

Status of the Galena Mountain caribou herd.

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Abstract: A resident herd of caribou (*Rangifer tarandus granti*) inhabits the Koyukuk River valley and Kokrines Hills, which are located on the north side of the Yukon River near the Alaskan villages of Galena and Ruby. Personnel from the Alaska Department of Fish and Game, U.S. Bureau of Land Management, and U.S. Fish and Wildlife Service studied this herd from October 1983 to January 1990. The highest caribou count was 258 in June 1987. The proportion of newborn calves observed during the May calving period ranged from 0 to 28% (mean=10%) whereas it ranged from 4 to 17% (mean=13%) in October. Caribou inhabited mostly coniferous forest from October through April and open habitat from May through September. Male caribou occupied fewer habitat types, travelled less distance, and remained at lower elevations than female caribou. Management concerns for this herd are discussed.

Keywords: Alaska, caribou, Galena Mountain, land uses, *Rangifer*, subsistence.

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Introduction

The Galena Mountain Caribou (*Rangifer tarandus granti*) herd (GMH) inhabits the Koyukuk River valley and Kokrines Hills, which are located on the north side of the Yukon River near the Alaskan villages of Galena and Ruby. Galena Mountain is a local name for the Vertical Azimuth Bench Mark named Bald. Although the origin of these caribou is unknown, they may be survivors of a commercial reindeer (*R. t. tarandus*) operation in the Kokrines Hills that ended about 1935 (Osborne 1989). Feral reindeer may have also mixed with migrant members of the Western Arctic Caribou herd (WAH). Between 1950 and 1975, some WAH caribou migrated across the central Brooks Range into the Koyukuk River valley. Caribou migration into the Koyukuk drainage ceased as WAH numbers declined from 242,000 to 75,000 animals during the early 1970s (Davis and Valkenburg 1978). Data collected from 1983 to 1989 by personnel of the Alaska Department of Fish and Game (ADFG), U.S. Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (FWS) located animals on summer range, winter range, and calving areas, thus con-

firmed existence of a resident herd. Because the observed calving dates coincided with those of caribou rather than reindeer, we concluded that these animals were caribou.

According to a BLM subsistence inventory, caribou are important to Galena residents (BLM 1986a). These people have hunted caribou on BLM lands in the headwaters of Holtakatna Creek, which is related to the customary migration route of caribou through this area. Therefore, the Environmental Impact Statement for the Central Yukon Resource Management Plan examined conflicts between caribou and potential development of mineral resources (BLM 1986a). The preferred alternative in the Environmental Impact Statement was to open 78% of the caribou habitat within the Dulbi-Kaiyuh Mountain Subunit (1 of 5 subunits in the Central Yukon planning area) to mineral entry and location and 83% to noncompetitive leasing for oil and gas. Known crucial habitats on BLM land were included in these openings, but designated as Areas of Critical Environmental Concern (ACEC) (BLM 1986b). A suspected but unsubstantiated movement route was deferred from mineral openings pending additional stud-

es. Robinson (1988) prepared an ACEC management plan, which identified stipulations for protecting traditional calving areas. Final decisions regarding the movement route have not been made.

Objectives of this project were to (1) determine population status and trend of the Galena Mountain Caribou herd and (2) delineate herd boundaries, seasonal use areas, and movement routes on BLM land. This information was necessary to determine impacts from potential conflicting land uses. In addition, caribou survey data could be used to set hunting seasons and bag limits. This paper constitutes a final report for this project.

Study area

Caribou wintered in the Koyukuk Flats and summered in the Kokrines Hills (Fig. 1). Elevations ranged from 60 to 1,517 m. The Koyukuk Flats was a broad valley characterized by extensive wetlands, lichen crusted taiga, and black spruce (*Picea mariana*) forests. The Kokrines

Hills were covered by mixed forest and scrub vegetation at lower elevations, while higher elevations were covered by alpine and subalpine vegetation. Key wildlife species for this area were waterfowl, raptors, furbearers, wolves (*Canis lupus*), black bear (*Ursus americana*), grizzly bears (*Ursus arctos*), moose (*Alces alces*), and caribou. More detailed information can be found in the Proposed Resource Management Plan, Final Environmental Impact Statement for the Central Yukon Planning Area and the Koyukuk National Wildlife Refuge Final Comprehensive Conservation Plan, Environmental Impact Statement, and Wilderness Review (BLM 1986a, FWS 1987).

