

THE IMPACT OF EXPLORATION FOR COAL ON MOUNTAIN

GOATS IN NORTHEASTERN BRITISH COLUMBIA

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Abstract: Coal mining and related activities conflict with the maintenance of mountain goat (*Oreamnos americanus*) populations. In northeastern British Columbia, coal exploration has correlated with a decline of mountain goat populations. Depressed populations have shown no sign of recovery.

Imminent coal developments including nine open pitmines, two underground mines, several preparation plants, one completely new town, highways, railways, and airports will affect approximately 15,000km². Within this area lie 1,900km² of coal license and 1,200km² of mountain goat range. Twenty percent of the mountain goat range is under license by coal companies.

The precise mechanism of the mountain goat population decline is not known but appears to be related to easy human access. Habitat destruction is not an important factor in known losses but may be a factor in attempts to re-establish populations after mining.

New approaches to management may have to be developed for mountain goat populations with intact habitat but easy human access. High populations still exist in remote parts of the coal block but present management techniques based on manipulation of open season length will not protect these populations if their habitat is explored for coal using road dependent equipment.

In 1976 intensive studies of mountain goat (*Oreamnos americanus*) distribution, abundance and habitat were initiated as part of a general environmental impact assessment of proposed coal development in northeastern British Columbia. These studies were undertaken by the Environment and Land Use Secretariat (now the Resource Analysis Branch) in co-operation with the Fish and Wildlife Branch.

In this paper we assess the effects of past coal exploration and development on mountain goats and suggest how detrimental impacts can be avoided in future. We acknowledge assistance in data collection or writing from Dr. J. Elliott and Messrs. F. Harper, R. Crook, A. Edie, R. Bonnar and B. Fuhr.

STUDY AREA

The study area included 15,000km² on both sides of the Rocky Mountains (Fig. 1), but in this paper we emphasize the east slopes of the Rocky Mountains in the vicinity of the coal licenses and known goat ranges. Coal licenses include 1,879km² in a 270km strip from Williston Reservoir south east to the Alberta border. Goat habitat varies from steep river banks in forested foothills to rugged peaks of the central Rockies. Some of the best goat habitat is on flat-topped or rolling mountains in the eastern part of the range. These mountains have large expanses of alpine meadow bounded by cliffs which provide escape terrain.

METHODS

Fig. 1 delineates goat habitat from Canada Land Inventory (C.L.I.). CLI methodology and its application in British Columbia is explained by Blower (1973). CLI information for goats was supplemented recently by Goat Distribution and Abundance Maps (Blower, 1976). We excluded habitat with more than 50% CLI class 6 and 7 (lands with severe limitations to and no ungulate production respectively). This procedure demonstrated that all but extremely marginal goat habitat in the

