

THE NATURE OF BROWN BEAR PREDATION ON CATTLE,  
KODIAK ISLAND, ALASKA

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The relationship between brown bears (*Ursus arctos middendorfi*) and domestic cattle was studied on Kodiak Island, Alaska, from May 1, 1964 through June 30, 1965 to provide information which might alleviate the conflict between the brown bears and the cattle industry. Primary considerations throughout the study were: (1) extent of bear predation on cattle, (2) sex and age composition of bears on the cattle ranges, (3) the place of origin and patterns of movement of bears on the cattle ranges.

The study was conducted within the land area of eight Bureau of Land Management grazing leases occupied by cattle on the northeast end of Kodiak Island. These leases contain over 180,000 acres which comprise approximately one-twelfth of the land area of Kodiak Island

Terrain inside the grazing areas varies from lowland meadows located at the heads of the bays to steep inland mountains rising to over 3300 feet. Rolling hills often dissected by deep ravines, form the principal grazing areas.

Vegetation generally consists of dense growths of tall grasses and forbs interspersed with shrubs and trees. Important species include blue joint grass (*Calamagrostis canadensis*), fireweed (*Epilobium angustifolium*), beach rye (*Elymus mollis*), sedge (*Carex* sp.), willow (*Salix* sp.) and elderberry (*Sambucus racemosa*). Sitka spruce (*Picea sitchensis*) is an important cover species in the Cape Chiniak and Anton Larsen Bay areas and alder (*Alnus crispa*) is abundant on well drained hillsides. The area has a wet, mild climate with mean annual rainfall exceeding 60 inches. Temperatures seldom rise above 70° F. in the summer or fall below 0° F. in the winter.

Russian settlers introduced the first cattle on Kodiak Island in 1794. These and other early introductions were not particularly successful. However, in recent years, the cattle industry has gradually expanded and there are now 1350 cattle, excluding calves, on eight grazing leases. Rieger and Wunderlich (1960) suggested that ranchers on Kodiak Island would need approximately 200 head of breeding cattle to produce a satisfactory income for one family. Presently, two leases on Kodiak Island meet this requirement, and three others show promise of attaining the mark. The volume of beef butchered during the last three years has varied between 33,000 and 77,000 pounds and has been sold locally for 50 cents per pound.

Causes of cattle mortality are malnutrition, ingestion of water hemlock (*Cicuta* sp.), a toxic plant, accidents such as falling or drowning, birth defects, and bear predation. Some animals are occasionally killed by hunters and poachers. A few cattle have reportedly died from consuming excessive amounts of grain.

The brown bear hunting season on the north end of Kodiak Island, including the cattle leases, opens 1 September and closes 30 June. Registered guides do not operate in cattle grazing areas; local residents and

military personnel stationed at the Kodiak Naval Station furnish most of the hunting pressure. Sport hunting has not been effective in alleviating predation by brown bears even though lease areas contain the only road system on Kodiak Island. During the study period 19 bears were known to have been killed on the cattle grazing areas. Four were taken by sport hunters and 15 were killed as predators or potential predators. Alaska Department of Fish and Game regulations allow the taking of game animals in defense of life or property.

#### Methods

When the study was initiated, ranchers were asked to report any occurrences of predation. Personnel located carcasses from the ground in 1964 and with a Piper PA-18 aircraft in 1965. Mortalities were subsequently examined by Department personnel and the cause of death determined by using criteria explained by Murie (1948).

Dead cattle were examined to determine if they had been killed by bears. Only those cattle with puncture marks accompanied by hemorrhage were listed as bear kills.

Bear skulls and reproductive tracts were collected whenever possible to determine the sex and age composition.

Information on bear numbers, distribution, and movements were obtained from aerial observation of bears and snow trails and ground counts of tracks on salmon streams.

#### Findings

Thirty-three cattle were determined to have been killed by bears during the 14-month period of the study. The most characteristic mark present on cattle killed by bears was canine tooth punctures in the thoracic vertebrae region. These were present in about three-fourths of the carcasses positively identified as bear kills (Table 1). This differs from information given by Murie (1948) who found tooth marks on the dorsal part of neck to be the most characteristic mark present on bear-killed cattle in Wyoming. Seven more cattle were still alive after being mauled by bear. These maulings varied from slight lacerations to deep open wounds. Actual losses were probably higher since ranchers report that only about one-half of the missing cattle are located. The cause of death of six cattle was listed as unknown and may have been caused by predation.

