Alaska Department of Fish and Game Division of Wildlife Conservation

Federal Aid in Wildlife Restoration Research Progress Report

Influence of Body Condition on Productivity of Adult Female Caribou in the Porcupine Caribou Herd

by

Kenneth R. Whitten



Project W-24-1 Study 3.39 April 1993

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PROGRESS REPORT (RESEARCH)

State: <u>Alaska</u>

Cooperators:Thomas R. McCabe, U.S. Fish and Wildlife Service; Donald E. Russell,
Canadian Wildlife Service; Robert G. White, University of Alaska FairbanksProject No.:W-24-1Project Title:Wildlife Research and ManagementStudy No.:3.39Study Title:Influence of Body Condition on Productivity
of Adult Female Caribou in the Porcupine
Caribou Herd

Period Covered: <u>1 July 1992-30 June 1993</u>

SUMMARY

Adult cow caribou (*Rangifer tarandus*) from the Porcupine caribou herd (PCH) were captured, weighed, measured, sampled, and scored for body condition during late June/early July, mid-July, and late September 1992. Calves from the Central Arctic herd were collected for necropsy during the same time periods and also in early June. Body condition parameters and changes in these parameters will be analyzed relative to parturition or lactation status, time of year, and habitat use. Results of these studies should enable management agencies to make more informed decisions on the importance of specific habitats on the coastal plain of the Arctic National Wildlife Refuge to the wellbeing of the PCH. If petroleum development should ever occur on the coastal plain, this baseline data should also be useful in both determining and mitigating impacts on caribou.

Key Words: Arctic National Wildlife Refuge, body condition, caribou, habitat use, Rangifer tarandus.

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BACKGROUND

The coastal plain of the Arctic National Wildlife Refuge (ANWR) is considered to be the most promising onshore prospect for a major new petroleum discovery in the U. S. (Clough et al. 1987). Both the federal government and the State of Alaska favor petroleum leasing and development within ANWR, but only if it proceeds in a manner sensitive to the environmental needs of the Porcupine caribou (*Rangifer tarandus*) herd (PCH) and other wildlife.

The PCH is an important international resource and a major food source for Native villages in northeastern Alaska and in the Yukon and Northwest Territories of Canada. Porcupine herd caribou are also used by sport hunters in both nations and are becoming increasingly popular with hikers, river floaters, wildlife watchers, and photographers in ANWR and the Northern Yukon National Park. An International Agreement between the United States and Canada recognizes both nations' commitment to preserving these animals for present and future generations.

Proposed petroleum development on the ANWR coastal plain could affect use of calving and summer habitats by the PCH. Because of consistent and long-term use, these habitats are assumed to be important to caribou. Previous research has documented higher calf survival when the PCH uses coastal plain habitats during calving, apparently as a consequence of lower predator densities on the coastal plain relative to adjacent foothills and mountains (Fancy and Whitten 1991, Whitten et al. 1992). The coastal plain may also provide higher forage quality and quantity (White et al. 1989, Fancy and Whitten 1991, McCabe et al. 1992). If caribou access to preferred habitats is reduced as a consequence of oil development on the ANWR coastal plain, the PCH might be adversely affected through increased mortality and/or lower nutritional status.

Currently, baseline data are lacking on caribou body condition relative to specific habitat use within the proposed development area and adjacent areas to which caribou might be displaced. The agencies charged with managing the PCH must have reliable baseline data on caribou use of ANWR habitats to plan adequately for responsible development and to detect and mitigate any adverse effects that development might have. Such baseline data will be necessary to determine whether any future declines in caribou body condition are man-caused or fall within the range of natural variation, and whether they will likely result in reduced productivity or lower calf survival. Therefore, the Alaska Department of Fish and Game, the U. S. Fish and Wildlife Service (USFWS), the Yukon Wildlife Branch (YWB), the Canadian Wildlife Service (CWS), and the University of Alaska Fairbanks are all cooperating on investigating and refining the relationships between caribou habitat use and population dynamics.

OBJECTIVES

To characterize and compare oversummer weight gain of female caribou and their calves and examine the relationships between fall body weight/condition and subsequent calf production and survival. To determine what patterns of summer range use may result in insufficient weight gain that may lead to either pregnancy failure or lowered calf survival.

Study Objectives

- 1. Determine oversummer changes in body weight and composition of nonlactating adult female caribou.
- 2. Determine oversummer changes in body weight and composition of lactating adult female caribou and their calves.
- 3. Determine whether differences in weight and condition between nonlactating and lactating females are reflected in calf growth.
- 4. Refine existing relationships between fall body weight and subsequent reproductive success, emphasizing the relative influence of fat reserves versus protein reserves.
- 5. Establish relationships between body condition as determined by necropsy and *in vivo* morphometric measurements, weight, and body condition ratings for calves.
- 6. Make recommendations for establishing a routine monitoring program capable of detecting changes in female body condition that would result in measurable declines in pregnancy rate and/or production of viable calves.

METHODS

Twenty-nine PCH calves and their mothers were captured, measured, weighed, and rated for body condition in late June 1992. The mothers were equipped with radiocollars. The calves had been collared as neonates by USFWS staff and their habitat use had been monitored daily. Nineteen previously collared females that had given birth, but lost their calves, were also captured, measured, weighed, and rated for body condition in late June. Habitat use of the collared cow-calf pairs was monitored daily by USFWS staff through mid-July. In late September 1992, 12 cows and 12 calves from the cow-calf pair sample (including 5 pairs, 7 calves whose mothers were not recaptured, and 7 cows whose calves had died) were again captured, measured, weighed, and rated for body condition, as were 13 of the cows that had lost their calves before the late June capture. Data from these captures will be used to address Study Objectives 1, 2, and 3.

To address Study Objective 4, all cows captured in June and/or September will be monitored daily by fixed-wing aircraft during late May and early June 1993 to determine parturition status and, if appropriate, calving date and early calf survival.

To address Study Objective 5, 10 calves each were collected from the Central Arctic herd in early June (near birth), late June, mid-July, and early October. These calves will be necropsied for correlation of body composition with *in vivo* measurements.

All results of this study will be integrated with findings of concurrent studies on PCH physiology, productivity, and habitat use being conducted by the USFWS, CWS, and YWB to address Study Objective 6.

Parameter estimates and measures of precision for Study Objectives 1, 2, 3, and 6 will be derived using univariate parametric and nonparametric statistical methods. Relationships will be estimated for Study Objective 4 using a logistic regression model. Relationships for Study Objective 5 will be estimated using multiple regression procedures.

RESULTS AND DISCUSSION

All captured animals were weighed, measured, and sampled according to the protocols described in the Methods section. The calves collected from the Central Arctic herd were field processed for future necropsy. Data and specimens are currently being analyzed and results will be presented in the next progress report.

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PREPARED BY:

Kenneth R. Whitten Wildlife Biologist III

SUBMITTED BY:

Daniel J. Reed Regional Research Coordinator

APPROVED BY: 161 mare David G. Kelleyhouse, Director

Division of Wildhife Conservation

Steven R. Peterson Senior Staff Biologist Division of Wildlife Conservation



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