

The Caribou Question

By Suzanne Iudicello



When the trans-Alaska oil pipeline was constructed in the mid-70's, it was heralded by the petroleum industry as one of the greatest engineering feats in the world. Many of the construction problems were unlike those ever experienced. In fact, some construction techniques were developed and tried for the first time. Among its "first's," "most's" and other superlatives, the pipeline was distinguished by the environmental protection standards applied to it.

Protection of the fragile tundra, the animals on it, and the streams that meandered through it was built into the right-of-way stipulations for the project. Because the pipeline would traverse the range of several of Alaska's caribou herds, concern about the effects of construction on this big game animal became the focus of environmentalists, hunters and biologists alike. Today, half a decade after the major construction activity, pastoral photographs of caribou grazing near the pipeline and within the Prudhoe oilfield along with a small increase in the number of animals in the pipeline corridor seem to indicate there were little or no adverse impacts from the pipeline. But with petroleum development expanding and gasoline construction imminent, the verdict on the pipeline and the caribou isn't in yet.

Caribou and reindeer occur throughout the arctic regions of the world and are considered one species. The barren ground subspecies found in Alaska generally inhabits open tundra lands near or above timberline. These animals, a distinctive part of Alaskan wildlife for thousands of years, are an important source of food for many Alaskans.

Like most wild herd animals, caribou move from one area to another as food becomes available.

Spring movements of caribou are generally to areas of early snow melt-off and emergence of green vegetation. Other key habitat factors are thought to be scarcity of predators and proximity to areas where animals can find relief from insects as the spring turns to summer. This is particularly important to the calves, which are born (in the Arctic) in early June. Caribou are often harassed by hordes of mosquitoes, nasal bot flies and warble flies, and flee to windswept ridges or coastal areas for relief. Fall movements are triggered by snowfall; winter distribution covers a wide range, believed to be related to optimal snow depth and forage availability. Early in winter the animals tend to stay near rivers and lowlands. As the season progresses and the snow becomes deeper, they move up to wind-swept hilltops or into the mountains where winter feeding conditions are better. If caribou can graze all summer, grow, build up fat and stay clear of the

insects, they can survive all but the most unseasonably hard winters.

In late winter the cows and calves gather together, and the spring migration to the calving grounds begins again, stringing out over miles with the males and yearlings bringing up the rear.

These seasonal migrations posed one of the first questions for biologists considering the impacts of the construction of the 800-mile oil line from Prudhoe Bay to Valdez. Would the caribou cross it and its parallel haul road?

Many believed that the above-ground structure of the pipeline would interfere with caribou migrations across the North Slope. Although there was little evidence to confirm this, wildlife managers working with the designers of the pipeline held out for the most conservative approach to construction. Stipulations in the right-of-way lease required builders of the line to fund research on the caribou question and to design modifications to accommodate big game crossings.

As construction began in 1974, so did a long-term study by Department biologists Ray Cameron, Ken Whitten and Walter Smith, and graduate student Dan Roby. Their first achievement was confirmation that a distinct herd of some 5,000 caribou, now known as the Central Arctic herd, ranges in the pipeline corridor along the Sagavanirktok River, between calving grounds on the coast to wintering range in the northern foothills of the Brooks Range.

Surveying from the haul road and from the air, the researchers compared the sex and age composition of groups of caribou along the haul road with that beyond the sound and visual range of construction activity. These observations were augmented by radio tracking certain individuals. Although effects of single factors such as road and air traffic, noise and presence of humans and buildings were difficult to isolate and compare, the study team narrowed its focus to the proportion of calves near the pipeline versus the proportion in the group as a whole.

They confirmed after five years that there were proportionately fewer cows with calves near the pipeline and haul road, particularly in the summer, than there were among the caribou distant from the pipeline. The study surveys showed, for example, that among the remote herd, calves averaged about 20 per hundred caribou. In comparison, the corridor group had from a maximum of 12 calves per hundred caribou to as few as three per hundred. The fall counts showed the proportion (as compared to the "expected" 20 per hundred) ranging from 20 per hundred in 1975 to as low as three per hundred in 1978. In 1979, the number of calves in the corridor increased to 14 per 100.

