

FEDERAL AID ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
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PROJECT TITLE: Development of methods to assess effects of oil field infrastructure on caribou movements, growth, and survival

PRINCIPAL INVESTIGATOR: Stephen M. Arthur

COOPERATORS: U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NO. W-33-7

PROJECT NO. 3.49

WORK LOCATION: Central Arctic coast

STATE: Alaska

PERIOD: 1 July 2008 – 30 June 2009

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Estimate annual pregnancy and birth rates for caribou cows.

Fifty-nine caribou cows (≥ 3 yr old) were located during 1–7 June 2007. Of these, 39 were pregnant and 16 were accompanied by calves. Parturition rate was 93%. Fifty-seven cows were located on 21–22 June, of which 46 (81%) were accompanied by calves. These rates were unchanged when only cows ≥ 4 years old were included ($n = 55$ and 53 cows for early and late Jun, respectively).

OBJECTIVE 2: Estimate survival of female calves to yearling age class and determine causes of mortality.

Of 34 calves that had been radiocollared during early June 2006, 32 were alive in July and were monitored through early June 2007 to estimate survival rates. These included 15 from the eastern calving area and 17 from the western calving area (calving areas were either east or west of the Sagavanirktok River). In summer 2006, no calves from the eastern area died, whereas survival for western calves was 88% (2 deaths during Jul–Aug). Annual survival rates for the eastern and western calving areas were 0.70 and 0.43, respectively.

OBJECTIVE 3: Estimate rates of weight gain by calves during summer (Jun–Sep) and winter (Sep–Mar).

Thirty radiocollared calves were captured by net-gunning in September 2006 and 18 were captured in March 2007. Measurements of mass and metatarsus length, and changes in these parameters, are provided in the Appendix: Tables 1–4.

OBJECTIVE 4: Determine characteristics of physiography and vegetation at calving sites and assess changes in these that may occur over time.

Data collection concluded in June 2006. Data analysis was suspended pending acquisition of additional funds for a graduate research assistant/associate.

OBJECTIVE 5: Develop methods to model movements of caribou cow–calf pairs during summer to estimate exposure to human disturbance and use of habitats.

Twenty-eight caribou cows equipped with GPS collars were monitored during June 2006–March 2007. Twenty-four of these were captured by net-gun during March 2007 and their collars removed. The remaining 4 collars were recovered on 3 July 2007 after the programmed release mechanisms caused the collars to fall off the caribou. Data were downloaded from the collars and will be analyzed to assess movement patterns.

OBJECTIVE 6: Monitor movements of caribou to determine areas used for wintering, and fidelity of cows to specific calving areas.

Wintering distribution was assessed by radiotracking cows and calves during March 2007. Fifty-eight cows and 26 calves were located. The greatest concentrations of collared caribou were in Gates of the Arctic National Park, south of the crest of the Brooks Range, or along the northwestern boundary of the Arctic National Wildlife Refuge, in the northern foothills of the Brooks Range. Some additional caribou were in the Middle Fork Chandalar River and the Wind River.

OBJECTIVE 7: Estimate size of the herd using a complete aerial photocensus.

A photocensus was not conducted during 2006 or 2007 due to failure of the herd to aggregate.

OBJECTIVE 8: Analyze and publish results.

An interim progress report was prepared and distributed to cooperators and other interested individuals. In addition, presentations were made at the annual national conference of *The Wildlife Society* in September 2006 and at the North Slope Science Initiative caribou workshop in February 2007.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB/ACTIVITY 4A: Determine habitat characteristics of calving sites.

Analysis of habitat use was postponed pending development of plans for additional data analysis and modeling of caribou movements.

JOB/ACTIVITY 5A: Develop models of caribou movements.

No progress was made on model development due to lack of funding for graduate student.

JOB/ACTIVITY 8A: Prepare annual report, travel to meetings.

An annual progress report was prepared and distributed to cooperators and other interested individuals, and results of the project were presented at the Northern Oil and Gas Research Forum in Anchorage, Alaska (Oct 2008).

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

None.

IV. PUBLICATIONS

None.

V. RECOMMENDATIONS FOR THIS PROJECT

None.

VI. APPENDIX

TABLE 1. Body mass (kg) of female calves from the Central Arctic caribou herd, June–March 2001–2007.

Area	Cohort	Jun			Sep			Mar ^a		
		\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>
East ^b	2001	6.1	0.9	33	40.9	4.3	24	47.3	6.4	11
	2002	7.0 ^c	1.0 ^c	20 ^c	43.4	4.7	16	46.2	5.6	7
	2003	6.7	1.1	23	45.3	3.9	19	46.8	3.7	10
	2004	7.0	0.9	23	41.1	4.1	20	43.8	5.0	12
	2005	6.7	1.0	29	39.8	4.1	19	45.8	4.0	6
	2006	6.9	0.5	9	42.6	2.0	9	46.4	4.1	6
West ^b	2001	6.3	0.9	32	39.0	4.3	24	44.6	3.7	14
	2002	6.6	0.8	30	41.4	6.1	26	44.9	3.5	15
	2003	6.5	0.8	26	41.1	3.9	18	44.0	2.8	11
	2004	6.5	0.8	24	39.9	4.6	17	44.4	2.6	8
	2005	6.4	0.8	26	38.4	4.2	17	43.9	4.2	13
	2006	6.5	0.8	11	37.9	5.5	8	45.8	1.2	4

^a Mar data were from the year following birth of each cohort.

