

**Alaska Department of Fish and Game
Division of Wildlife Conservation
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Population dynamics of Interior and Southwest Alaska caribou herds

**Mark Keech
Patrick Valkenburg**

**Research Final Performance Report
1 July 2001–30 June 2007
Federal Aid in Wildlife Restoration
Grants W-27-5, W-33-1, W-33-2, W-33-3, W-33-4, and W-33-5
Project 3.45**

This is a progress report on continuing research. Information may be refined at a later date.

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**FEDERAL AID
FINAL RESEARCH PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Population dynamics of Interior and Southwest Alaska caribou herds

PRINCIPAL INVESTIGATORS: Mark Keech and Pat Valkenburg

COOPERATORS: Jim Woolington (ADF&G, Dillingham), Bruce Dale (ADF&G, Palmer), and Andy Aderman (FWS, Dillingham)

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GRANT AND SEGMENT NR.: W-27-5, W-33-1, W-33-2, W-33-3, W-33-4, and W-33-5

PROJECT NUMBER.: 3.45

WORK LOCATION: Game Management Unit 20A

STATE: Alaska

PERIOD: 1 July 2001 – 30 June 2007

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Demand for caribou hunting in relatively accessible areas of Interior and Southwest Alaska is high. However, managers are unsure how to maximize long-term sustainable harvest from caribou herds because our understanding of natural regulation of caribou numbers is incomplete and mechanisms of natural population regulation are often herd-specific. Although progress has been made in recent years understanding mechanisms involved in caribou population dynamics, these studies have not continued long enough to document the possible range of population responses to variations in weather, predation, and population density. In addition, natural systems are complex and vary across regions of Alaska and even between herds within a region. Managers need regional or even herd-specific guidelines on which to base management programs designed to achieve optimum harvests from caribou herds.

Studies of population dynamics of the Delta caribou herd began in 1979, making the Delta herd one of the longest studied caribou herds in Alaska. Much of the information obtained from this long-term study was applicable to the management not only of the Delta herd but also to other similar caribou herds across Interior Alaska. The continuation and expansion of this study had the potential to provide more data on population response of caribou to variation in different environmental influences. Therefore, in order to continue to take advantage of this long-term data set on Delta caribou and compare new information with other similar herds, ADF&G initiated this Federal Aid in Wildlife Restoration project in July 2001.

II. REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR NEED

In 1977 the leading caribou biologists in North America identified the need for a long-term population dynamics study of one or more caribou herds in Alaska (Klein and White 1978). In response to this recommendation, in 1979 ADF&G began a long-term investigation of the Delta caribou herd because of its proximity to Fairbanks and relatively large amount of background data available. Since that time biologists made significant progress in understanding the dynamics of Interior and Arctic caribou herds during the early to mid-1990s (Adams et al. 1995; Valkenburg et al. 1996; Whitten 1996; Valkenburg 1997; Mech et al. 1998). During the previous studies of caribou population dynamics (Valkenburg 1997; Valkenburg et al. 2002c), we documented that caribou herds in Interior Alaska can decline suddenly from any density because of interactions between weather and predation. More recently we documented chronic undernutrition in the Nelchina herd in summer that resulted in low autumn calf weights, low natality in 3- to 5-year-old females, and high winter mortality of calves (Valkenburg et al. 2002a). In southwestern Alaska, we also documented low calf weights and high prevalence of pneumonia in calves during a population decline in the Northern Alaska Peninsula herd (Valkenburg et al. 2002b). It therefore appears that causes of caribou population decline can vary markedly over time and between regions and herds. Studies of contrasting caribou herds that are influenced by different parameters provide an opportunity to investigate factors limiting population growth and also provide managers with herd-specific recommendations for maximizing harvest.

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III. APPROACHES USED AND FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED

OBJECTIVE 1: Census the Delta herd annually from 2002 to 2006.

We conducted aerial censuses of the Delta herd when animals were aggregated during summers 2001, 2002, 2003, 2004, and 2007. No censuses of the Delta herd were conducted during summer 2005 due to smoke from forests fires or in 2006 due to poor weather conditions. We estimated the population of the Delta herd to be 2965, 2803, 2581, 2211, and 2985, in 2001, 2002, 2003, 2004, and 2007, respectively.

OBJECTIVE 2: Determine causes and timing of mortality adult in the Delta herd.

