ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: W-33-8

PROJECT NUMBER: 6.15

PROJECT TITLE: Demographics and spatial ecology of Dall sheep in the central Brooks Range

PROJECT DURATION: 1 July 2008–30 June 2013

REPORT PERIOD: 1 July 2009–30 June 2010

REPORT DUE TO HQ: 1 September 2010

PRINCIPAL INVESTIGATOR: Stephen M. Arthur

WORK LOCATION: Central Brooks Range, Unit 24A

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

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

The trans-Alaska pipeline, Dalton Highway, and 2 adjacent gas pipeline rights-of-way cross the Bureau of Land Management-managed Utility Corridor Planning Area in the Brooks Range, Alaska. The Bureau of Land Management has identified 5 Areas of Critical Environmental Concern in this area, which are intended to protect Dall sheep habitat. Potential factors that may affect sheep in the utility corridor include: 1) unlimited guided sport hunting that occurs on state and federal land; 2) upgrades to the Dalton Highway that will facilitate travel and increase human use of the area; 3) proposed changes to current state law that prohibits the use of ORVs within 5 miles of the Dalton Highway in the Brooks Range; and 4) intense interest in resource development in the area, including a proposed gas pipeline, increased mining activity, and ecotourism. The effects of land management decisions and human activity on Dall sheep in the utility corridor are difficult to predict due to the lack of basic information about this population.

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

The Dall sheep population in the area surrounding the utility corridor declined by approximately 40% during the early 1990s. No data are available on the causes of this decline, or why the population did not recover during the relatively mild winters that followed. Results of sheep population surveys in the central utility corridor since 2002 have varied greatly among years, indicating either differing rates of mortality and fecundity or irregular movements of animals into and out of the area. However, no information is available to evaluate potential causes of variation among surveys.

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

This project will evaluate factors that may limit Dall sheep population growth and assess movement patterns that may be affected by human activities in a development corridor. A sample of 20 adult ewes will be captured during March 2009 and fitted with GPS-equipped radio collars. Collars on ewes will obtain GPS fixes at intervals of 11 hours. Data will be relayed by the Argos satellite system twice weekly during summer and once per week during winter. Collars will be designed with a battery life of 3.5 years, and will be recovered in March 2012. GPS data from collars on ewes will be analyzed to determine daily, seasonal, and among-year differences in sheep distribution in relation to established survey unit boundaries. GPS data will also be used to investigate sheep movements across the utility corridor and determine the potential effects of increased human activity in the area. In addition, 20–25 lambs will be captured and radiocollared during May of each year, 2009–2011. Lambs will be located by aerial radiotracking twice per month during June–September and monthly during October–May during the year following birth, to determine the number that survive and to estimate dates when lambs die. Lamb collars will be expandable, incorporate a breakaway design, and have an expected battery life of 1.5 years. Standard Kaplan-Meier techniques will be used to estimate survival rates for each cohort through the age of 1 year. Ewe and lamb mortality events will be investigated to determine causes of mortality.

IV. MANAGEMENT IMPLICATIONS

None.

V. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY

JOB/ACTIVITY 1b: Collect and analyze GPS data

Accomplishments: GPS data from collared ewes were relayed by satellite uplink and entered into a database. A preliminary analysis identified one area of particularly high use by sheep. Additional studies are planned to identify specific attributes that make this area attractive to sheep.

JOB/ACTIVITY 2a: Fixed-wing radiotracking flights to determine birth rates of ewes

Accomplishments: Birth rates were not estimated due to logistical difficulties (primarily weather) that precluded flights during the latter half of the lambing period. However, sufficient flights were conducted to estimate that the lambing period began approximately 15 May and likely peaked during 17–20 May.

JOB/ACTIVITY 3a: Capture lambs

Accomplishments: Twenty-five lambs were captured during 17–19 May. Lambs were equipped with expandable, breakaway VHF radio collars. No lambs died as a result of captures, and all lambs rejoined their mothers within minutes after release.

JOB/ACTIVITY 3b: Fixed-wing radiotracking flights to determine survival of lambs

Accomplishments: Lambs radiocollared during May 2009 were monitored twice per month during July–September 2009 and February–May 2010 to estimate survival until 1 year of age. Lambs collared during May 2010 were monitored weekly during May and June 2010. First-year survival of the 2009 cohort was 68% (n = 19, excluding 1 lamb that shed its collar).

JOB/ACTIVITY 3c: Helicopter flights to investigate lamb mortalities

Accomplishments: Thirteen instances of lamb mortality were investigated during May 2009–May 2010. Causes of death were drowning, eagle predation, and wolverine predation.

JOB/ACTIVITY 4a: Data analysis, report writing, and travel

Accomplishments: Data on sheep movements and survival were entered into databases. A poster was prepared and presented at the Northern Wild Sheep and Goat Symposium, June 2010, and an annual research performance report was prepared.

VI. PUBLICATIONS

DEL VECCHIO, P. A., S. M. ARTHUR, AND T. CRAIG. 2010. Demography and spatial ecology of Dall's sheep in the central Brooks Range, Alaska (Abstract). Proceedings of the Northern Wild Sheep and Goat Symposium 17:in press.

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

Eight additional ewes were captured and equipped with refurbished GPS radio collars during March 2010. Three of these collars were obtained from collared ewes that had died, and 5 were obtained from a previous study.

VIII. RECOMMENDATIONS FOR THIS PROJECT

Fieldwork is continuing.

Prepared by: Stephen M. Arthur
Date: 19 August 2010