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Today it is for the most part avoided by all but small bands of bulls and juveniles.

Continued expansion of this field is the greatest immediate concern to biologists. The density of development there and the associated human activity are likely to interfere significantly with calving and summer distribution of caribou. The other critical factor in the location of the complex is that it lies in the path of the regular movements caribou make along the coast to avoid insect harassment. The relief they seek and find from the cool, shore breezes is necessary for uninterrupted feeding and nursing that provides the growth and fat they need to survive through the winter.

Other concerns are the imminent construction of the gas pipeline and increased public use of the haul road. Biologists see these events in a cumulative light, not as isolated occurrences. The key to the caribou question seems to be whether or not the caribou respond to these additional developments singly or in combination.

Data indicate that caribou may tolerate traffic, structures and human proximity up to a point. For example, during the early days of construction, the herd wandered through the Prudhoe Bay complex, and photographs display bulls standing in the shade of the overhead pipe. But other animals have exhibited a reluctance to come near the corridor, even where the pipeline is buried. This, in combination with the data showing change in caribou response over the period of construction, leads biologists to believe that there is an upper threshold of accumulated stimuli such as airplanes, truck traffic, buildings, construction noises and human presence below which caribou show little or no adverse response. But a combination of successive events, additional structural development and continued human presence may eventually be perceived by the caribou as a cumulative stimulus, causing them to avoid areas they formerly occupied.

The key effects of development—sensory disturbances, physical obstructions and habitat alterations—are individual pieces of an overall picture that may be accumulating to reach the critical threshold. But the tolerance of caribou to such changes is not defined yet, beyond the observation that maternal cows have a lower tolerance for such disturbances than other caribou.

Though these factors have not, to date, resulted in any negative changes (in fact, the herd has increased slightly) it is not sufficient to look at the short-term absence of biological impacts from these disturbances. In the *Canadian Field Naturalist* in 1979, Cameron and his associates wrote: "Disturbance-related abandonment of range is thought to be a gradual process occurring with increasing avoidance of adverse stimuli, and the recent history of caribou occupation near Prudhoe Bay appears to reflect this pattern." (Volume 93, pp. 155-162)

Caribou distribution may continue to stabilize at the summer trend of corridor avoidance if the levels of haul road traffic and oil field activity remain as they are today. Caribou may even habituate this level of disturbance and reverse their tendency to avoid the corridor.

National energy policy, present oil and gas leasing policy, the beginning of gasline construction and the recent court decision opening the haul road to the public make the likelihood of "present level" activity pretty slim. Additionally, the potential of exploration and development in the Arctic National Wildlife Refuge is not as remote a possibility as it once was.

In the face of all this, Alaskans might resign themselves to a simple displacement of the Central Arctic herd, and hope their numbers don't suffer. But even displacement is significant from the standpoint of user groups, both subsistence and recreational. Should the Central Arctic herd be squeezed out of its range to such an extent that the habitat is not capable of supporting the herd, or if the animals are absorbed into another herd, they will no longer be distinguishable as a distinct group, and the losses might well be irreversible.

The future is not all bleak, however. Several petroleum companies with interests at Prudhoe Bay have responded to the potential conflicts with their support of research, cooperation in scheduling activity around critical seasons, keeping disturbance at a minimum in areas where movements occur, and approaching the design of roads and pipelines in a corridor pattern rather than spread over large areas.

Only continued research will uncover the short and long-term risks and consequences of petroleum development. Only a conservative approach to that development in the living space of Alaska's caribou will assure that the environmental and wildlife trade-offs are known before they are made. □

This article was compiled and edited by Suzanne Iudicello from research by Dr. Ray Cameron, Kenneth Whitten, Dr. Walter Smith, Dan Roby and others. Cameron and Whitten are game biologists specializing in ungulate research. Cameron received a Ph.D. in zoophysiology from the University of Alaska in 1972, and continues to serve as an affiliate faculty member. Whitten received an M.S. in biology from the University of Alaska in 1975. Smith received a Doctor of Arts degree from Idaho State University. Roby received a Master's Degree from the University of Alaska in 1978 and is presently working on a Ph.D. in avian ecology.

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WINTER 1981

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