood plain; Mr. Hotte in the Kloo Lake area; and Mr. Brewster around Haines Junction. Many of these horses have - at least in the past - utilized areas within the Park and Reserve boundaries. Even though these outfitters have grazing leases the horses are not fenced in and range over much larger areas than are leased to the outfitters. Often they can only be located after extensive air searching. Besides these horses, a large number of feral horses live in the Kluane area. In certain areas they compete with sheep, in all areas severely with moose and possibly also with caribou and deer in late winter. These horses are not part of the native fauna of the southwest Yukon, they compete with native ungulates and they are a traffic hazard. Furthermore, their protection has been the reason for much wolf poisoning, which put the ratio of predators to ungulates out of balance. There is no excuse for furtheron having horses on open range.

It is suggested that the Parks Service in co-operation with Federal and Territorial government agencies solve this problem through the establishment of community pastures. All horses now on open range should be kept in such pastures, that should be fenced in. Hired cowboys, paid by the outfitters' association and possibly subsidized by the government, should look after the horses and maintain the fences. Here, and only here, would any predator control be justified. Once all legally-owned horses have been looked after, all feral ones should be brought under control or disposed of. As already pointed out, the horse does not belong to the native fauna of the area.

D. Conflicts created through inadequate Park and Game Reserve boundaries

One of the functions of a National Park is to maintain "balanced" natural animal populations. Even though Kluane National Park is large in total acreage, its "zone of life" or wildlife habitat, is only a narrow strip of twenty to thirty miles paralleling the Shakwak Trench in a northwesterly direction. Many animals, particularly large predators, do not restrict their activities to such a narrow area, but move out of it, at least at certain times of the year. This can be said with certainty for male grizzlies, black bear, wolves and moose. This also applies to the "Burwash Upland" caribou, which are dealt with separately, and to the very scanty deer population. Once these animals cross the Alaska and Haines Highways they are subject to hunting, trapping, predator control and other means of prosecution. This upsets the natural balance within the Park, particularly the predator to prey ratio. I am convinced that the very large sheep densities observed in some areas of the Park, for instance the Slims River valley, are in part due to a constant "draining" of wolves. The wolf is considered a "predatory animal" in Yukon, which means that it can be shot at any time and in any number. In addition, the high price of its fur, previous bounty system and poisoning programs have contributed their part. Wolves are particularly vulnerable when on the ice of large lakes as Kluane Lake and Dezadeash Lake, and it is here where they have experienced heavy casualties in the past.

With the aim in mind to create a natural balance in the Kluane area, with particular emphasis on the wolf but also in respect to grizzly and black bear, it is proposed that the Parks Service in co-operation with local government agencies endeavours to have extended the present Kluane Game Sanctuary to the northeast to include the Shakwak valley and the adjacent areas to the height of land as shown on Map #2. Even though some animals will move farther than this, it is in the valley along the Alaska and Haines Highways and on the lakes that they are mainly pursued.

Many sheep and goat move out of the National Park during summer (see maps for details) into the Game Sanctuary. But since they are still protected in the latter, this seasonal movement will not upset the balance within the Park.

E. Other potential avenues of conflict

Within Kluane National Park, as it stands at present, a number of common animals must be considered rare, because of lack of suitable habitat. They deserve therefore consideration in the planning.

First and foremost in this connection must be mentioned mammals and birds found in marshes. This would include beaver, muskrat, mink, otter, as well as the associated avifauna, particularly waterfowl, shorebirds and passerines. No other habitat type is so limited in extent. The few areas, I am aware of, are the braided Dezadeash River valley near Haines Junction and portions of the Alder Creek and Sockeye Lake areas. It is therefore essential, that these few areas deserve special consideration.

A number of birds breeding in alpine elevations must be considered rare in the Park. These include snowbunting, wheatear, Wandering Tattler and possibly Long-tailed Jaeger. The Kluane area is considerably south of the "normal" breeding range of these species. The Steele glacier (critical Area C) is one of the areas, where these birds have been observed. Needless to say, these birds should not be disturbed.

The Park also has some rare plant associations, which must not be disturbed. However, it was not the subject of this report to discuss botanical questions.

Recommendations

While it is recognized that some development is necessary to give the average Park visitor, who hardly ever leaves his vehicle, the chance to appreciate the Park; it is recommended that such development is kept to a minimum.

Only one new road should be built to the terminus of the Kaskawulsh glacier, which may at a later date be extended along the Kaskawulsh River to join the Sugden Creek trail.

Other developments should be restricted to the improvement of already existing trails, which are found in many valleys. In a few places it may become necessary to avoid critical bear habitat and reconstruct existing

trails through safer routes. All trails must be supplied with fenced-in overnight campsites, or better yet, with cabins and mountain huts. Such a setup would protect the hikers and also solve the garbage problem. From the point of view of the hikers, this may not be the most romantic way of spending nights in the wilderness, but it has been shown again and again, if it comes to conflicts between bears and people, in the long run, the bears are the ones that lose out. This must not happen here; Kluane National Park is one of the last strongholds of grizzlies.

