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: AKW-B-R2-2020

PROJECT NUMBER: 6.18

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

PERIOD OF PERFORMANCE: July 1, 2019 - June 30, 2020

PERFORMANCE YEAR: July 1, 2019 - June 30, 2020

REPORT DUE DATE: Submit to FAC August 28, 2020

PRINCIPAL INVESTIGATOR: Tom Lohuis

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

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 2020 project year with 34 radiocollared ewes. Overall mortality was lower than usual with one ewe killed by an avalanche in February of 2020 and another lost to an unknown cause in June. We attempted to reach the second 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 determine cause of death.

Capture operations were truncated this year due to lockdowns imposed to curb the spread of COVID-19. We only captured and handled eight sheep before ceasing work. Eight 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. 9 of 34 (26%) ewes were observed with lambs between May 15 2020 and June 13 2020. 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 8 ewes captured during the current reporting period. These samples are currently being 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.

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.

During the three most recent reporting periods, we have begun to use ultrasound to more precisely measure subcutaneous rump fat 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 Mr. 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. Potential indicators of snowpack and persistence include date and volume of peak streamflow of streams draining the project area, newer 'Planetcube' 1-3M pixel satellite imagery, and placing a network of snow stakes and remote time lapse cameras across the study area to more precisely measure snow depth throughout the course of the winter season. This year, we tested remote cameras and snow stakes to determine intervals between photo data collection and how best to spatially separate measuring sites to capture snowpack variability across the landscape.

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 conducted three, 2- to 5-day sampling sessions to collect an additional 62 vegetation samples. He subsequently analyzed these samples as well as 452 others collected in previous years for nitrogen content, protein content, stable isotope signature, and other standard metrics of forage quality. Currently, data analysis is ongoing to determine if there is a relationship between summer temperature and precipitation and measures of forage nutritional quality.

Objective 4. Data analysis and writing.

ACCOMPLISHMENTS: We amended the project statement for future work on this project to more closely investigate the relationship between habitat quality, weather patterns, and sheep population performance, and to build a carrying capacity model for GMU 14C sheep.

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 in other 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 the COVID-19 pandemic and associated lockdowns and travel restrictions. As a result, we did not spend all the funds allocated to this project. Only $38.5K was spent out of $60K allocated to line 3000, contractual services. On this project, these funds are primarily used for

aircraft charters for capture and sampling operations, and laboratory analyses. Similarly, since we did not capture animals, we did not need as many supplies, equipment, and gear, which meant that only $26.5K was spent out of the $70K allocated to line 4000 commodities.

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 conduct field forage sample collection and analysis and develop 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: 8/24/2020