FEDERAL AID
ANNUAL PERFORMANCE REPORT

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

Grant Number: **W-33-8** **Segment Number: 1**

Project Number: 6.16

Project Title: Ewe Dall's sheep survival, pregnancy and parturition rates, and lamb recruitment in GMU 13D, Chugach Mountains, Alaska

Project Duration: July 1, 2009 – June 30, 2012

Report Period: July 1, 2009 – June 30, 2010

Report Due Date: September 1, 2010

PRINCIPAL INVESTIGATORS: Tom Lohuis, ADF&G

WORK LOCATION: Central Chugach Range, GMU 13D

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

Dall's sheep (Ovis dalli dalli) populations fluctuate. Periodic die-offs and rebounds are well documented (Murie 1944; Murphy and Whitten 1976; Whitten 1997). 28-35% increases and decreases in sheep numbers have been reported over 1-3 year periods in some areas in the Alaska Range (Arthur 2003) and in Canada (Hoefs and Bayer 1983).

However, aerial trend surveys as well as anecdotal evidence suggest that sheep populations in Southcentral Alaska appear to have been experiencing a continual decline since approximately 1990 (ADF&G, 2007 sheep management reports). Definitive cause and effect relationships generating this decline have not been established.

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

Sheep population declines have been linked to weather patterns, disease, predation, population density, and nutrition. However, most of the initial research on Dall's sheep populations was conducted prior to the advent of reliable, inexpensive VHF radio collar technology. In the early days, investigators relied upon data obtained during observations of sheep at mineral licks (e.g. Heimer and Watson 1986), or through multiple survey flights and ground observations without benefit of marked individuals (e.g. Nichols 1978, Murphy et al. 1990). While these survey flights provided demographic information in the form of ratios of lambs:100 ewes or of the ratio of rams:100 ewes in a given population, they did not allow investigators to definitively determine the underlying cause(s) of those ratios.

Further, observations at mineral lick sites provide opportunity for long-term monitoring but population-level conclusions drawn from these observations must be interpreted with caution (Heimer and Watson 1986 p.29). Neonate mortality between birth and appearance at the observation site may affect conclusions about individual ewe reproductive performance.

Two more recent studies utilizing radio collared animals and investigating the rates and causes of ewe and lamb mortality in the Alaska Range showed that pregnancy and parturition rates tended to be high, ranging from 74-91 % and 44-76%, respectively, but that neonate lamb survival was typically low, ranging between 12-36% annually, with predation accounting for greater than 90% of lamb deaths (Scotton 1998; Arthur 2003). Adult animals tended to show high survival, with annual survival rates averaging 86% over several years of study, again with predation being the primary proximate cause of mortality.

However, data collected in interior mountain ranges may not be directly applicable to ranges in southcentral AK, as predator numbers, density, and behavior, as well as weather patterns, exposure to disease, habitat quality, and other influences may well be different between mountain ranges.

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

In order to identify potential limiting factors that affect this sheep population, it is necessary to measure pregnancy, natality, and parturition rates, and enumerate the rates and causes of adult and lamb mortality. It is also critical that this population be screened for the presence of diseases that may have individual or population-level impact.

To do so, 37 adult ewes were captured via helicopter netgunning and radio collared in March 2009 to initiate this project. At capture, we collected a blood sample to determine pregnancy status and to screen for exposure to viral diseases, a fecal sample to measure parasite load, and a nasal and pharyngeal swab for bacterial culture to determine if these sheep were carrying bacterial known to cause pneumonia in other wild sheep populations. Surviving ewes from this cohort will be captured annually for at least three years, and animals will be captured to replace any adult mortalities that may occur, to establish a dataset on pregnancy rates and lifetime reproductive performance.

During May and June, pregnant ewes will be monitored from fixed wing aircraft. Neonate lambs will be radio collared, and ewes and lambs will be monitored regularly throughout their life to determine the timing of mortality. When mortalities are detected, it will be investigated as soon as possible to attempt to assign a cause.