Approximately two-thirds of the cattle predation was reported in June. Cattlemen generally agree that the critical predation periods are from mid-April through June, and late fall. According to Clark (1957), these periods correspond with the time of most severe food shortage for bears.

The movement pattern of bears, particularly predator bears, in the cattle grazing areas is important to know in considering control measures. Although many tracks were observed and recorded, only two cases were observed where significant movements of individual bears could be determined. In the first case, bear tracks were observed on March 12, 1965, in the Saltery Lake area. Since there was complete snow cover, except

in the meadows and along the low slopes, the tracks could be followed by observers using aircraft. This bear travelled a straight line distance of approximately ten miles from where tracks originally appeared to where three dead cattle were observed near a bay. Tracks continued until the bear was later killed less than a mile from where the tracks were originally observed. This bear travelled about 20 miles through deep snow and over precipitous terrain in a 15-day period. Five dead cattle were attributed to this bear. His travels had taken him completely through one lease and about half-way through another in a wide circuit. In the second case, two ranchers were simultaneously experiencing cattle losses to bear predation. The tracks near the kills on both ranges were measured and both were the same size. Flights made on June 19, 1965 and on June 24, 1965 revealed that the bear had been crossing over a high snow covered ridge to move from one ranch to the other.

Of the 19 bears killed in the cattle range, 16 were adult males, two were adult females, and one was a yearling male. Neither cubs of the year nor two and one-half year old bears were reported. Since bears were not collected selectively, this indicates a marked difference in sex and age composition from that reported by Troyer and Hensel (1964) at Karluk Lake, Kodiak National Wildlife Refuge. Age composition at Karluk was 26 per cent cubs, 22 per cent yearlings and 17 per cent two and one-half year olds; the adult sex ratio was 78 per cent females. These figures indicate the bear population in the Kodiak cattle grazing areas is not being produced by a resident breeding population.

Five of the 19 bears killed were known to be predator bears. Examination of the hides showed that all five were adult males. Skulls were collected from three of the five bears. These bears were aged as 4+, 6+, and 8+, based on dental and skull suture characteristics. One instance of attempted predation was observed. The bear involved was judged to be a medium large female accompanied by a two and one-half year old. The incident occurred within 300 yards of the observers. A band of five or six cattle was feeding on a hillside above a dense alder and willow grove. The bear emerged from the grove and crept towards the cattle. The cattle moved uphill into another alder patch and the bear continued to follow them until about 30 feet separated the cattle and the bear. At this point, the cattle abruptly ran uphill and out of sight while the bear followed in full chase. The small bear did not actively take part in the chase, but followed the female alternately making a short rush and then hiding in the dead grass. These rushes were quite noisy and may have alerted the cattle. The observers climbed the hill, and found the cattle had escaped and the bears had terminated the chase.

#### Summary

Studies conducted from May 1, 1964 through June 30, 1965 indicate that Kodiak brown bears are an effective predator on cattle and that cattle and bears are not compatible on the same ranges. Sport hunting is light due to sparse bear populations and does not alleviate the conflict.

The most characteristic mark found on cattle attacked by bears was the presence of canine tooth marks, accompanied by hemorrhaging in the area of the thoracic vertebrae. Claw scratches and bites were sometimes present in other areas.

