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Status of woodland caribou in Alberta

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Abstract: A recent review of woodland caribou (*Rangifer tarandus caribou*) status in Alberta estimated that there are between 3600 and 6700 caribou occupying 113 000 km² of habitat. There are two ecotypes of caribou in Alberta; the mountain ecotype in the west central region and the boreal ecotype primarily in the north. Mountain caribou populations are stable or declining and boreal populations, where data are available, appear to be stable or declining slowly. A major initiative in caribou management in Alberta has been the development of the Woodland Caribou Conservation Strategy. This document was developed over two and a half years by a committee of multi-stakeholder representatives. The past five years has seen an increase in baseline inventory and applied research jointly funded by government, industry and universities, addressing a wide range of management issues from caribou response to logging to interactions of moose, wolves and caribou in the boreal ecosystem. Land use conflicts on caribou range remain high with timber harvesting, oil and gas development, peat moss extraction, coal mining, agricultural expansion and increasing road access overlapping. Cumulative effects of these disturbances are poorly understood and have received little attention to date.

Key words: population size, distribution, current research and management programs.

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Current status

Woodland caribou and their habitat are threatened in Alberta and the *Wildlife Act* lists them as an endangered species. This means that caribou are likely to become endangered in Alberta if the factors causing their reduction in numbers are not reversed. Since 1900, caribou distribution and numbers have declined along the southern edge of their range where human encroachment has been greatest. Alberta has two ecotypes of woodland caribou; a mountain ecotype in west central Alberta and a boreal ecotype primarily in northern Alberta. There are few data on past and current population sizes, and the decline in caribou numbers and distribution documented by Edmonds (1986) has been challenged (Bradshaw & Hebert, 1996). A recent assessment estimates that 3600 to 6700 caribou inhabit about 113 000 km² of northern and west central Alberta (Alberta's Woodland Caribou Conservation Strategy, 1996) (Fig. 1).

Mountain herds are estimated to total 600 to 750 animals with growth trends vatying from stable to declining sharply (Brown *et al.*, 1994; Alberta Environmental Protection, unpubl. data). Densities and population trends estimated in two studies of boreal herds were 0.05 caribou/km² and stable (Alberta Environmental Protection, unpublished data) and 0.08 caribou/km² and stable or declining slowly (Stuart-Smith *et al.*, 1997). Most of the boreal herds of Alberta have not been adequately inventoried. However, baseline inventory and research studies of Alberta's woodland caribou populations have increased substantially in the past five years so the knowledge base has improved for understanding population numbers, trends, and limiting factors (Edmonds & Smith, 1991; Bradshaw, 1994; Brown *et al.*, 1994; Hornbeck & Moyles, 1995; Bradshaw *et al* , 1995; Stuart-Smith *et al.*, 1997).

Limiting Factors

In Alberta, scientists and managers agree that predation by wolves (*Canis lupus*) is the major cause of death of caribou that inhabit undisturbed habitat (Brown *et al* , 1994; Stuart-Smith *et al* , 1997; Alberta's Woodland Caribou Conservation Strategy,

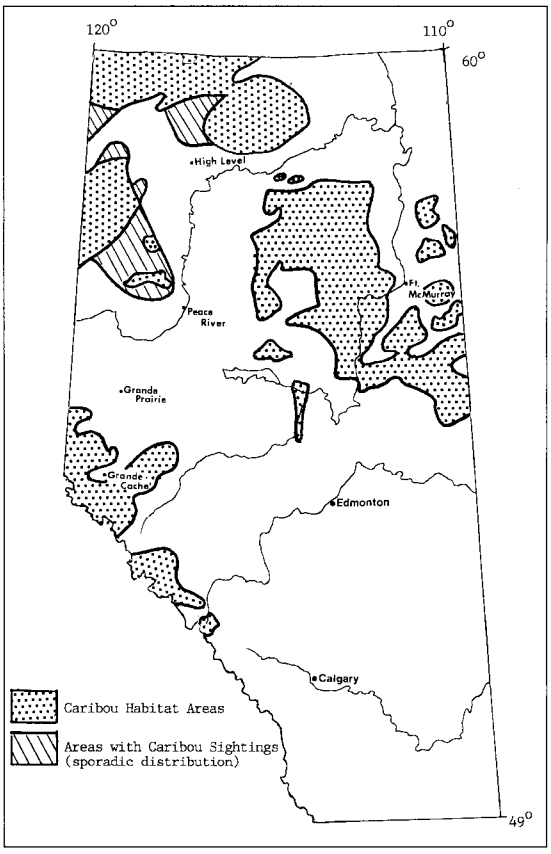

Fig. 1. The present distribution of caribou habitat in Alberta.