Major developments in the form of large campsites, garbage dumps, and visitor centres, as well as all commercial enterprises like lodges, stores, horse stables, and privately owned houses and cottages must be kept outside the Park boundaries.

A special effort should be made in co-operation with the Territorial Government and with the communities and lodges bordering the Park to bring about efficient and effective garbage disposal, removal and incineration. Enough is known about bear - garbage problems by now, that conflicts experienced in other parks need not come into being here.

Snowmobiles and other types of "cross-country" vehicles should not be allowed in the Park.

An attempt should be made to stop all commercial fishing in Dezadeash and Kluane Lakes.

Motorboats should only be permitted on Kathleen, Dezadeash and Kluane Lakes. Upper Kathleen, Sockeye, Mush and Bates Lakes should be used only by rowboats, canoes and kayaks, so that visitors have the opportunity of a true wilderness experience on those lakes.

"Down-hill" ski slopes, if contemplated, as well as cross-country ski routes must be carefully planned to avoid winter range destruction of wildlife as well as direct disturbance.

Air corridors to fly mountain climbers to staging areas should follow wide river valleys at high elevations so that no disturbance of wildlife, particularly during lambing, kidding and calving periods, is possible. Certain critical areas, like the Steele Creek valley, should be closed to flying at such times.

Privately owned as well as feral horses should be brought under control and kept in fenced-in community pastures.

To make Kluane National Park a more viable ecological unit the following additions are recommended in decreasing order of importance.

a) Large predators like wolf, grizzly, black bear but also coyote, wolverine and lynx must be protected when moving out of the Park or Sanctuary areas. This is absolutely necessary to create a "balanced" system in the presently protected areas. It is recommended that the Kluane Game Sanctuary be extended to the northeast to inc'ude the Shakwak Trench to the adjacent height of land as is shown on Map #2. If it is not possible to give this addition the full status of a game sanctuary, it should at least be made into a special "large predator protection zone".

b) Of those areas of the Kluane Game Sanctuary presently not included in the National Park, I consider the Dalton Post area in the south the most valuable addition. This area would add first-class grizzly and moose habitat, good goat range, salmon streams, some marsh habitat, a diverse avi-fauna and a picturesque waterfall. This area also has historical significance. No other addition would add so much "per square mile".

c) To add a substantial caribou population to the Park on a year-round basis, additions are necessary in the north of the Park. To be effective we would be dealing with "major" additions, several times the size of the Dalton Post area. Little is known about the caribou north of Kluane National Park. Map #2 shows the distribution based on observations in recent years. We know that their range is continuous not only across the Alaska Highway to the northeast, but also across the international boundary to the north into Alaska. A detailed study over several years is necessary to suggest effective boundaries for future Park extensions here.

d) The area between Haines Junction and Kluane Lake is of least importance. It would not add anything new to the Park. The Shakwak Trench is fair moose habitat, but not better than south of Haines Junction to Kathleen Lake. The mountain portion is mainly sheep summer range. While any additions to the Park would be worthwhile, I would most definitely not settle for this area at the expense of the Dalton Post area in the south or good

caribou range in the north.

My last recommendation is of philosophical nature. National Parks try to serve at least two major functions; on the one hand they are set up to protect natural ecosystem in undisturbed, pristine conditions; on the other hand they try to provide outdoor enjoyment for an ever-increasing number of visitors. These two functions are not compatible, and most parks - including all small ones - have settled for the latter. Even the larger Parks in the Rocky Mountains are more and more opened up through trails into the back country. The argument goes that a narrow trail, one or two feet wide, does not create great disturbance. However, even narrow trails can be used by a lot of hikers. The outcome is an unbalanced ecosystem. Some animals get used to people quickly. They increase in numbers along such trails, displace other animals and change the vegetation cover. Often they are fed by visitors. Shy animals, particularly predators, move away into the back country, of which less and less is available to them. Sooner or later a very artificial setup comes into being, the very opposite of what the National Park was set up to protect in the first place.

Kluane National Park is large enough to serve both these major functions effectively, if the philosophy of Park planners is that way inclined. I have stressed throughout this report that developments should be kept to a minimum. Most of the things that Kluane National Park has to offer can already be appreciated from existing roads and trails. Except for a road to the Kaskawulsh glacier terminus, no other large developments are necessary inside the Park boundaries.

It must be realized that the goats on Goatherd Mountain and west of the Alsek River, the sheep in the Donjek valley and the moose along the upper Duke River <u>do not look any different</u> than the sheep on Sheep Mountain, the goats around Kathleen Lakes and the moose along the Mush Lake road. The latter group are already used to man to some extent. They can be further exploited as exhibition animals. The former group lives in essentially pristine conditions and there is no reason, whatsoever, to tangle with them.