^b Sample areas were located either east or west of the Sagavanirktok River.

^c Excluding 10 calves that were not considered neonatal based on the absence of umbilicus and appearance of hooves.

TABLE 2. Change in body mass (kg) of female calves from the Central Arctic caribou herd, June through March 2001–2006.

Area	Cohort	Jun–Sep			Sep–Mar ^a			Jun–Mar ^a		
		\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>
East ^b										
	2001	34.6	3.9	24	6.7	2.6	11	40.9	5.8	11
	2002	36.3	4.2	16	2.7	1.6	7	38.8	5.2	7
	2003	38.6	3.7	19	–0.1	2.9	10	39.8	3.2	10
	2004	34.2	3.7	20	2.0	4.3	12	37.1	4.7	12
	2005	33.0	3.6	19	5.7	1.2	5	39.0	4.2	6
	2006	35.8	2.2	9	4.0	3.9	6	39.5	4.4	6
West ^b										
	2001	32.6	3.9	24	5.4	3.8	13	38.0	3.5	14
	2002	34.8	5.6	26	2.2	1.5	14	38.3	3.3	15
	2003	34.5	3.6	18	2.3	1.7	7	37.0	2.8	11
	2004	33.3	4.2	17	1.9	2.5	8	37.3	2.2	8
	2005	32.0	3.9	17	4.1	3.1	10	37.2	4.0	13
	2006	31.4	5.4	8	4.3	1.0	4	39.6	1.8	4

^a Mar data were from the year following birth of each cohort.

^b Sample areas were located either east or west of the Sagavanirktok River.

TABLE 3. Metatarsus lengths (cm) of female calves from the Central Arctic caribou herd, June–March 2001–2007.

Area	Cohort	Jun			Sep			Mar ^a		
		\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>
East ^b										
	2001	25.9	1.2	33	33.0	1.0	24	35.4	1.2	11
	2002	25.6 ^c	1.7 ^c	20 ^c	32.9	1.4	16	35.2	0.9	7
	2003	26.0	1.2	23	33.1	0.8	19	35.6	0.8	10
	2004	26.4	1.1	23	33.0	0.7	20	34.7	0.9	12
	2005	26.8	2.3	28	33.0	1.2	19	35.0	0.8	6
	2006	26.2	1.5	9	32.8	0.9	9	34.6	1.1	6
West ^b										
	2001	25.6	1.6	32	32.7	1.2	24	35.3	1.3	14
	2002	25.4	0.9	30	32.6	1.3	26	35.0	0.7	15
	2003	25.3	0.8	26	32.9	0.8	18	34.9	0.5	11
	2004	25.7	1.0	24	33.2	2.4	17	35.0	0.8	8
	2005	26.0	1.1	26	32.8	0.7	17	34.9	0.8	13
	2006	26.1	1.7	11	32.2	0.7	8	34.8	1.1	4

^a Mar data were from the year following birth of each cohort.

^b Sample areas were located either east or west of the Sagavanirktok River.

^c Excluding 10 calves that were not considered neonatal based on the absence of umbilicus and appearance of hooves.

TABLE 4. Change in metatarsus lengths (cm) of female calves from the Central Arctic caribou herd, June–March 2001–2007.

Area	Cohort	Jun–Sep			Sep–Mar ^a			Jun–Mar ^a		
		\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>	\bar{x}	<i>s</i>	<i>n</i>
East ^b										
	2001	6.9	1.0	24	2.5	0.7	11	9.1	1.1	11
	2002	7.0	1.2	16	2.5	0.9	7	9.5	0.9	7
	2003	7.1	1.0	19	2.1	0.6	10	9.2	1.2	10
	2004	6.6	0.9	20	1.8	0.3	12	8.3	0.9	12
	2005	6.6	0.9	18	2.3	0.5	5	8.6	0.8	6
	2006	6.6	1.1	9	2.0	0.2	6	8.8	1.3	6
West ^b										
	2001	6.8	1.2	24	2.7	1.6	13	9.2	1.7	14
	2002	7.1	1.0	26	2.3	1.0	14	9.4	0.6	15
	2003	7.5	0.8	18	2.1	0.6	7	9.4	0.9	11
	2004	7.5	2.6	17	2.0	0.7	8	9.0	0.7	8
	2005	6.6	1.1	17	2.0	0.4	10	8.6	1.4	13
	2006	6.1	1.7	8	2.6	0.2	4	9.2	1.8	4

^a March data were from the year following birth of each cohort.

^b Sample areas were located either east or west of the Sagavanirktok River.

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