1996). Grizzly bear (*Ursus arctos*) predation is also an important factor in the mountain caribou herds (Edmonds, 1988; Brown *et al.*, 1994; Alberta Environmental Protection, unpubl. data).

Direct mortality from humans results from illegal hunting (recreational sport hunting was closed in 1981), mistaken identity (caribou shot in mistake for moose, deer or elk) and native subsistence harvest. Generally, data on human harvest is poor. In west central Alberta where monitoring has been longer and more successful, and road access within caribou range is abundant, at least five to ten caribou a year are shot (about 1% of the population) (Alberta Environmental Protection, unpubl. data). One study in northeast Alberta determined that three of 16 radio- collared caribou (18%) that died during the four year study were shot (Stuart-Smith *et al.*, 1997). Vehicle collisions are a serious problem with one mountain caribou herd where as many as 17 caribou (about 10% of the herd) have been killed in one winter on a highway that bisects their winter range (Alberta Fish & Wildlife, unpubl. data).

An adequate amount of suitable habitat is a key factor in maintaining viable caribou populations in Alberta. Timber harvesting, oil and gas exploration and development, coal mining, peat moss extraction, agricultural expansion and the proliferation of access routes have and will continue to result in loss, fragmentation or alteration of important habitat elements such as winter ranges, calving areas or migration routes. All caribou range in west central Alberta outside of provincial and national parks, and most range in northern Alberta has been committed to timber harvesting through Forest Management Agreements or Quota Licences. Conflict between timber harvest and caribou range in west central Alberta is high. In northern Alberta this conflict may not be as significant, particularly for the herds that remain for much of the year in large fens and peatlands. Expansion of coal mining in west central Alberta will remove alpine winter range and possibly disrupt seasonal movements of a mountain caribou herd. Oil and gas exploration and development generally does not result in much direct loss of habitat but the associated access can be a significant disturbance Incremental increases in the abundance and quality of roads, pipelines, seismic lines, etc. will result in increased mortality from hunting and vehicle collisions. Predator efficiency and seasonal movements may also be affected. Proliferation of access is one of the primary factors degrading the effectiveness of caribou habitat in Alberta.

Management

In 1994, the Natural Resources Service, Wildlife Branch convened a committee to develop a Provincial Woodland Caribou Conservation Strategy. This committee consisted of representatives from a variety of industries, conservation groups, aboriginal groups, academic and government agencies. They produced a document that identified and assessed the various factors (biological, social and economic) that may affect the overall vision of a healthy caribou population in Alberta; developed solutions to deal with those factors; recommended specific actions to make the strategy effective; and outlined the consequences of those actions. Maintaining the effective partnerships, cooperation, and lines of communication that were developed among the stakeholders will be key to achieving the caribou population and habitat goals that the committee endorsed.

The Caribou Conservation Strategy is provincial in scope and a more specific level of management is required. Presently three regional caribou management committees exist to develop management plans for caribou in northern and central Alberta. These committees are comprised of government, industry, university and aboriginal representatives. They; develop guidelines for how industrial activity will be conducted on caribou range and how adequate amounts of caribou habitat will be maintained in the short and long term; determine what further research or inventory is required in order to assess the effectiveness of the guidelines and habitat supply analysis; and develop a cost sharing agreement for the management of caribou and their habitat (Rippin *et al.*, 1996).

There are two main challenges in caribou management in the next decade:

1. to resolve and better define the conflict between timber harvesting (wood supply for the mills) and caribou habitat needs in both the short and long term;
2. to resolve and better define the conflict between caribou habitat and oil and gas development, which generally requires high quality access to extract and move their product to markets.

Resolution of these conflicts require a commitment from industry to try new approaches and to accept the increasing cost of operating in a fashion that maintains the sustainability of all resources on public land. The majority of industries in Alberta are meeting this challenge and along with government agencies and concerned public groups, are willing to try the concept of adaptive management as a way to ensure the long term survival of current caribou populations.