IV. MANAGEMENT IMPLICATIONS

Managers will benefit from accurate estimates of demographic parameters. The first priority is to further our understanding of baseline demographics including survival, pregnancy, natality, and recruitment rates. At the same time, the influences shaping sheep population trends need to be elucidated. These influences include but are not limited to weather, predation, disease, habitat and nutrition, and human action. Finally, a research program must be designed to develop techniques and compile baseline data sets that will facilitate future research to advance the scientific knowledge base on Alaskan Dall Sheep while simultaneously providing the best possible information with which to manage sheep populations.

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

VI.

JOB/ACTIVITY 1: Pregnancy, parturition, and recruitment rates; Timing and cause of mortality.

Accomplishments:

Pregnancy rates: 37 adult ewes were captured in March 2009 to initiate this project. 22/34 (65%) of these ewes were pregnant in 2009. 33 adult ewes survived to March 2010, and 30/33, along with another 4 adult ewes were recaptured. 88% (30/34) of ewes were pregnant in 2010.

Parturition rates: In 2009, 19/22 (86%) of pregnant ewes were observed with a viable lamb, with one additional stillborn lamb observed. In 2010, 25/30 (83%) of pregnant ewes were observed with a viable lamb.

Recruitment rates: In 2009, 24 lambs were radiocollared. 2 lambs shed their collars and were excluded from analysis. 2 additional lambs were killed by eagles after being handled and prior to reunification with the ewe, and were also excluded from analysis. 8/17 (47%) lambs survived until May 2010.

In 2010, 26 lambs were radiocollared. 3 lambs have shed their collars and are excluded from analysis. As of this writing (Sept. 1, 2010), 16/23 (69%) of lambs are alive. Monitoring continues on these animals.

Rates, causes, and timing of mortality

Adult mortality:

33/37 (81%) of ewes initially captured in March 2009 were still alive in March 2010. Deaths occurred in March 2009 (Unknown cause, possibly capture related); March 2009 (Wolverine predation), April 2009 (Avalanche), and March 2010 (Avalanche).

Between April 1, 2010 and Sept. 1 2010, three adult ewes died. Two deaths occurred in May 2010, one caused by a systemic infection related to an aborted fetus and retained placenta and the second as a result of pneumonia. Pathology laboratory results are pending on these cases. The third death occurred in August 2010 and was also the result of pneumonia. Pathology laboratory reports are pending on this case as well.

Lamb mortality:

Of the 2009 cohort of 17 lambs, 9 deaths were recorded. Six deaths occurred in May and June 2009 (2 eagle predation, 1 brown bear predation, 1 unknown predator, 1 drowning, and 1 starvation as the ewe apparently failed to lactate.) Three deaths occurred during winter 2009-2010 and were caused by

malnutrition (December 2009), Malnutrition (January 2010), and wolf predation (February 2010).

Of the 2010 cohort of 23 lambs, 7 deaths have been recorded so far. Three deaths occurred in May 2010 (Fall, drowning, and starvation due to the ewe failing to lactate). Three deaths occurred in June 2010 (Eagle predation, drowning, and one to an unknown cause). One lamb died in August 2010 as a result of pneumonia. Pathology laboratory reports are pending on this case.

JOB/ACTIVITY 2: Animal health profile

Accomplishments: After the 2009 capture session, blood sera from 34 adult ewes was tested for exposure to viral diseases known to affect sheep populations. Samples from the additional four animals captured in 2010 were also tested. Samples were screened for titers to Parainfluenza-3, malignant Catarrhal fever, Bovine viral diarrhea, Episodic hemmorhagic disease, Ovine progressive pneumonia, Respiratory syncitial virus, and infectious bovine rhinotrachieitis. No exposure was detected to any of these diseases.

Nasal and pharangeal swabs from 37 animals captured in 2009 were sent to the Washington Animal Disease Diagnostic laboratory and cultured to ascertain if these animals carried bacteria associated with respiratory disease and pneumonia in other wild sheep populations. 19/37 animals tested positive for bacteria of the genus Pasturella, and 9/37 were positive for bacteria of the species Mannheimia hemolytica. Work is ongoing to determine how pathogenic these bacteria are and what effect they might be having on the study population.

