

Introduction to the Population Ecology of North American Caribou

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Caribou (*Rangifer tarandus*) in North America naturally occur at densities ranging from several animals/km² to less than one caribou/100 km². Seip (1991) and Bergerud (1992) discussed how those major differences in density across North America appear to be related to the impact of wolf (*Canis lupus*) predation, and the strategies used by caribou to avoid wolves. Caribou living in areas without wolves usually occur at high densities and are regulated by competition for food. Migratory arctic caribou coexist with wolves, but their long distance migrations reduce their exposure to wolves during the calving period. Although wolf predation is often a major limiting factor, migratory arctic caribou coexist with wolves at relatively high densities. In the mountains of western North America, caribou usually aggregate on alpine plateaus or disperse in rugged, high-elevation habitat during the calving period and thereby reduce their exposure to wolves. That strategy is only moderately effective so the caribou coexist with wolves at medium densities. Caribou that live in the boreal forests across North America have the least effective options to avoid wolves, and are often reduced to very low densities or even eliminated. Those caribou often calve on islands, in muskegs, or in rugged terrain to avoid wolves.

The impacts of predation on caribou are usually greater in areas where there are other prey species, such as moose (*Alces alces*), that support higher wolf populations, or in areas where other predators such as bears (*Ursus* spp.) are also present. In some areas high levels of human harvest have significantly reduced caribou populations below natural densities. Consequently, habitat modifications that enhance other ungulates, or improve access for human hunters, can be detrimental to caribou populations.

In this session, we asked the presenters to discuss the population ecology of different caribou herds in

North America and to evaluate if they fit the general model outlined above. The first paper by Ouellet *et al.* describes two high density caribou herds that live on wolf-free islands and are regulated by competition for food. The next three papers by Crête *et al.*, Heard *et al.*, and Whitten discuss migratory arctic caribou herds. The papers by Farnell *et al.*, Valkenberg *et al.*, and Seip & Cichowski discuss caribou in mountainous areas of western North America. The paper by Cumming *et al.* describes how caribou in the boreal forests of Ontario spatially separate themselves from wolves and moose. The final paper by Bergerud is a review of caribou population ecology and was the special presentation at the banquet.

The presentations were generally consistent with the hypothesis that major differences in density AMONG caribou herds in different areas of North America are related to differences in the impact of wolf predation, and the ability of caribou to avoid wolves. However, many of the papers also stress the major amount of variability that occurs WITHIN populations from year to year. Much of that variability appears to be related to the impacts of weather and its interactions with food availability and predation. Some of the past debate surrounding caribou population ecology is clarified by making this distinction between the factors responsible for the order of magnitude differences in density AMONG populations across North America, and the factors responsible for the significant year to year variability that often occurs WITHIN populations. Collectively, these papers provide a clearer understanding of those relationships, and their importance to caribou population ecology.

References

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