Current research

There are presently six research and inventory studies of woodland caribou being conducted in Alberta. Table 1 outlines the type of study, location, duration, primary investigator or contact person, and progress reports, if any.

Research needs

A relatively accurate and cost effective method of caribou herd inventory is needed. Woodland caribou herds are sparsely distributed often in forested habitat making sightability low. For the mountain caribou ecotype a large sample of marked animals is required, and the time of year when caribou are most visible must be determined. There are other methods that show some promise to assess population trends of the boreal ecotype such as annual March surveys to obtain cow;calf ratios and stratified track density surveys (Farnell & Gauthier, 1988). The technique of using faecal pellet counts and DNA sequencing for a 'mark/capture' estimation of population size also deserves investigation. Assessment of population status is of considerable importance to industries working within caribou range where operational guidelines can be costly. Industry and the public are concerned about our ability to manage viable caribou populations in the face of increasing human and natural impacts.

Future studies are needed to assess the effectiveness of mitigation guidelines applied to industrial and recreational activity on caribou range. New guidelines for operating in caribou range should be implemented on an experimental basis, monitored for population response and then if justified applied more broadly, i.e implement adaptive management. Changes in population trends; herd distribution and movements in response to disturbance (particularly the extensive linear developments of the petroleum industry); and recovery of lichens and other habitat attributes after logging are a few of the factors needing study. In northern Alberta, further information on the extent of human harvest is needed, and cooperative approaches with aboriginal communities are essential and are being developed.

Cumulative impacts are poorly understood. Several industrial developments can occur on caribou range simultaneously, complicating our understanding of individual limiting factors. Government regulation of human impacts on the land are dealt with individually. There is no requirement of an applicant to assess their impact within the context of other land use activities unless the type of project requires an environmental impact assessment. In Alberta, this is not required for land based forestry operations or oil and gas exploration. The regional management committees have recognized the presence and impact of multiple users on the land and are trying to co-ordinate and mitigate their accumulated activities. The field of cumulative impact assessment is a young discipline in Alberta, but models for elk and grizzly bears are being developed. The development of GIS (Geographical Information Systems) greatly increases

Table 1. Current studies of woodland caribou being conducted in Alberta.

Type	Location	Duration	Primary Investigator/Contact	Progress Reports in preparation
Woodland caribou response to clearcut logging on winter range	Grande Cache – west central Alberta	1993-1997	K. Smith Alberta Environmental Protection, Edson, Alberta T7E 1T2 ksmith@env.gov.ab.ca	(goal for distribution December 1997)
Woodland caribou and wolf distribution relative to linear corridors	Wabasca and Winefred Lakes – northeastern Alberta	1994-1997	K. Stuart-Smith Dept. of Forest Science, Oregon State University, Corvallis, OR, 97331-7501, USA stuartK@fsl.orst.edu	poster published – these proceedings
Spatial relationships dynamics of wolves, moose and caribou.	Northeastern Alberta	1994-1997	A. James Alberta Environmental Protection, Natural Resources Service. Grande Prairie, Alberta. T8V 6J4 ajames@env.gov.ab.ca	Ph.D. Thesis in prep. Dept. of Biological Sciences, University of Alberta T6G 2E9
Woodland caribou population, distribution and habitat use in northwestern Alberta predator-prey and	Caribou Mountains and Red Earth	1995-1999	B. Wynes Diashowa-Marubeni International Ltd., Peace River, Alberta T8S 1Y4 bwynes@telusplanet.net	none
Response of caribou to a long-term heavy oil development project	Wabasca	1996-199?	Elston Dzus Nova Gas Transmission Ltd. 158-10114 Ave. Edmonton, AB T5M 2Z4 elston.dzus@pipe.nova.ca	none
Movements and survival of caribou in relation to linear corridors	Red Earth, Wabasca and Caribou Mtns	1995-1998	Elston Dzus (see above)	none

Web Sites	Woodland Caribou Research and Management in Alberta http://129.128.55.125/profs/lmorgant/caribx/carib1.htm
	North American Caribou Resources http://www.ualberta.ca/~ajames/Caribou.html

our ability to do cumulative effects analysis. The next decade will require the application of such a management tool if caribou are to survive on some of the more heavily impacted ranges.

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