We monitored approximately 61–72 radiocollared short-yearling or older caribou in the Delta herd from July 2001 to June 2007. The annual survival rates were approximately 85% during the study. The majority of the mortality occurred during winter, with wolves being the proximate cause of death for most individuals when mortality sites were investigated. However, due to budgetary constraints not all sites were visited each year and frequency of radiotracking flights decreased after June 2005.

OBJECTIVE 3: Monitor movements, distribution, and dispersal of the Delta herd.

Since July 2001 we have conducted 30 comprehensive radiolocation flights (6, 6, 6, 5, 3, and 4 during the 2002–2007 reporting periods, respectively). In addition, during the same time period we also conducted 17 partial radiolocation flights of Delta herd animals. Movements and distribution of Delta caribou during these years was similar to previous years, with the majority of the herd occupying the northcentral portion of the Alaska Range or the Yanert–upper Wood River valleys, smaller groups of caribou were located along the eastern edge of Unit 20A and in the northern portion of Unit 13E. Most major concentrations of caribou during photocensuses were within the Wood River drainage, with smaller groups in eastern Unit 20A, the Yanert River, and northern Unit 13E.

OBJECTIVE 4: Determine age-specific natality rate, timing of calf production, and weighing newborn calves in the Delta herd.

Natality rate for collared Delta cows 3 years or older was determined during the 6 years of this study and was 85%, 79%, 91%, 88%, 86%, and 76% in spring 2002, 2003, 2004,

2005, 2006, and 2007, respectively. On 21 May 2002, we weighed 22 male and 18 female newborn caribou calves in the Delta herd. Males averaged 9.09 kg and females averaged 9.12 kg. In May 2003 we attempted to capture newborn caribou calves in the Delta herd but were unsuccessful in obtaining an adequate sample size given cost constraints. We ultimately abandoned that aspect of this project for the remainder of the study. Timing of calf production was not determined during any years of this study.

OBJECTIVE 5: Determine the natality rate and timing of calf production in the Mulchatna, Nushagak Peninsula, and the Northern and Southern Alaska Peninsula herds.

Operating funds from this project were not used to assist in determination of natality rate and timing of calf production in these other herds during spring 2001 through 2007. Natality rate and timing of calf production in the Mulchatna, Nushagak Peninsula, and the Northern Alaska Peninsula herds was determined during these years by Department of Fish and Game area offices and federal agency cooperators.

OBJECTIVE 6: Determine recruitment in the Delta herd, Mulchatna, Nushagak Peninsula, and the Northern and Southern Alaska Peninsula herds.

We completed composition counts on the Delta herd during late September or early October during each year of this project. Fall calf:cow ratios were 13, 25, 20, 35, 33, and 27 calves:100 cows for 2001 through 2006 respectively. Operating funds from this project were not used to assist in composition counts on other Alaska herds. The Department of Fish and Game area offices and federal agency cooperators conducted composition counts on the Mulchatna, Nushagak Peninsula, and the Northern and Southern Alaska Peninsula herds during 2001–2006.

OBJECTIVE 7: Investigate the presence and role of disease in the Delta, Mulchatna, Nushagak Peninsula, and Northern and Southern Alaska Peninsula herds.

During fall 2002, 10 short-yearling caribou were collected from the Mulchatna herd to necropsy for disease investigation information. No caribou were collected for necropsy from the other study herds in 2002 or from any study herd during 2001–2007 for this project. All short-yearling and older caribou that were captured in the Delta, Mulchatna, Nushagak Peninsula, and Alaska Peninsula herds for other aspects of this project had blood drawn to scan for diseases and to store for future analysis.

OBJECTIVE 8: Monitor food habits of the Delta, Denali, Mulchatna, Nushagak Peninsula, and the Northern and Southern Alaska Peninsula herds, and periodically monitor winter food habits of other Interior herds.

No fecal samples were taken to monitor food habits of study herds for this project.

OBJECTIVE 9: Monitor body condition and changes in body size and weight in calves and adults, and determine if weight and condition are related to summer and winter weather and recruitment.

