

**FEDERAL AID ANNUAL RESEARCH  
PERFORMANCE REPORT**

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

**SEGMENT NUMBER:** 9

**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 DUE DATE:** 1 September 2011

**PRINCIPAL INVESTIGATOR:** Stephen M. Arthur, ADF&G

**COOPERATORS:** U.S. Bureau of Land Management; National Fish and Wildlife Foundation; Perry Barboza, University of Alaska Fairbanks

**WORK LOCATION:** Central Brooks Range, Unit 24A

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**I. SUMMARY OF WORK COMPLETED THIS SEGMENT ON JOBS IDENTIFIED  
IN ANNUAL WORK PLAN**

**OBJECTIVE 1: Investigate seasonal and annual distributions and movement patterns of Dall sheep in relation to survey units and the Dalton Highway utility corridor.**

*JOB/ACTIVITY 1B: Analyze GPS data to investigate distributions and movements.*

GPS data from 28 ewes equipped with GPS radio collars 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.

**OBJECTIVE 2: Estimate annual birth rates for Dall sheep ewes.**

*JOB/ACTIVITY 2A: Monitor collared ewes during May to detect births.*

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 16–18 May. Snow cover was widespread at this time, and ewes were distributed in more open terrain than was typical in previous years. Warm temperatures and heavy rain occurred at the end of the lambing period, resulting in rapid melting of snow and extremely heavy runoff. These events apparently caused the death of 4 collared lambs due to drowning (see below).

**OBJECTIVE 3: Estimate survival of lambs to yearling age class and determine causes of mortality.**

*JOB/ACTIVITY 3A: Capture lambs.*

Twenty-four lambs were captured during 18–19 May 2011. 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.*

Lambs radiocollared during May 2010 were monitored twice per month during July–September 2010 and February–May 2011 to estimate survival until 1 year of age. Lambs collared during May 2011 were monitored weekly during May and June 2011. First-year survival of the 2010 cohort was 48% ( $n = 25$ ).

*JOB/ACTIVITY 3C: Helicopter flights to investigate lamb mortalities.*

Fourteen instances of lamb mortality were investigated during July 2010–June 2011. Dead lambs were initially located by aerial radiotracking, and the sites were then visited by helicopter. Collars from dead lambs were tested for the presence of blood using a chemiluminescent reagent sensitive to hemoglobin (Bluestar Forensic, Monte Carlo, Monaco). Causes of death were drowning and predation by eagles, wolverines, and grizzly bears.

**OBJECTIVE 4: Evaluate nutritional status of sheep in comparison to other populations.**

*JOB/ACTIVITY 4A: Collect and analyze soil samples to determine nutrient availability.*

Soil samples were collected at 30 randomly chosen sites in areas used by radiocollared sheep during 2009–2010, plus 3 known or suspected mineral licks. Samples were sent to the University of Alaska Agricultural Experiment Station, Palmer, Alaska, for analysis of mineral composition.

*JOB/ACTIVITY 4B: Collect urine and fecal samples to estimate relative contribution of dietary vs. body protein in the winter diet.*

Samples of sheep feces and urine (frozen in snow) were collected at 5 sites each in the Alaska Range (Unit 20A) and Brooks Range (Unit 24A). These samples were provided to Dr. Perry Barboza of the University of Alaska Fairbanks, for a preliminary study to determine the feasibility of assessing nitrogen isotopes as an indicator of diet quality for mountain sheep.

**OBJECTIVE 5: Prepare annual and final reports.**

*JOB/ACTIVITY 5A: Data analysis, report writing, and travel.*

An annual report was prepared.

**IV. RECOMMENDATIONS FOR THIS PROJECT**

Fieldwork will continue through May 2012.

**PREPARED BY:** Stephen M. Arthur

**DATE:** 24 August 2011