

**Alaska Department of Fish and Game  
Division of Wildlife Conservation  
September 2005**

# **Interrelationships of Dall Sheep and Predators in the Central Alaska Range**

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**Research Performance Report  
1 July 2004–30 June 2005  
Federal Aid in Wildlife Restoration  
Grant W-33-3, Project 6.14**

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

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**FEDERAL AID  
ANNUAL RESEARCH PERFORMANCE REPORT**

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF WILDLIFE CONSERVATION  
PO Box 25526  
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**PROJECT TITLE:** Interrelationships of Dall sheep and predators in the Central Alaska Range

**PRINCIPAL INVESTIGATOR:** Stephen M. Arthur

**COOPERATORS:** Alaska Chapter, Foundation for North American Wild Sheep, University of British Columbia

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**GRANT AND SEGMENT NR:** W-33-3

**PROJECT NR:** 6.14

**WORK LOCATION:** Central Alaska Range, Unit 20A

**STATE:** Alaska

**PERIOD:** 1 July 2004–30 June 2005

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**I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION**

**OBJECTIVE 1:** Estimate home range size and reproductive success of resident coyote pairs.

From March 1998 through June 2003, 19 coyotes were captured and radiocollared as part of project 6.13. These coyotes were located approximately twice per month to determine home ranges, habitat use, movement patterns, and reproductive success. These included 15 resident adults (5 M:F pairs, plus 5 mortalities), 3 pups (2 M, 1 F; aged 10–13 months), and 1 dispersing 2-year-old male. Three of these coyotes were monitored through June 2005 (no additional captures occurred during 2004–2005).

**OBJECTIVE 2:** Estimate annual survival and cause-specific mortality of Dall sheep lambs.

Lambs were captured and radiocollared during late May–early June, and monitored during June–April to estimate survival and mortality causes. Twenty-four lambs were captured in 1999, 23 in 2000, 23 in 2001, 24 in 2002, 20 in 2003, and 22 in 2004. Project 6.13 covered the period from July 1999 through June 2003, when the current project began.

OBJECTIVE 3: Estimate annual survival and natality of Dall sheep ewes.

Ewes radiocollared during 1999–2002 as part of project 6.13 were located daily during May to estimate birth rates and approximately twice per month during other months to estimate survival and causes of mortality.

OBJECTIVE 4: Estimate size and age/sex composition of the Dall sheep population each year.

The sheep population in the study area was surveyed annually during June 1995–2005. Surveys consisted of intensive searches conducted with R-22 and R-44 helicopters. Sheep were counted and classified as lambs, yearlings, adult ewes, or rams (4 horn size classes).

OBJECTIVE 5: Data analysis and report writing.

Analysis of survival rates and home ranges has begun.

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

JOB 1: Radiocollaring and tracking resident coyote pairs to estimate home range size and reproductive success.

No coyotes were captured during this period. However, movements of 4 previously radiocollared coyotes (3 males, 1 female) were monitored during FY 2005. These represented 3 resident adult pairs (one collared male was paired with a female whose collar was not functioning, one was paired with an uncollared coyote, and one male paired with an uncollared female following the death of his collared mate). All 3 pairs evidently denned during spring 2005, and pups were observed accompanying one pair during midsummer 2005. Data on home ranges and habitat use were collected and will be compared with sheep distributions to assess coyote foraging behavior. In addition, University of British Columbia graduate student Laura Prugh completed her Ph.D. dissertation concerning coyote foraging ecology in relation to population dynamics of sheep, hares, and other prey.

JOB 2: Estimate annual survival and cause-specific mortality of Dall sheep lambs.

No lambs were captured during this period. Ten lambs collared during May 2004 were monitored from July 2004 to June 2005. Four lambs survived the year. Three were killed by golden eagles, 1 was killed by coyotes, 1 by an unknown predator, and 1 died of undetermined causes. Estimated annual survival for the 2004 cohort of lambs was 0.26 (SD = 0.11).

JOB 3: Estimate annual survival and natality of Dall sheep ewes.

No ewes were captured during this period. Thirteen ewes previously collared as part of project 6.13 were monitored during FY 2005. None died during the period, but one collar ceased functioning in late April 2005. Thus, 12 radiocollared ewes were monitored during May and June 2005. Of these, 9 (75%) were seen with lambs during mid–late May. The first lambs were observed on 14 May, and lambing probably peaked around 18 May, when 50% of confirmed births had occurred.

JOB 4: Estimate size and age/sex composition of the Dall sheep population each year.