Methods

We counted caribou to establish population size during October from 1983 to 1986 and 1988. Calving areas were examined during late May from 1985 to 1989. We looked for post-calving aggregations during June from 1987 to 1989. In April 1986, we captured and fitted four with ra-

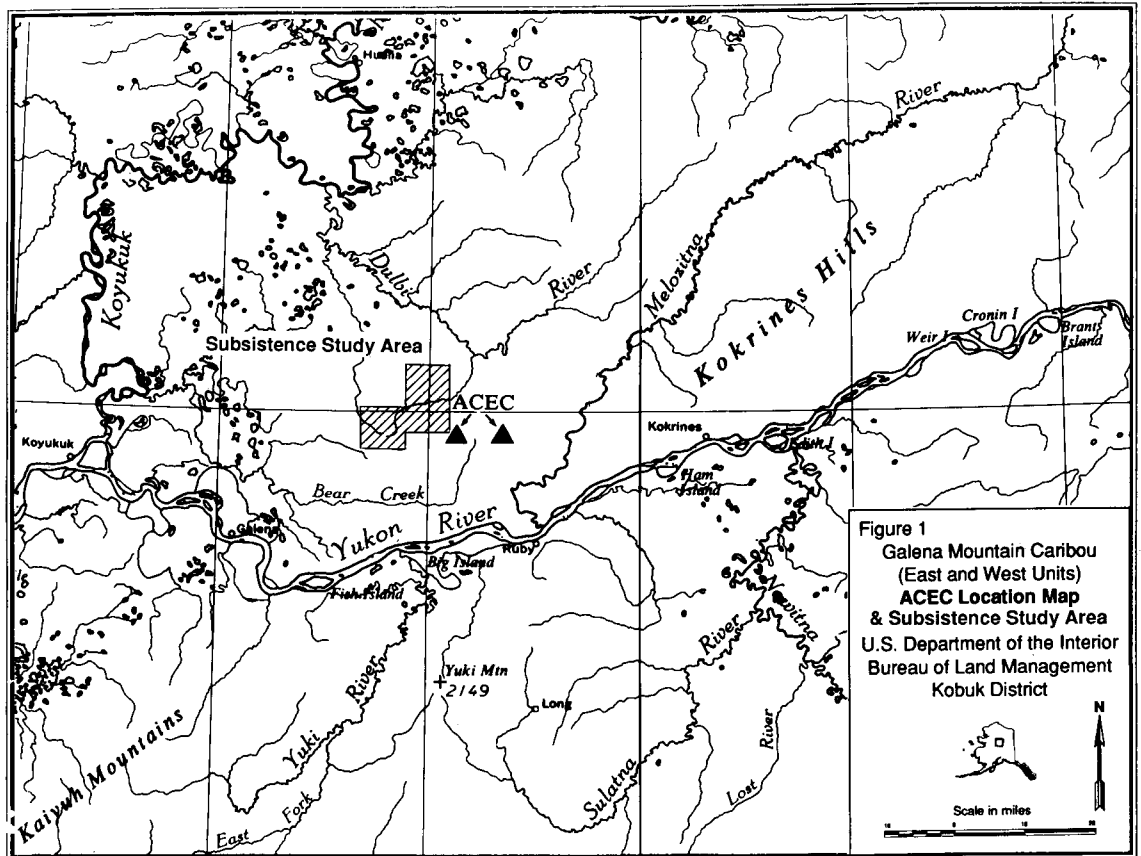


Figure 1
Galena Mountain Caribou
(East and West Units)
ACEC Location Map
& Subsistence Study Area
U.S. Department of the Interior
Bureau of Land Management
Kobuk District

Table 1. Radio frequencies, sex, dates collared, last date of location, and number of relocations of radio-collared caribou in the Galena Mountain Herd, 1986-90.

Radio frequency	Sex	Date collared	Date last location	Number of relocations	Notes
151.831	M	04/09/86	03/30/88	11	Mortality
151.820	M	04/09/86	11/25/88	17	Mortality
151.870	M	04/09/86	09/07/89	24	
151.841	F	04/09/86	01/24/90	26	
151.900	F	03/23/87	03/30/88	8	Mortality
151.850	F	03/24/87	06/27/88	11	Mortality
151.861	F	03/23/87	09/07/89	18	
151.881	F	03/23/87	09/07/89	20	

dio-transmitting collars (Telonics Inc., Mesa, Arizona) and four more caribou in March 1987 for a total of eight caribou (Table 1). Using either a Piper Super Cub or single-engine Cessna, we flew 34 monitoring flights from April 1986 to January 1990. Animal locations were plotted by latitude, longitude, and legal location on 1:63,360 and 1:250,000 scale quadrangles. Habitat data was described by broad vegetative type, landform, and elevation. We also recorded the animal's activity and group size. ADFG and FWS assisted with data collection.

