Alaska Department of Fish and Game
Division of Wildlife Conservation
2007

Effects of snowshoe hare population cycles on demography of Dall sheep and their predators

Stephen M. Arthur

Research Annual Performance Report
1 July 2006–30 June 2007
Federal Aid in Wildlife Restoration
Grant W-33-5
Project 6.14

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

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
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PROJECT TITLE: Effects of snowshoe hare population cycles on demography of Dall sheep and their predators

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-33-5

PROJECT NR.:6.14

WORK LOCATION: Central Alaska Range, Unit 20A

STATE: Alaska

PERIOD:1 July 2006 – 30 June 2007

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

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

From March 1998–June 2003, 19 coyotes were captured and radiocollared as part of project 6.13. These coyotes were located approximately twice per month through September 2005 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 (2M, 1F; aged 10–13 months), and 1 dispersing 2-year-old male.

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

Lambs were captured and radiocollared shortly after birth during late May–early June, 1999–2004, and monitored through their first year of life 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 1998–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 through September 2005 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 1995–2006. 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/ACTIVITY 1: Radiocollaring and tracking resident coyote pairs to estimate home range size and reproductive success.

No coyotes were captured during this period.

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

No lambs were captured or monitored during this period.

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

No ewes were captured or monitored during this period.

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

The sheep population was surveyed on 14 and 15 June 2007 using an R-44 helicopter. We saw a total of 886 sheep (Table 1), with overall ratios of 44 lambs and 42 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 752 sheep, with ratios of 44 lambs and 48 rams per 100 ewes (Table 2). The population estimate for these sections was the highest since standardized surveys began in 1994, although the count of rams was less than in recent years. The most likely explanation for these results is that some groups of ewes moved into the area while some rams moved out of the area. Costs of the survey were provided by Survey and Inventory funds.

JOB 5: Data analysis and report writing.

Data analysis has begun. This will continue during FY08.

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

As part of SWG Project T-1-8, a helicopter survey of eagle nesting success was conducted on 15 June 2007 in part of the sheep study area. Five active nests produced at least 7 young birds that survived until late June. This was similar to results from 2003 through 2006 and a substantial increase from 2002 when only one occupied nest was

found, and no young birds survived. Of the 29 nests first surveyed during July 2000, 2 were occupied and produced 2 young birds.

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. 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., S.M. Arthur, and C.E. Ritland. Submitted. Use of fecal genotyping to determine individual diet. Submitted to Wildlife Biology.

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

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

Prugh, L.R., C.E. Ritland, S.M. Arthur, and C.J. Krebs. 2005. Monitoring coyote population dynamics by genotyping geces. 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, 14–15 June 2007

					Ram class[a]						Lambs:100	Rams:100
Unit[b]	Section[c]	Ewes[d]	Lambs	Yearlings	1	2	3	4	Rams	Total	Ewes	Ewes
27	4	28	13	7	2	3	3	2	10	58	46	36
28	3	15	12	3	3	2	3	4	12	42	80	80
29	3	54	23	12	6	1	2	5	14	103	43	26
30	2	55	22	11	6	13	21	13	53	141	40	96
31	2	101	38	26	2	0	0	0	2	167	38	2
32	1	60	24	22	15	13	9	7	44	150	40	73
33	1	60	32	18	7	7	9	0	23	133	53	38
50A	3	0	0	0	9	1	3	3	16	16		
50B	4	45	18	10	3	0	0	0	3	76	40	7
Total		418	182	109	53	40	50	34	177	886	44	42

[a] Ram classes: 1 = <1/2 curl; 2 = 1/2–3/4; 3 = 3/4–7/8; 4 = full curl.
[b] Sample units designate areas that were surveyed continuously or with only brief interruptions (to refuel helicopter).
[c] Sections 1–3 were surveyed during 1994–2007; section 4 was surveyed during 1998–2007 and some years prior to 1994.
[d] Counts of ewes likely included some young rams.

TABLE 2. Comparison of annual sheep surveys for the central Alaska Range sections 1–3, 1984–2007

Year	Date	Ewes[a]	Lambs	Yearlings[a]	Rams	Total	Lambs:100 Ewes[a]	Rams:100 Ewes[a]
1984	11–12 Jul	605	231		266	1102	38	44
1991	22–25 Jul	374	68		195	637	18	52
1994	4 Jun	211	72		125	408	34	59
1995	7 Jun	249	109	61	167	586	44	67
1996	9 Jun	267	137	95	158	657	51	59
1997	17 Jun	212	85	93	177	567	40	83
1998	17 Jun	287	117	69	192	665	41	67
1999	10–11 Jun	267	138	75	210	690	52	79
2000	24–25 Jun	279	84	67	185	615	30	66
2001	21–22 Jun	234	72	48	198	552	31	85
2002	20–22 Jun	219	108	17	152	496	49	69
2003	20 Jun	279	120	117	159	675	43	57
2004	18–19 Jun	208	86	60	169	523	41	81
2005	21–22 Jun	235	101	63	144	543	43	61
2006	24, 28 Jun	283	124	76	234	717	44	83
2007	14–15 Jun	345	151	92	164	752	44	48

[a] 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.

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