From 1 July 2001 to 30 June 2007 we captured 129 female calves to monitor body condition and body size. Of these, 60 calves were captured at 4 months-of-age and 69 were captured at 10 months-of-age. In addition, 30 adult caribou were captured between

1 July 2001 and 30 June 2007 to replace old radio collars, obtain blood, and measurements. Funds from this project were also used to participate in the capture of 10 Nushagak Peninsula female calves in April 2002, 22 Mulchatna female calves in April 2002, and 22 Mulchatna female calves in March and April 2003. No funds from this project were used to capture caribou from Southwest herds after April 2003 due to budgetary constraints. Funds from this project were also used to participate in the capture of 17 Ray Mountains caribou in March 2002, 6 Ray Mountains caribou in October 2003, 7 in Ray Mountains caribou in April 2006, and 5 Ray Mountains caribou in April 2007.

OBJECTIVE 10: Review literature, prepare annual progress reports, a final report, and manuscripts for publication in refereed literature.

Relevant caribou literature was reviewed through this reporting period. Federal Aid research performance reports covering 1 July 2002–30 June 2003, 1 July 2003–30 June 2004, 1 July 2004–30 June 2005, and 1 July 2005–30 June 2006 were written and submitted to Federal Aid and have been posted to the ADF&G website. No other results from this study were reported or published through this reporting period.

IV. MANAGEMENT IMPLICATIONS

The Delta caribou herd has been in a slow population decline since the mid 1990s. This project was initiated in July 2001 and documented the continued decline of the Delta herd to a population low of 2211 caribou in June 2004. This was the lowest recorded population for the Delta herd. However, since that survey, we estimated 2985 caribou in the Delta herd in June 2007, indicating that the decline of the Delta herd may now have ended and the population may be starting to rebuild. Data collected from other aspects of project also suggest that population stabilization or increase may be expected over the next several years. Weights of 4- and 6-month-old calves captured in the Delta herd are on average higher than during the mid to late 1990s when the herd began this last decline. Further, weights of Delta calves compared with those of other herds around the state suggest that nutritional limitation is not likely a major factor. Additionally, natalty rates of adult Delta caribou are within the range expected for a herd in good physical condition. The most probable factor regulating herd growth at this time is survival. The annual survival rates of our radiocollared adult study animals have averaged about 85% during this study which is lower than in the 1980s when the Delta herd was increasing in population. The current harvest of the Delta herd caribou has little effect on the overall population and has been limited to less than 50 bulls each fall since 2001 (approximately 1.5% annual harvest of the population). At this time we would not recommend any change in harvest strategy of the Delta herd. However, if the increasing population trend observed in the 2007 census continues, harvest strategy may need to be changed to maintain the population at 3500 caribou, as suggested in the findings of the previous research Delta research project that ended in the 2001.

V. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN FOR LAST SEGMENT PERIOD ONLY

ACTIVITY/JOB 10: Review literature and prepare technical report.

Caribou literature was reviewed and data was analyzed relative to the completion of this report and the final ADF&G technical report, which will be submitted as stipulated on the ADF&G research report agreement.

VI. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THE LAST SEGMENT PERIOD, IF NOT REPORTED PREVIOUSLY

In addition to the work stipulated on the FY07 Wildlife Research Annual Work Plan, operating funds from Project 3.45 were used to capture 11 short-yearling and 4 adult caribou in the Delta herd to obtain body condition indices and maintain radio collars in the herd in April 2007. Funds were also used to determine natality rate of Delta caribou in May 2007 and to help conduct a population census of the Delta herd in June 2007.

VII. PUBLICATIONS

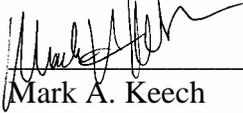
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VIII. RESEARCH EVALUATION AND RECOMMENDATIONS

We recommend funds be allocated and used through management activities to maintain an adequate number of radio collars on Delta herd caribou to determine annual population estimates, composition counts, and natality rates. Additionally, 10-month-old caribou calves should be captured at least biennially for condition assessment. The Delta herd has been extensively studied since the late 1970s, thus making one of the largest and most complete data sets regarding caribou population dynamic and condition in Alaska, and we should continue to add to that data set.

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PREPARED BY:

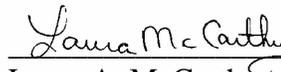


Mark A. Keech
Wildlife Biologist III

SUBMITTED BY:



David D. James
Regional Supervisor



Laura A. McCarthy
Publications Technician II

APPROVED BY:



Clayton R. Hawkes
Federal Assistance Coordinator
Division of Wildlife Conservation



Douglas N. Larsen, Director
Division of Wildlife Conservation

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