Results

Population status and trend

Our total observed caribou numbers ranged from 17 in May 1989 to 258 in June 1987 (Fig. 2). The highest caribou counts during October were 184 and 185 in 1984 and 1985, respectively. The proportion of newborn calves observed during the May calving period ranged from 0 to 28% (mean=10%) whereas it ranged from 4 to 17% (mean=13%) in October. We estimated the total population to be 500 caribou: the product of 250 for mostly cows and calves observed in June 1987 times 2 for unseen bulls. This is equivalent to a density of 0.11 caribou per sq.km. These numbers do not include 100-200 caribou (probable members of the Wolf Mountain Caribou herd) seen with a GMH cow on the calving area near Wolf Mountain.

We collected trend data during the first three Octobers of this study, but caribou were difficult to track and locate during October 1986 and 1988 and no surveys were attempted during October 1987 and 1989. Therefore, we were hesitant to describe population trend for this herd.

Distribution and movements

We determined the home range, covering 4,648 sq.km, of GMH caribou from 135 observations of 3 male and 5 female radio-collared caribou (Fig. 3). Cows occupied winter range in the Koyukuk Valley from October through February, while bulls remained through April or May. In November 1988, one collared GMH caribou mixed with approximately 3,000 caribou of the Western Arctic Caribou Herd. Ninety-two percent of our cow observations and 88% of the bull observations were in the coniferous forest. Eight percent of our cow and bull observations were in mixed forest. The 4% balance of bull observations were in scrub habitat (Table 2). Elevations of the valley floor were 60 to 90 m.

Pregnant cows began moving to higher summer range during March and April, while barren cows stayed behind through May. Bulls also

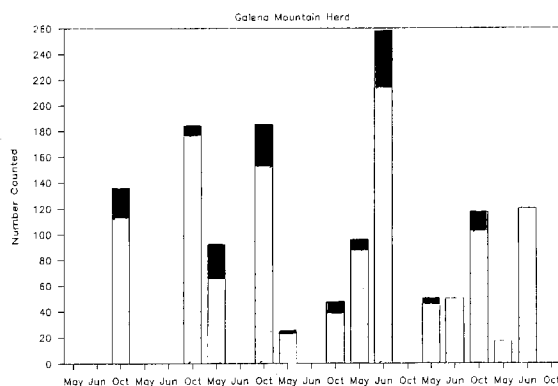


Fig. 2. Aerial counts of 1983-89.

□ Adults ■ Calves

(Caribou were difficult to track and locate during October 1986 and 1988. Animals were neither sexed nor aged during surveys conducted June 1988 and 1989).

Table 2. Number of radio-collared GMH caribou observed by habitat during different seasons of the year, 1986-90.

Habitat	Females			Males		
	Oct-Feb	Mar-Apr	May-Sep	Oct-Apr	May	Jun-Sep
Conifer	11	13	6	21	5	5
Hardwood	0	0	3	0	0	0
Mixed forest	1	0	3	2	0	3
Scrub	0	0	2	1	0	1
Tundra	0	8	22	0	4	5
Snow field	0	0	3	0	0	0
No data	0	6	4	0	3	3
Total	12	27	43	24	12	17

waited until May before moving to higher country. During March and April, 48% of our cow observations were in the coniferous forest and 30% were on open tundra. Elevation of these cows ranged from 60 to 980 m (mean=315 m). During May, bulls demonstrated a similar pattern with 42% of our observations in the coniferous forest and 33% on open tundra (Table 2). Elevation of these bulls ranged from 60 to 670 m (mean=302 m).

We identified 2 separate calving areas in the Kokrines Hills. Pregnant cows were on their respective calving areas during the latter half of May. The calving area west of the Melozitna River, covering 83 sq. km, was consistently used by 2 of the 5 collared cows. Elevation of our observations ranged between 430 and 850 m (mean=640 m). The other calving area east of the Melozitna River, covering 91 sq. km, was consistently used by 1 of the 5 collared cows. In 1987, this cow travelled 121 km, point to point, from her previously known location in the Koyukuk Valley. In 1988, she travelled 127 km, point to point, from a known location in the Koyukuk Valley. Elevation of our observations ranged between 760 and 1,160 m (mean=945 m). Cows of the adjacent Wolf Mountain Caribou Herd also used this same calving area. The other 2 cows either remained on their winter range or moved into the hills, but outside of the calving areas. These 2 cows did not calve during our period of observations.

