

Wildlife Restoration MULTI-YEAR GRANT INTERIM 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: AKW-19

PROJECT NUMBER: 2.0

PROJECT TITLE: Assessing Dall's Sheep Horn Morphometrics as a Management Tool

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

PERFORMANCE YEAR: July 1, 2016 – June 30, 2020

REPORT DUE DATE: Due to FAC Sept 1, 2018

PRINCIPAL INVESTIGATOR: Brad Wendling, Wildlife Biologist III

COOPERATORS: Tom Lohuis (Region 4 Wildlife Biologist IV), Chris Brockman (Region 4 Wildlife Biologist II)

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Measure and record horn measurements brought in by hunters when they seal their harvested sheep at Division of Wildlife Conservation offices.

ACCOMPLISHMENTS:

We measured and photographed ~42% of harvested rams in 2019 (349 of 840). For each horn, we quantified age, total horn length, total degree of curl, distance between consecutive annuli, and degree of curl by annulus segments.

OBJECTIVE 2: Analyze sheep horn morphometric data.

Job/Activity 2a: Conduct a comparative analysis of data collected on this project to the Alaska Department of Fish and Game (ADF&G) DWC 1968-1970 horn data set.

ACCOMPLISHMENTS:

We used histograms to plot the age structure of Dall's sheep harvest in Alaska under $\frac{3}{4}$ curl harvest strategy, 1968–1971 and under full curl harvest strategy in 2016 - 2018. We used linear regressions to examine the relationship between Dall's sheep age and degree of horn curl for rams harvested in Alaska under $\frac{3}{4}$ curl harvest strategy, 1968–1971, and under full curl harvest strategy in 2016 - 2018. We used linear regressions to examine the relationship between Dall's sheep horn length and degree of horn curl for rams harvested in Alaska under $\frac{3}{4}$ curl harvest strategy, 1968–1971, and under full curl harvest strategy in 2016 - 2018. Lastly, we calculated the percentage of Dall's sheep harvested as a function of the number of seasons they were legal to be harvested under $\frac{3}{4}$ curl regulation, 1968– 1971, and full curl regulation in 2016 - 2018. We tested for differences in the escapement rate of rams through time and among mountain ranges. A rigorous analysis of the data has been conducted and a manuscript is in preparation for submission to a peer reviewed journal.

Job/Activity 2b: Use horn morphometric data to quantify the relationship between and the relative influence of covariates including winter and summer weather patterns, hunter effort, habitat quality as assessed by NDVI and other remotely sensed habitat variables, and summer survey flight data on horn growth patterns.

During the horn morphometric project, we began a collaboration the NASA ABoVE project “Assessing Alpine Ecosystem Vulnerability to Environmental Change Using Dall Sheep as an Iconic Indicator Species”. This research addressed Dall's sheep performance in relation to remotely sensed habitat and weather variables. Because of that collaboration and the manuscripts that came from the project we chose not to further pursue Job/Activity 2b.

OBJECTIVE 3: Disseminate project results to hunters.

ACCOMPLISHMENTS:

A Dall's sheep newsletter, which included a summary of this research, was prepared and distributed to hunters who had reported hunting sheep within the past 3 years (n = 4300).

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Dall's sheep (*Ovis dalli*) are a coveted big game species pursued by a relatively small but passionate group of hunters across 8 mountain ranges in Alaska. The Alaska Board of Game determines state harvest regulations and in recent years have received numerous public proposals aimed at altering sheep management. Proposals are directed at reducing a perceived level of competition between resident and non-resident hunters, and to address a possible lack of legal rams available for harvest. Specifically, many hunters believe that all legal rams are harvested each year and want to increase their availability by reducing the hunting opportunities available to non-residents. Generally, most sheep hunting is managed under a full-curl harvest strategy. Full-curl is defined as: the tip of one horn has grown through a 360° circle described by the outer

surface of the horn when viewed from the side, or both horn tips are broken, or the sheep is 8+ years old. Since 2004, successful hunters are required to seal sheep horns at ADF&G offices. In 2016, we began a study to evaluate horn morphometrics as a tool to inform management decisions. We measured and photographed > 58% of harvested rams in 2016 (474 of 783), 2017 (483 of 798), and 2018 (460 of 792). For each horn, we quantified age, total horn length, total degree of curl, distance between consecutive annuli, and degree of curl by annulus segments. The relationship between total horn length and degree of curl was significant ($p < 0.01$; $r^2 = 0.37$). The relationship between age and degree of curl was not significant ($p = 0.3$). The mean age at which rams achieved 360° curl was 8.5 years (range 5 to 12 years). For 2016, 2017, and 2018, 19%, 16%, and 20% of harvested rams were legally taken on criteria other than 360° of curl, while 28% and 27%, and 20% of rams were harvested in the first year they became legal based on degree of curl. On the other hand, 53% and 57%, and 59% of harvested rams were available for harvest during at least one previous hunting season after their horns grew through 360° curl. Preliminary analyses indicate hunters are only removing approximately half of all legal rams each year statewide. Estimating ram escapement each hunting season will inform policy decisions.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

None

IV. PUBLICATIONS

Assessing Dall's Sheep Horn Morphometrics as a Management Tool (In Preparation)

2017 Alaska Department of Fish and Game, [Dall's Sheep Newsletter](#).

Presented results of the project at the 2018 Northern Wild Sheep and Goat Biennial Symposium. Abstract will be published in the proceedings which is in preparation.

Presented results of the project at the 2018 [WAFWA](#) Wild Sheep Working Group winter meeting.

Presented results of the project at the 2019 Alaska Chapter of the Wildlife Society meeting.

Presented results of the project at the 2018, 2019 Alaska chapter of the Wild sheep foundation "sheep hunter university" prior to their annual banquet.

Presented results of the project to the Tanana Valley Sportsmen's association (March, 2019).

Presented results of the project to the Healy advisory (February, 2019).

Presented results of the project at the Alaska Department of Fish and Game's sheep hunting clinic (July, 2019).

V. RECOMMENDATIONS FOR THIS PROJECT

None

Prepared by: Brad Wendling Wildlife Biologist III

Date: 8/14/2020