

**PROJECT TITLE: ABUNDANCE AND DEMOGRAPHY OF DALL SHEEP IN THE
BAIRD MOUNTAINS, NOATAK NATIONAL PRESERVE, ALASKA**

COMPONENT: SURVEY METHOD EVALUATION

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INTRODUCTION

Dall sheep (*Ovis dalli dalli*) populations in northwestern Alaska declined substantially during the early 1990s following 2 severe winters, resulting in closures on hunting seasons in the region. Recently, a limited subsistence hunting season has been restored. Sheep populations are currently monitored by simple fixed-wing surveys with no correction for visibility bias or estimates of precision. Recent trends in these counts have been difficult to reconcile with reasonable estimates of population parameters. Further, little is known about patterns of productivity and survival of Dall sheep in the region. This study was undertaken to provide information required for improving survey methods and understanding demographics of Dall sheep in the Baird Mountains of northwest Alaska.

Progress for the demography component of this study will be reported separately. Here we report on progress for the first year of the survey methods component. The purpose of this component is to directly compare aerial survey methods, using radio-collared animals to assess validity of key assumptions, for Dall sheep in the Baird Mountain count units (Fig. 1). The basic methods to be considered include unadjusted fixed-wing surveys (Ayres 1996), single observer mark-resight (Neal et al. 1993), double observer sight-resight (McDonald et al. 1990), double sampling ratio (Whitten 1997), and covariate-based modeling (Bodie et al. 1995). Based on this evaluation, we will ultimately recommend a cost-effective monitoring protocol for the population.

METHODS

Dall sheep were captured in the Baird Mountain count units (Fig. 1) and fit with radio collars 23-30 March 2000. Details about capture and collaring activities will be provided in the progress report for the demographic component of this study. Survey field work was conducted 23 June -

22 July 2000. During this period, there were 35 (8 male, 27 female) collared sheep in the study population.

Movements of collared sheep were monitored for 2 weeks immediately before the survey period with a single PA-18 Super Cub. Flights were conducted every day with suitable weather during this period, resulting in 6 days of flying between 23 and 30 June.

Surveys were conducted from 8-20 July. Unusual weather patterns permitted survey flights with accompanying tracking flights on only 3 out of the 14 days allocated for this work. One additional tracking flight was accomplished on a day during this period that was not suitable for survey flights. Tracking flights were conducted with 2 PA-18 Super Cubs. Tracking flights determined which collared sheep were in each count unit before it was surveyed and monitored movements of sheep in other units (and on the days without a survey). Surveys were conducted with 3 PA-18 Super Cubs and 1 Bell Jet Ranger II helicopter. Each Cub surveyed 2 randomly selected units per day so that 6 different units were surveyed each day and all 18 units were surveyed over the 3 workable days. Two of the cubs were selected to have some of their units double sampled by the helicopter. Helicopter surveys were conducted on 1 of the units surveyed by each of these Cubs each day so that 6 different units (3 units for each of 2 Cubs) were double sampled over the 3 workable days. Although the sample size is considerably smaller than expected, survey data will allow population estimation with each of the methods being considered and limited evaluation of assumptions.

We attempted to monitor movements of collared sheep for 2 weeks immediately following the survey period, but the continued unusual weather pattern allowed tracking flights on only the first 2 days (21-22 July) of the post-survey period.

RESULTS

Though we were not able to obtain any replication, all 18 count units were surveyed with PA-18 Super Cubs during a 13 day period from 8 - 20 July. This provides unadjusted fixed-wing survey data obtained with the same methodology and comparable to previous surveys of the Baird Mountain Dall sheep population. A total of 525 Dall sheep were observed during the fixed-wing surveys, including 101 lambs and 107 1/2 curl or larger rams (Table 1).

A total of 32 collared sheep were available to be detected in units when they were surveyed. The 3 Cub crews detected from 83% to 100% ($\bar{x}$ = 91%) of the available collared sheep. The helicopter crew detected 80% of the available collared sheep. Total counts from helicopter surveys ranged from 60 to 100% ($\bar{x}$ = 88%) of the counts for the same units from Cub surveys.

Tracking flights located each collared sheep on 3 - 6 different days ($\bar{x}$ = 4.6) during the pre-survey period (Fig. 1), on 3 - 4 different days ($\bar{x}$ = 3.3) during the survey period, and on 1 - 2 different days ($\bar{x}$ = 1.7) during the post-survey period. Locations were not all in the same unit for 34% (12/35) of the collared sheep during the pre-survey period and for 31% (11/35) of the collared sheep during the survey period. Tracking flights did not provide sufficient data for assessing post-survey movements among units.

PLANS FOR CONTINUATION

Research activities will continue through the second year of this study as described in the study plan. Additional sheep will be collared in March 2001 to augment the sample of collared sheep. The same aircraft will be used to monitor sheep movements for a 2 week pre-survey period in late June, monitor movements and conduct surveys during a 2 week survey period in early July, and monitor movements during a 2 week post-survey period in late July 2001.

LITERATURE CITED

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Table 1. Counts of Dall sheep observed in Baird Mountain count units during aerial surveys with PA-18 Super Cubs, 8-20 July 2000.

Unit	Total	Lambs	Rams				Other
			1/2 Curl	3/4 Curl	7/8 Curl	Full Curl	
A	23	4	7	1	0	0	11
B	5	0	2	1	1	1	0
C	4	0	2	0	0	0	2
D	39	6	0	0	0	0	33
E	60	20	0	0	0	0	40
F	5	1	1	0	0	0	3
G	0	0	0	0	0	0	0
H	63	7	19	9	2	4	22
I	28	6	0	0	0	0	22
J	37	7	5	3	1	2	19
K	47	6	7	0	1	2	31
L	96	28	0	1	1	0	66
M	44	3	10	5	9	0	17
N	0	0	0	0	0	0	0
O	7	2	0	0	0	0	5
P	13	1	7	0	0	1	4
Q	52	9	1	1	0	0	41
R	2	1	0	0	0	0	1
Total	525	101	61	21	15	10	317

Figure 1. Locations of radio collared Dall sheep in the Baird Mountain count units, Noatak National Preserve, Alaska on 30 June 2000. Some circles indicate the location of more than 1 collared individual.