Blood sera from 34 adult ewes was collected at initial capture in March 2009, and from 4 additional animals captured in 2010. A portion of this sample was sent to the University of Wyoming veterinary laboratory for analysis of trace mineral levels and amino acid profiles, and a portion was sent to Providence Hospital in Anchorage for blood chemistry and metabolic panel analysis. This data is currently being analyzed and compiled.

JOB/ACTIVITY 3: Assess weather effects

Accomplishments: Six temperature dataloggers were deployed in the study area in fall, 2009. These dataloggers record the temperature at one-hour intervals for a two year period. They will allow us to determine whether freeze-thaw (chinook) events are causing ice layers to form on snow in sheep winter range, which could increase the availability of winter forage. We are also relying on NOAA's Remote Automated Weather Stations (RAWS network) to collect snowfall data at two points adjacend to the study area.

JOB/ACTIVITY 4: Data analysis and report writing

Accomplishments: This job was not active during the reporting segment

VII. LITERATURE CITED

ADF&G, 2007. Sheep management reports. J. Coltrane, T. McDonough, R. Schwanke, and T. Peltier, authors. Alaska Department of Fish and Game, Juneau, AK.

Arthur, S. M. 2003. Interrelationships of Dall sheep and predators in the central Alaska Range. Federal Aid in Wildlife Restoration Research Final Report. Project 6.13. 1 July 1998- 30 June 2003. Alaska Department of Fish and Game publication. Juneau, AK. October 2003.

Hoefs , M., and M. Bayer. 1983. Demogrpahic characteristics of an unhunted dall sheep (Ovis dalli dalli) population in southwest Yukon, Canada. Can J Zool. 61: 1346-1357.

Heimer, W. E. and S.M. Watson. 1986. Comparative dynamics of dissimilar Dall sheep populations. Federal Aid in Wildlife Restoration Research Final Report. Project 6.9. 1 July 1979-30 June 1985. Alaska Department of Fish and Game publication. Juneau AK. June 1986.

Murie, A. 1944. The Wolves of Mt. McKinley. US Government Printing Office, #5, Fauna of the National Parks. (4th Printing 1997).

Murphy, E. C. and K. R. Whitten.1976. Dall sheep demography in McKinley Park and a reevaluation of Murie's data. JWM. 40(4): 597-609.

Murphy, E.C., F.J. Singer and L. Nichols. 1990. Effects of hunting on survival and productiveity of Dall sheep. JWM 54(2):284-290.

Nichols, L. 1978. Dall sheep reproduction. JWM. 43: 570-580.

Scotton, B. 1997. Estimating rates and causes of neonatal lamb mortality of Dall sheep in the Central Alaska Range. Federal Aid in Wildlife Restoration Research Final Report. Project 6.12. 1 May 1995-30 June 1997. Alaska Department of Fish and Game publication. Juneau AK. October 1997.

Whitten, K.R. 1997. Estimating population size and composition of Dall sheep in Alaska: assessment of previously used methods and experimental implementation of new techniques. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Research Final Report. Project 6.11. Alaska Department of Fish and Game publication. Juneau AK. October 1997.

VIII. PUBLICATIONS:

At this time, we have not collected sufficient data to submit manuscripts for peer-reviewed scientific journals. However, the PI (Lohuis) presented research updates to several scientific and popular audiences during the reporting period. These presentations are detailed as follows:

Oral presentations:

Dall's sheep research in the Chugach Range, Alaska. April 2009. Safari Club International, Anchorage Chapter.

Dall's sheep productivity and Survival in the Chugach Range, GMU 13D, Alaska. February 2010: Special session for arctic and alpine ungulates, Alaska Chapter of The Wildlife Society. Anchorage AK.

Dall's sheep productivity and Survival in the Chugach Range, GMU 13D, Alaska. June 2010: Northern Wild Sheep and Goat Council, Hood River, OR.

Poster Presentation:

Dall's Sheep research in Alaska. February 2010. The Wild Sheep Foundation annual convention, Reno, NV.

I. RECOMMENDATIONS FOR THIS PROJECT

Continue capture and monitoring operations for a minimum of two more years.

Prepared by: Tom Lohuis, WB III

Date: September 1, 2010.