TABLE 1

Data on 33 Cattle Carcass Classified as Killed by Bears  
from May 1, 1964, Through June 30, 1967  
on Kodiak Island

Sex	Age	Breed	Month Killed	Body Areas Showing Tooth Marks	Body Areas Showing Claw Marks
M	Yearling	Angus	June	Thoracic Vertebrae; Nasal Area; Eye	Sternum
M	Yearling	Angus	June	Thoracic Vertebrae	
?	Yearling	Angus	June	Thoracic Vertebrae	Sternum; Head; Neck
M	Adult	Angus	June	Thoracic Vertebrae; Cervical Vertebrae	
M	Yearling	Angus	June	Frontal Bone; Cervical Vertebrae	Shoulder
F	Adult	Angus	June	Thoracic Vertebrae	Flanks; Back; Sternum
M	Yearling	Hereford	June	Thoracic Vertebrae	Head; Neck; udder
M	Yearling	Hereford	June	Thoracic Vertebrae	Abdomen; Shoulder
F	Yearling	Hereford	June	Thoracic Vertebrae	Abdomen; Leg
F	Adult	Angus	July	Thoracic Vertebrae; Cervical Vertebrae	Sternum; Head; Flank; Neck
M	Calf	Highland	July	Thoracic Vertebrae; Cervical Vertebrae	
F	Adult	Angus	March	Thoracic Vertebrae; Lumbar Vertebrae	Flank; Udder
?	Adult	Angus	March	Thoracic Vertebrae; Lumbar Vertebrae	
?	Adult	Angus	March	Thoracic Vertebrae	Flank
F	Adult	Hereford	March	Thoracic Vertebrae	
?	Adult	Angus	March	Thoracic Vertebrae	Flanks; Legs
F	Yearling	Highland	March	Thoracic Vertebrae	
M	Yearling	Highland	March	Sternum; Frontal Bone	
?	Yearling	Highland	March	Thoracic Vertebrae; Animal was partly eaten.	

TABLE 1 (Continued)

Sex	Age	Breed	Month Killed	Body Areas Showing Tooth Marks	Body Areas Showing Claw Marks
F	Calf	Hereford	May	Frontal Bone; Cervical Vertebrae; Legs; Thoracic Vertebrae	
F	Yearling	Angus	May	Nasal Area; Thoracic Vertebrae	Neck
M	Yearling	Angus	June	Nasal Area; Ventral Abdominal Region; Thoracic Vertebrae	Flank
M	Adult	Hereford	June	Nasal Area; Thoracic Vertebrae	
M	Yearling	Hereford	June	Thoracic Vertebrae; Cervical Vertebrae	Abdomen
M	Yearling	Hereford	June	Cervical Vertebrae; Thoracic Vertebrae; Nasal Area	Anus
M	Adult	Hereford	June	Thoracic Vertebrae; Nasal Area	Shoulder; Abdomen
M	Yearling	Angus	June	Thoracic Vertebrae; Nasal Area	Anus
M	Yearling	Hereford	June	Thoracic Vertebrae; Sternum; Nasal Bone	Anus; Neck
M	Adult	Hereford	June	Thoracic Vertebrae; Frontal Bone	Anus; Neck; Nose
M	Yearling	Hereford	June	Thoracic Vertebrae; Nasal Area; Ventral Abdominal Region	
M	Adult	Angus	June	Nasal Area; Cervical Vertebrae	
F	Yearling	Hereford	June	Nasal Area; Thoracic Vertebrae	Shoulders
M	Calf	Hereford	June	Nasal Area; Lumbar Vertebrae	

Most predation occurred during the month of June and to a lesser extent throughout the other spring and summer months.

Individual predator bears demonstrated extensive movement patterns and were responsible for killing several cattle.

Age and sex ratios of bears killed on the cattle ranges indicate that the area does not support a breeding population of bears. Predator bears that were killed were all adult males; however, one bear which was observed chasing cattle was judged to be a female accompanied by her two and one-half year old offspring.

#### Literature Cited

- Clark, W. K.  
1957. Seasonal Food Habits of the Kodiak Bear. Trans. N. Am. Wildl. Conf. 22: 145-149.
- Murie, A.  
1948. Cattle on Grizzly Bear Range. J. Wildl. Mgt. 12(1): 57-72.
- Rieger, S. and R. E. Wunderlich.  
1960. Soil Survey and Vegetation Northeast Kodiak Island Area, Alaska. U. S. D. A. Soil Survey Series 1956. No. 17.
- Troyer, W. A. and R. J. Hensel.  
1964. Structure and Distribution of a Kodiak Bear Population. 28(4): 279-772.

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**ANCHORAGE, ALASKA**

**JULY 7-9, 1965**