Observations of post-calving aggregations during June were within or adjacent to the respective calving areas. During the balance of summer, cows roamed throughout the high country. From May through September, our cow

observations switched from mostly forest (28%) to open (63%) habitat (Table 2). Elevation of these observations ranged between 180 and 1,160 m (mean=622 m). from June to September, bulls were more restricted than cows in their movements. For example, collared bulls did not follow the cows across the Melozitna River. They also occupied 4 habitat types whereas cows utilized 6 different types. During this time period, 47% of our bull observations were in coniferous and mixed forests whereas 35% were in open tundra and scrub habitats (Table 2). Elevation of these observations ranged between 240 and 850 m (mean=471 m).

We discovered a small portion of summer range, covering 149 sq. km, that bulls and cows consistently used from March through September. This special area, which lies within and adjacent to the calving area west of the Melozitna River, had the greatest number (20%) of all collared caribou observations. This special area is larger than the designated east unit ACEC. Also, we never observed any calving activity in the designated west unit ACEC on Galena Mountain.

Management concerns

Present activity

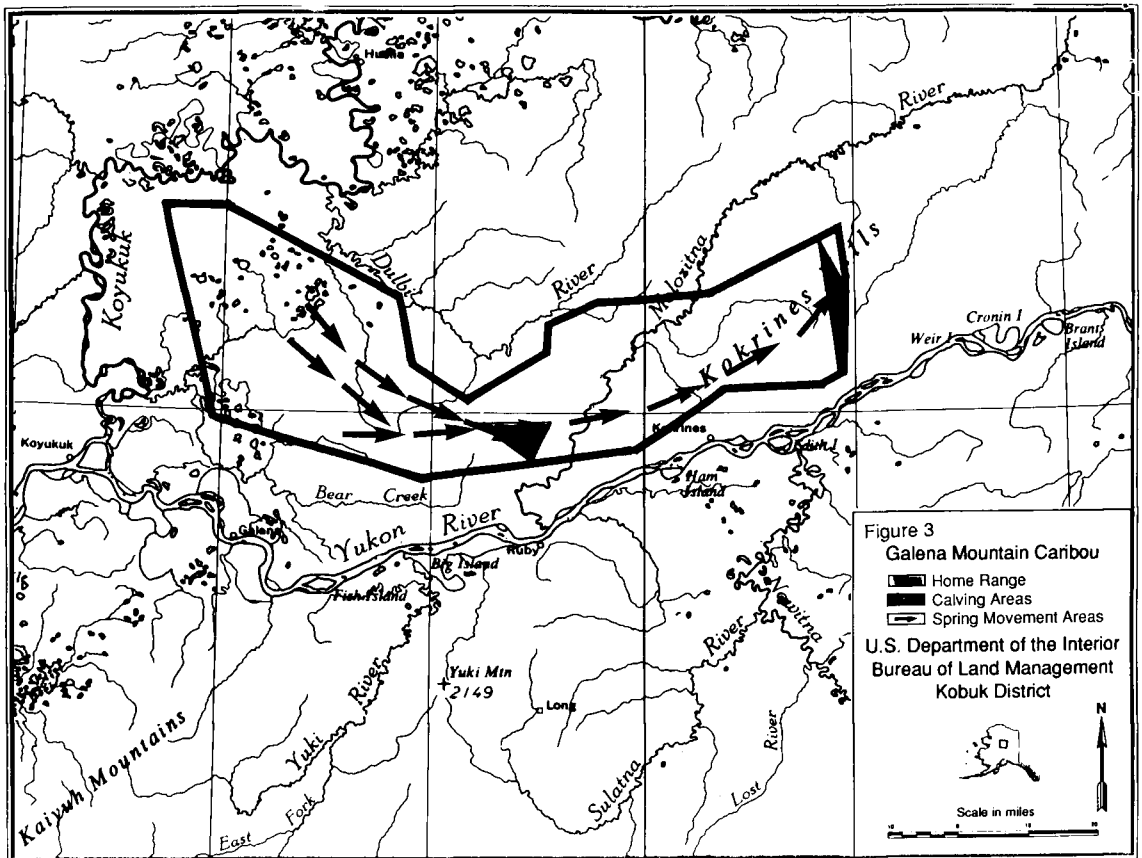
There are neither historic nor current mining claims in or near the calving areas. Therefore, geologists have reasons to believe that this area has low potential for occurrence of metalliferous minerals. The BLM lands within the home range of GMH caribou are currently closed to mineral leasing because of Public Land Order 5251, but the Central Yukon Resource

Management Plan will open these lands to leasing when fully implemented (BLM 1986b).