The sheep population was surveyed on 21–22 June 2005 using an R-44 helicopter. We saw a total of 625 sheep (Table 1), with overall ratios of 45 lambs and 53 rams per 100 ewes (counts of ewes excluded yearlings but probably included some young rams). In areas surveyed annually since 1994 we found a total of 543 sheep, with ratios of 43 lambs and 61 rams per 100 ewes (Table 2). The population estimate for these sections was more than the 523 sheep counted during June 2004 but less than the 675 sheep counted during June 2003. The proportion of ewes with lambs was greater than during 2004 (41 lambs:100 ewes) and equal to the ratio of 2003. The visibility during the 2005 survey was less than optimal due to bright sun, dark shadows, and fresh snow about 4000 ft elevation.

JOB 5: Data analysis and report writing.

Data analysis has begun. This will continue during FY05.

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

#### **IV. PUBLICATIONS**

The following publications describe work conducted as part of this project. Publication costs were provided by other (non Federal Aid) sources.

Prugh, L. R. 2004. Foraging ecology of coyotes in the Alaska Range. Ph.D. thesis. University of British Columbia, Vancouver, Canada.

Prugh, L. R. 2005. Coyote prey selection and community stability during a decline in food supply. *Oikos* 110:253–264.

Prugh, L. R., and Krebs, C. J. 2004. Snowshoe hare pellet decay rates and aging in different habitats. *Wildlife Society Bulletin* 32: 386–393.

Prugh, L. R., and Ritland, C. E. 2005. Molecular testing of observer identification of carnivore feces in the field. *Wildlife Society Bulletin* 33:189–194.

Prugh, L. R., Ritland, C. E., Arthur, S. M., and Krebs, C. J. 2005. Monitoring coyote population dynamics by genotyping feces. *Molecular Ecology* 14:1585–1596.

#### **V. RECOMMENDATIONS FOR THIS PROJECT**

None.

## VI. APPENDIX

Table 1. Results of helicopter sheep survey in the central Alaska Range, 21–22 June 2005.

Section <sup>b</sup>	Unit <sup>c</sup>	Ewes <sup>d</sup>	Lambs	Yearlings	Ram Class <sup>a</sup>				Rams	Total	Lambs:100 ewes	Rams:100 ewes
					1	2	3	4				
1	32	60	33	15	19	14	34	12	79	187	55	132
1	33	20	5	7	0	0	1	0	1	33	25	05
2	30	20	5	8	4	9	10	3	26	59	25	130
2	31	88	44	24	0	3	5	1	9	165	50	10
3	28	16	4	3	2	3	3	3	11	34	25	69
3	29	31	10	6	6	1	5	6	18	65	32	58
3	50A	0	0	0	0	0	0	0	0	0		
4	27	25	13	9	0	0	1	2	3	50	52	12
4	50B	15	9	8	0	0	0	0	0	32	60	0
All	Total	275	123	80	31	30	59	27	147	625	45	53
1–3	Total	235	101	63	31	30	58	25	144	543	43	61

<sup>a</sup> Ram classes: 1 = <1/2 curl; 2 = 1/2–3/4; 3 = 3/4–7/8; 4 = full curl.

<sup>b</sup> Sections 1–3 were surveyed during 1994–2005; section 4 was surveyed during 1998–2005 and some years prior to 1994.

<sup>c</sup> Sample units designate areas that were surveyed continuously or with only brief interruptions (to refuel helicopter).

<sup>d</sup> Counts of ewes likely included some young rams.

Table 2. Comparison of annual sheep surveys for the central Alaska Range sections 1–3.

Year	Date	Ewes <sup>a</sup>	Lambs	Yearlings <sup>a</sup>	Rams	Total	Lambs:100	Rams:100
							Ewes <sup>a</sup>	Ewes <sup>a</sup>
1984	11–12 July	605	231		266	1102	38	44
1991	22–25 July	374	68		195	637	18	52
1994	4 June	211	72		125	408	34	59
1995	7 June	249	109	61	167	586	44	67
1996	9 June	267	137	95	158	657	51	59
1997	17 June	212	85	93	177	567	40	83
1998	17 June	287	117	69	192	665	41	67
1999	10–11 June	267	138	75	210	690	52	79
2000	24–25 June	279	84	67	185	615	30	66
2001	21–22 June	234	72	48	198	552	31	85
2002	20–22 June	219	108	17	152	496	49	69
2003	20 June	279	120	117	159	675	43	57
2004	18–19 June	208	86	60	169	523	41	81
2005	21–22 June	235	101	63	144	543	43	61

<sup>a</sup> In 1984, 1991, and 1994, surveys were conducted using a Piper Super Cub; all yearlings were classified as ewes. All other surveys were conducted using helicopters; yearlings were separated from ewes. During all years, counts of ewes likely included some young rams.

**VII. PROJECT COSTS FOR THIS SEGMENT PERIOD**

**Stewardship Investment items purchased:**

None

FEDERAL AID SHARE \$41,625 + STATE SHARE \$13,875 = TOTAL \$55,500

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