**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 FY18

**PROJECT NUMBER:** 2.0

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

**PERIOD OF PERFORMANCE**: July 1, 2016 –June 30, 2020

**PERFORMANCE YEAR**: 1 July 2017-30 June 2018

**REPORT DUE DATE:** September 1, 2018

**PRINCIPAL INVESTIGATOR:** Brad Wendling, Wildlife Biologist III

**COOPERATORS:** Tom Lohuis (R4 Wildlife Biologist IV), Chris Brockman (R4 Wildlife Biologist II), Joe Want (STNP FWT III).

## I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Collect morphometric data from hunter harvested sheep horns.

**Job/Activity 1-a:** Measure and record horn measurements brought in by hunters when they seal their harvested sheep at DWC offices.

ACCOMPLISHMENTS: We measured and photographed ~60% of harvested rams in 2017 (483 of 798). 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 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 ¾ curl harvest strategy, 1968–1971 and under full curl harvest strategy in 2016 and 2017. We used linear regressions to examine the relationship between Dall's sheep age and degree of horn curl for rams harvested in Alaska under ¾ curl harvest strategy, 1968–1971, and under full curl harvest strategy in 2016. 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 ¾ curl harvest strategy, 1968–1971, and

under full curl harvest strategy in 2016. 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 ¾ curl regulation, 1968– 1971, and full curl regulation in 2016.

**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.

ACCOMPLISHMENTS: To date, no analysis has been performed on these data. Analyses will be conducted after we collect horn data from sheep harvested in the 2018 hunting season.

OBJECTIVE 3: Disseminate project results to hunters.

**Job/Activity 3a:** Create an annual flier summarizing horn morphometric data by mountain range to be distributed to all sheep hunters after each hunting season.

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). (See Section IV Publications)

## 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 has recently been inundated with 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. Alaska hunting regulations are complex, but 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 Alaska Department of Fish and Game offices.

In 2016, we began a study to evaluate horn morphometrics as a tool to inform management decisions. We measured and photographed ~60% of harvested rams in 2016 (474 of 783), and 2017 (483 of 798). For each horn, we quantified age, total horn length, total degree of curl, distance between consecutive annuli, and degree of curl by annulus segments. In 2016, the mean age at which rams achieved 360˚ curl was 8.5 years (range 5 to 12 years). In 2016, 19% of harvested rams were legally taken on criteria other than 360˚ of curl, while 28% of rams were harvested in the first year they became legal based on degree of curl. On the other hand, 53% of harvested rams were available for harvest during at least one previous hunting season after their horns grew through 360˚ curl. Our

preliminary analyses indicate that hunters are only removing approximately half of all legal rams each year statewide. Using horn morphometric data to estimate ram escapement each hunting season will inform policy decisions.

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

None.

## IV. PUBLICATIONS

- 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.

## V. RECOMMENDATIONS FOR THIS PROJECT

None.

**Prepared by:** Brad Wendling

**Date: 8/15/2018**