Analysis of the fire records from 1955 through 1986 revealed that 34 fires occurred on winter range, 16 fires on summer range, and none on calving areas. The size of these fires ranged from less than 0.1 to more than 2,023 hectares; 80% were less than 4 hectares. The size of these fires was influenced by fuel type, weather, and suppression action taken at the time of the fire. Caribou researchers have had differing opinions on impacts to caribou from wildfire (Bergerud 1980, Shideler *et al.* 1986). While some researchers base their conclusions upon destruction of lichens and a long regeneration time period of this valuable forage, other researchers base their conclusions upon maintenance of habitat heterogeneity, recycling of nutrients, and revitalization of sedges, forbs, and shrubs. Because of the study area's fire history, caribou's ability to move to unburnt lichen range, and the positive benefits to habitat in general, wildfire can do more good than harm to all wildlife inhabiting this study area.

Sport and subsistence hunters have harvested GMH caribou from August 10 to September 30; the bag limit was 1 caribou (ADFG 1990, FWS 1990). From 1981 to 1988, 0 to 6 (mean=1) caribou per year were taken (Osborne 1990). Because of the mixing of GMH with WAH caribou on winter range, the Alaska Board of Game allowed emergency hunting seasons in December since 1988. The Federal Subsistence Board decided in 1991 to allow additional winter hunting. These actions are mostly intended for WAH caribou, but some albeit an unknown amount of GMH caribou could be harvested. Excessive harvest of GMH caribou would be detrimental to its population size.

Subsistence use within the home range of GMH caribou is primarily winter trapping with some caribou and moose hunting by people from the villages of Galena and Huslia. BLM (1986b) identified 233 sq. km located north and west of the Galena Mountain (west unit) ACEC as a subsistence use study area because of suspected but unsubstantiated caribou movement routes (Fig. 1). Although the present



study identified caribou moving through this subsistence use study area during spring, Douthit (1991) recommended these townships be open to mineral entry and location, leasing for oil and gas, and other land use activities. However, each proposed action would have a Section 810 (a) evaluation and finding conducted before being permitted, and appropriate stipulations protecting subsistence uses and resources would be applied as necessary (BLM 1986b). Such activity would not likely affect caribou calving areas, nor would such activity likely restrict any subsistence use or resource.

Future activity

BLM (1986a) described exploration and development scenarios for different mining operations. Because of the ACEC designation, an individual environmental analysis would be conducted for any proposed action. If mineral development occurs, then habitat loss would result from construction of new roads, airstrips, drilling pads, and camp facilities. Forage production that is immediately adjacent to these facilities would be reduced due to changes in snow accumulation, surface water distribution, roadside dust, and gravel spray. In comparison to the total available area, these surface disturbances would be minimal in size and impacts to caribou would be insignificant. However, if these disturbances occurred within the calving and special areas identified during this study, then the impacts could be significant.

A human activity increases within the home range of GMH caribou, so does the possibility for disturbance to caribou. Behavioral avoidance of presently occupied habitat by caribou would cause an effective loss of habitat. This indirect loss of habitat would be greater than the direct loss described above. Maternal groups of caribou appear to be the most sensitive during the calving and post-calving period, May 5 through June 30 (Gilliam and Lent 1982, Bishop 1988). Therefore, human activity in the calving areas should be avoided during this period (Bergerud 1980).

Visual and auditory stimuli from aircraft, especially helicopters, associated with increased mineral exploration and development can be a major cause of disturbance. Possible impacts are decreased energy intake because of interruptions to grazing, accelerated energy expended while trying to escape, injury or mortality to young

animals due to stampeding, and separation of the cow-calf bond (Shideler *et al.* 1986). Although harassment by aircraft is not legal, individual caribou exposed to aircraft can habituate if it is not perceived as threatening (e.g. associated with hunting) (Valkenburg and Davis 1985).

The BLM prepared an ACEC management plan for directing actions in this study area (Robinson 1988). The management actions for protecting crucial calving areas from undue and unnecessary habitat alterations and disturbances should include the special area identified during this study. Because we never observed any calving activity in the designated west unit ACEC on Galena Mountain, management restrictions could be lifted unless future observations identify calving activity.

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