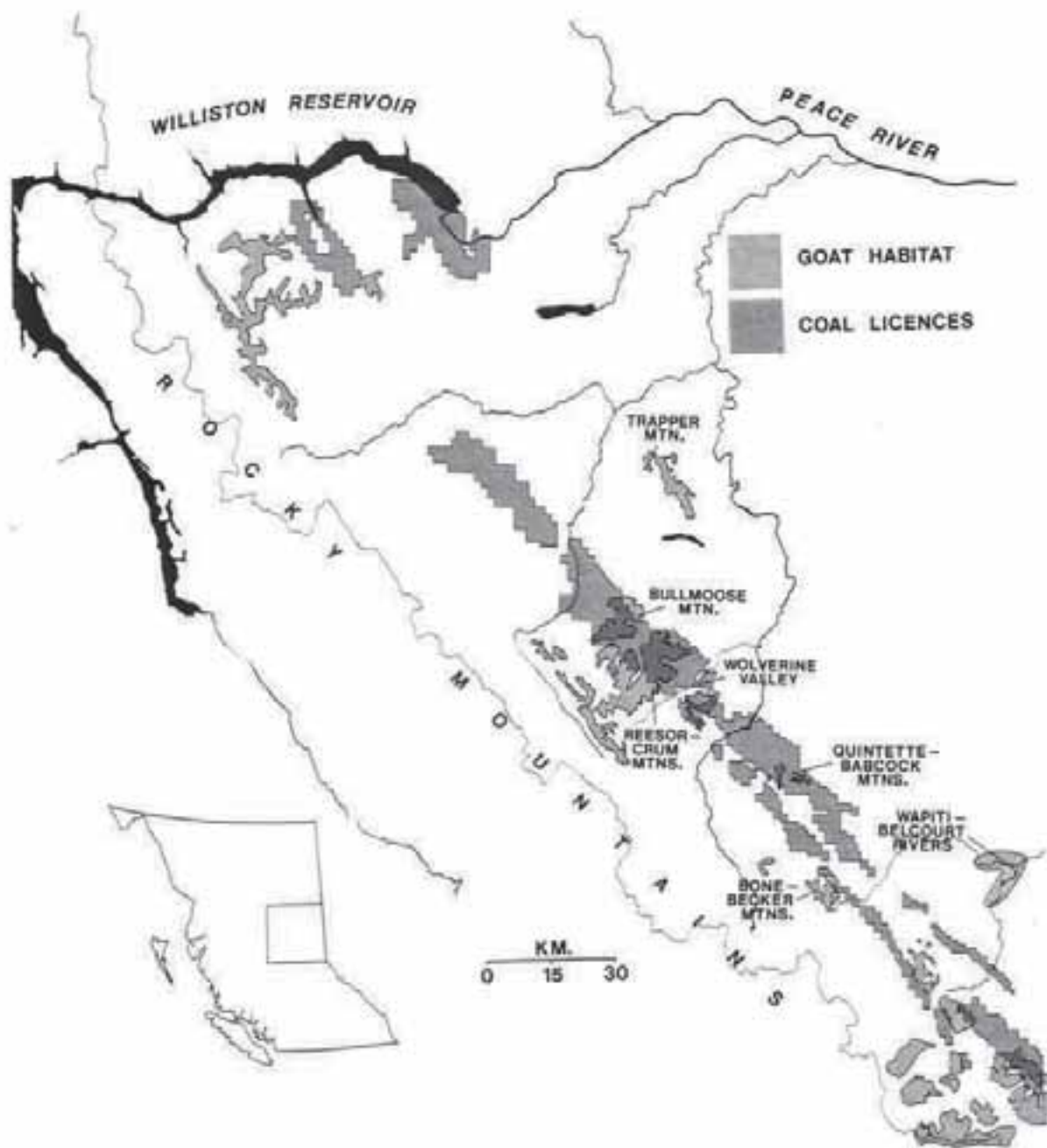


Figure 1.

study area was on the east slopes of the Rocky Mountains where snow fall is relatively moderate.

Information on historical population levels was obtained by interviewing trappers, guides, forestry personnel and Fish and Wildlife Branch staff. Previous populations are subjective estimates based on concensuses of several sources of information. Current population levels are based on estimates by people familiar with the area or estimates based on aerial counts. Maximum counts on record are listed and can be considered minimum populations. Aerial surveys included 12 hours by fixed wing aircraft by Fish and Wildlife Branch in 1974, and 54 hours of helicopter surveys by the Resource Analysis Branch in 1976.

Hunting data is from Fish and Wildlife Branch hunter return files. Road exploration data were obtained from Mines Department reclamation files.

RESULTS AND DISCUSSION

Mountain goat range occupies about 1,200km² of the area. The excellent quality of habitat in the coal block is well documented. Soper (1970) concluded that the whole east slope of the Rocky Mountains from Jasper Park north to the head of the Narraway and Wapiti Rivers (in the southern coal block) was unexcelled goat habitat. The best habitat shown by CLI is in the northern coal block and is rated class 2, an extremely high rating for mountain goat range. These sites have had high population levels reported as well (Table 1).

Table 1. Present and historical populations of goats in different parts of the North East Coal Block of British Columbia compared to presence of road access for coal exploration.

	Early 1960's		Present		Estimated population loss	Road access
	Estimated population	Actual count	Estimated population	Actual count		
Quintette - Babcock Mtns.	13	13	10	7	3	Yes
Wapiti - Belcourt R.	50	NA	50	40	0	No
Trapper Mtn.	80	60*	14	14	66	No
Ressor - crum Mtns.	60	NA**	15	8	45	Yes
Bullmoose	250	166	1	1	250	Yes
Bone - Becker Mtns.	90	NA	90	56	0	No
Wolverine Valley	200	162*	80	37	120	Yes

*Counts by ground observers
 **Not available

Good mountain goat habitat closely approximates coal license areas (Figure 1). Twenty percent of the mountain goat range, including some of the highest capability habitat, is under license by coal companies. Present and historical estimates of populations show that mountain goat numbers declined drastically in areas accessed by road, but remained stable in most other areas (Table 1). Trapper Mountain is an exception in that its population is also depressed but it was not explored for coal. However, this area is near a farming community, possibly a source of harassment to the mountain goats.

