

# Wildlife Restoration MULTI-YEAR GRANT INTERIM PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF WILDLIFE CONSERVATION  
PO Box 115526  
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## Alaska Department of Fish and Game Wildlife Restoration Grant

**GRANT NUMBER:** AKW-23

**PROJECT NUMBER:** 6.18

**PROJECT TITLE:** Ewe Dall sheep survival, pregnancy and parturition rates, and lamb recruitment in GMU 14C, Chugach Mountains, AK

**PERIOD OF PERFORMANCE:** July 1, 2020 - June 30, 2021

**PERFORMANCE YEAR:** July 1, 2020 - June 30, 2021

**REPORT DUE DATE:** Submit to FAC September 1, 2021

**PRINCIPAL INVESTIGATOR:** Tom Lohuis

**COOPERATORS:** : Dr. Roman Dial and Dr. Jason Geck, Alaska Pacific University; Brad Wendling, Alaska Department of Fish and Game, Fairbanks, AK

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Authorities: 2 CFR 200.328  
2 CFR 200.301  
50 CFR 80.90

### **I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR**

*Objective 1. Determine adult survival, pregnancy, natality, and recruitment rates.*

**ACCOMPLISHMENTS:** We started the project year with 36 radiocollared ewes. Overall mortality was lower than usual with two ewes lost to an unknown cause, one in August 2020 and another in February 2021, with a third killed by a brown bear in May 2021. We attempted to reach the August mortality by helicopter to conduct a field necropsy and determine the proximate cause of mortality but scavengers had opened the body cavity by the time we reached the carcass and as a result it was impossible to diagnose cause of death.

Capture operations were again truncated this year. We completed one day of capture work before inclement weather ended our first scheduled capture session. I (Lohuis) chose to cancel the second scheduled session due to extreme avalanche danger after a several day storm cycle with high winds deposited several feet of snow in our study area. We only captured and handled nine sheep before ceasing work. Nine is an insufficient sample size upon which to base population level estimates of pregnancy rates. Instead, we attempted to observe ewes three to

four times a week during the parturition period to assess population level pregnancy rates. Observation in previous years, combined with measurement of pregnancy rates via blood testing for Pregnancy Specific Protein B (PSPB) suggest that between 90-95% of pregnancies could be detected observationally. 12 of 36 (33%) ewes were observed with lambs between May 15 2021 and June 13 2021. While actual pregnancy rates will of course be somewhat higher than this figure, it still suggests a lower than usual pregnancy rate in this population.

We have not captured neonate lambs since the 2014 reporting period, so we do not have measures for natality and recruitment.

Objective 2. Develop animal health profile.

2a. Disease presence and prevalence

2b. Trace mineral levels and blood chemistry (CBC, CMP)

2c. Body Condition Scoring (BCS)

ACCOMPLISHMENTS:

2a. Blood sera and fecal samples, and nasal swabs were collected from all 9 ewes captured during the current reporting period. These samples were analyzed by the Washington Animal Disease Diagnostic Laboratory at Washington State University, and the USDA-Animal research section (Dr. Highland's laboratory) for indications of standard wildlife disease including *Mycoplasma ovipneumoniae*. *M ovi* has not been detected to date in samples collected from sheep in GMU 14C.

2b. At capture, 60-75 ml of blood was collected from adult ewes to assess serum levels of trace elements. Laboratory analysis is complete and data analysis is ongoing. Preliminary analyses suggest some animals may be selenium deficient relative to reference levels for Bighorn and/or domestic sheep.

2c. Each animal captured was assigned a qualitative body condition score (BCS) of 1-6. Chugach sheep are typically in poor body condition, even for ungulates in late winter, with most rating 1.5-2.0. All animals handled during this reporting period fell into this category.

During the three most recent reporting periods, we have begun to use ultrasound to measure subcutaneous rump fat more precisely in our sample of sheep. All animals sampled were in poor condition with 0.0-0.60 cm of subcutaneous rump fat.

Objective 3. Assess weather effects on habitat and nutrition

3a, b, and c. Temperature and snow depth monitoring

We have modified these objectives due to the extreme variation in snow deposition and persistence across the study area. It is apparent that direct measures of snow depth and hardness at a few selected points are not representative of the study area as a whole. Landsat and MODIS satellite imagery does not appear practicable due to infrequent and irregular imagery due to darkness and cloud cover. We are attempting to identify and validate metrics that accurately represent these measures.

In collaboration with Dr. Roman Dial and Dr. Jason Geck at Alaska Pacific University, we are attempting to develop metrics that accurately represent snowpack across the study area.

3d. (New objective) Develop and validate techniques to assess the effect of summer weather patterns on sheep forage nutritional quality.

ACCOMPLISHMENTS:

3a-c. Work to develop sampling methodology and technique continues. Potential indicators of snowpack and persistence include date and volume of peak streamflow of streams draining the project area, 'Structure for Motion' aerial photography, where snow depth relative to underlying structure is assessed via a mosaic of stereoscopic photographs and placing a network of snow measurement stakes and remote time lapse cameras across the study area to measure snow depth more precisely throughout the course of the winter season. This year, we used a helicopter to deploy several sampling sites where we tested remote cameras, snow measurement stakes, and temperature and rainfall sensors to determine intervals between photo data collection, how best to spatially separate measuring sites to capture snowpack variability across the landscape, and how best to quantify snow hardness, water content, and rain on snow events.

3d. We are developing and validating techniques to assess the effect of summer weather patterns on sheep forage nutritional quality. In the current project year, a short-term nonpermanent technician/MS level graduate student is completing his work and writing his MS thesis identifying crucial sheep forage items, and quantifying their nitrogen content, protein content, stable isotope signature, and other standard metrics of forage quality. His project is focused on determining if there is a relationship between summer temperature and precipitation and measures of forage nutritional quality.

Objective 4. Data analysis and writing.

ACCOMPLISHMENTS: None completed in the current project year, but work described above under 3d is in progress.

## **II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.**

Over the last several years of research, it appears that predation plays a smaller role in driving demography of Chugach sheep than it does in other mountain ranges. Only 1 of 4-6 radiocollared adults are killed by predators, and only 1 in 3 lambs. This low percentage of sheep lost to predators, and the broad distribution of mortalities across predator species, suggests strongly that Chugach sheep populations are not predation limited. Additionally, the low-level presence and prevalence of major wildlife diseases indicates that disease does not have a

population-level effect. Some individuals are lost to pneumonia or other disease, but it is likely that these animals are compromised due to poor nutritional condition and therefore susceptible.

Low and variable pregnancy rates, coupled with poor body condition strongly suggests that Chugach sheep are limited by nutrition and habitat, with long term weather patterns and climate change playing a major role. Work to identify specific limiting factors is ongoing.

### **III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.**

Our ability to capture, handle, and collect data from individual animals was limited this year as a result of hazardous avalanche conditions. WE schedule helicopter flight time for captures up to one year in advance; weather and snow conditions are impossible to predict ahead of time.

Unfortunately, we were unable to obtain our desired sample size to assess animal body condition, pregnancy status, and disease presence and prevalence. However, we were able to follow ewes during parturition to estimate pregnancy, and also develop and improve new methodology for use to assess snow conditions and how snowpack affects foraging efficiency and behavior in future years.

### **IV. PUBLICATIONS**

None in the current reporting period

**V. RECOMMENDATIONS FOR THIS PROJECT** This project will continue as amended with a focus on identifying specific limiting factors related to climate change and weather patterns, nutritional quality, and habitat limitation.

**Prepared by:** Tom Lohuis

**Date:** 9/1/2021