Future developments of areas already explored include nine open pit mines, two underground mines, several preparation plants, and one completely new town. A sour gas field immediately adjacent to the coal block is also slated for development. Attendant facilities will include powerlines, highways, and railways. Development of these resources will stimulate forest use in the area and generate further pressures for subdivisions and other developments. These projects and increased human populations associated with them will complicate efforts to maintain or re-establish goat populations.

Proposed explanations for the decline in goat numbers include: 1) movement of entire populations to other ranges because of hunting and/or harassment associated with easy access after exploration, 2) loss of habitat because of exploration, 3) overhunting resulting in depression of populations, and 4) poaching.

The notion that goat populations move to new habitat when harassed was commonly expressed by guides and outfitters during interviews, but is an incomplete explanation for the following reason. In the area concerned, Canada Land Inventory confirms that the sites with the highest capability for mountain goat production have shown the greatest losses in observed populations. No adjacent areas match the quality or size of goat range on Bullmoose and Trapper Mountains. This means there are no areas to which the once large goat populations of these mountains could go which would have sufficient carrying capacity to sustain them. In any case, if such habitat existed it would probably be already occupied. Further, aerial surveys haven't found the goats missing from Bullmoose and Trapper Mountains, thus if emigration occurred it must have been accompanied by die offs.

Considerable surface disturbance frequently accompanies coal exploration. Closely spaced roads are needed to provide access for drill rigs, pits are dug for sampling and trenches are made to trace coal seams. Bullmoose Mountain has a total area of approximately 80km² and has over 320km of roads and trenches. Though this disturbance is sufficient to give the area a very cut-up appearance, the roads are narrow, and, even allowing for sidecast and slumping, the surface area disturbed is much less than 1%. Although this loss could be significant if concentrated in critical areas we feel it is insufficient to explain the drastic population declines observed in the area under consideration.

The effect of goat hunting in the coal block area is difficult to document. A bag limit of one and an open season from early August to mid-December was applied to the entire area until 1972. Then the season in the area with the most depressed populations (Bullmoose and Trapper Mountains) was closed. Present hunting season in the area still open was from August 15 to October 15. Table 2 shows resident goat kill in Management Area 28 and non-resident kill in the study area for the period of greatest decline in numbers. Goat populations in Management Area 28 are in the coal development area with the exception of some populations north of the Peace River. However, Mr. F. Harper, Regional Biologist in the area during the period under consideration, indicated that the northern region would account for few of the resident goats taken because access in this area is primarily by horseback. Superficially the kill, which never exceeded 74 animals per year, does not appear sufficient to produce the decline observed. However, hunting effort was undoubtedly concentrated in areas newly accessed by roads. This factor may have greatly magnified the impact of hunting by concentrating kill on accessible herds while others went unharvested. Such over-exploitation following progressively increasing access has been singled out as the cause of drastic declines of mountain goat population in the East Kootenay area of British Columbia (Phelp et al. 1976).

Table 2. Mountain goat harvest from 1967 - 1976 in Management Area 28.

Year	Resident Harvest in Management Area 28 (includes study area)	Non-Resident Harvest from study area	Total
1967	11	21	32
1968	16	15	31
1969	29	19	48
1970	24	21	45
1971	20	18	38
1972	6	9	15
1973	38	36	74
1974	14	8	22
1975	11	9	20
1976	NA*	6	NA

*Not available.

The effect of illegal hunting by its nature is almost impossible to evaluate. Rumors of high illegal kill persist, however, no prosecutions are on record. Illegal hunting seems most likely in areas such as Bullmoose Mountain which has a large flat top and numerous roads that can be travelled

by motor vehicle above goat escape terrain on the mountain sides.

Whatever the precise mechanism of the decline of goat populations in the N. E. coal block, there is a clear relationship between access and goat numbers. Nowhere in the coal block is there a healthy goat population with nearby road access. Very close monitoring of goat numbers in remaining populations will be necessary to assess the impact of hunting relative to the impact of other factors which may be involved in the decline of goat populations. The effect of long hunting seasons and easy access documented by Phelps *et al.* (1976) in other areas warrant careful examination here. If hunting is demonstrated to be a major factor in population losses, a management rather than habitat protection problem is implied.

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