

**Alaska Department of Fish and Game
Wildlife Restoration Grant**

GRANT NUMBER: AKW-29

PROJECT NUMBER: 12.0

PROJECT TITLE: Identifying metrics for evaluating nutritional stress in muskox.

PERIOD OF PERFORMANCE: 3/23/2019 – 3/23/2020

PERFORMANCE YEAR: March 23, 2019 – March 23, 2020; year 2 of a 4-year grant

REPORT DUE DATE: May 29, 2020

PRINCIPAL INVESTIGATOR: Brynn Parr, WBIII

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Investigate field and analytical techniques used to date to evaluate nutritional condition of muskox and all allied species.

ACCOMPLISHMENTS: We conducted a thorough a literature review of field and analytical techniques used to date to evaluate nutritional condition of muskox and all allied species.

OBJECTIVE 2: Evaluate pregnancy and parturition-based indicators to nutritional condition and establish baseline values for populations with high productivity and reproductive potential.

ACCOMPLISHMENTS: We asked hunters to provide the pregnancy status (i.e. presence/absence of a fetus and lactation status) from female muskoxen harvested during the 2020 spring hunting season. Information and samples from the harvest had not yet been received by the end of this reporting period.

We obtained samples from 30 muskox (13 males, 16 females, 1 unreported sex) from the 2019 spring hunt during this reporting period. Pregnancy status provided by hunters revealed 86% of sampled females were pregnant and 38% were lactating; all of the lactating females were also pregnant.

OBJECTIVE 3: Evaluate forage and diet-based indicators to nutritional condition and establish baseline values for populations with high productivity and reproductive potential.

ACCOMPLISHMENTS: We asked hunters to provide fecal samples, livers, femurs, and fat measurements from muskoxen harvested during the 2020 spring hunting season. We had not yet received any samples by the end of this reporting period.

We received 23 fecal samples, 23 livers, 12 femurs, and 25 fat depth measurements from the 2019 spring hunt during this reporting period. Fecal samples were dried in our lab and submitted to the Micro Composition Laboratory in Broomfield, Colorado. We have not yet received results. Liver samples were submitted to the Washington Animal Disease Diagnostic Laboratory in Pullman, WA, to test for trace minerals. Results are comparable to trace mineral levels reported for domestic muskox and wild muskox in other parts of Alaska; however, iron and zinc levels are much lower than levels reported for muskox located on the eastern north slope and western Alaska. Femur lengths were measured in our lab; female femurs averaged 11.5 inches and male femurs averaged 13 inches in length. We then cut femurs in half to extract bone marrow to test for percent water loss. Water loss in females averaged 5% and males lost an average of 10%. Overall back fat averaged 3.01cm, and overall rump fat averaged 2.52cm.

OBJECTIVE 4: Evaluate stress-based indicators to nutritional condition and establish baseline values for populations with high productivity and reproductive potential.

ACCOMPLISHMENTS: We asked hunters to provide hair and fecal samples from muskoxen harvested during the 2020 spring season that will be used to evaluate cortisol levels. Samples from the spring harvest had not yet been received by the end of this reporting period.

We received 21 hair samples and 23 fecal samples from the 2019 spring hunt during this reporting period. We cut, cleaned, and submitted hair samples to the stable isotope lab at the University of Alaska Fairbanks to determine the rate of growth; results will allow us to next test cortisol levels at known periods of time for each hair sample. We did not receive results from the stable isotope lab by the end of this reporting period. Fecal samples remain frozen in our freezer and will be sent to the Smithsonian Conservation Biology Institute Wildlife Endocrinology Laboratory to test for progesterone and cortisol levels.

OBJECTIVE 5: Engage advisory committees and BOG to explore incremental adjustments to stocking density on Nunivak Island.

ACCOMPLISHMENTS: We traveled to Mekoryuk to speak with hunters directly. We explained the research project, the methods, and the desired outcome. We also provided a letter to all the Nelson Island hunters highlighting the same information, as we were unable to fly to Tununak to talk to hunters in person.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Year 2 of a 4-year project.

We conducted a thorough literature review of field and analytical techniques used to evaluate nutritional condition of muskoxen and allied species. We worked with local muskoxen hunters to obtain samples from harvested muskoxen as this method has proven successful for several muskox populations in northern Canada and is a commonly used approach for marine mammals in the region. We traveled to Mekoryuk and provided sampling kits directly to hunters. We also provided a letter and sampling kits to individual hunters who obtained a Nelson Island muskox registration permit in Tununak. The hunting season ended on March 15; due to time and logistical constraints with shipping samples to/from remote Alaska locations, we were unable to receive any samples from the 2020 hunting season by the end of this performance year.

We received samples from the 2019 hunting season during this reporting period. Fecal samples were sent to the Micro Composition Laboratory in Broomfield, CO, to test for fecal microhistology, but results had not yet been received by the end of this reporting period. Liver samples were submitted to the Washington Animal Disease Diagnostic Laboratory in Pullman, WA, to test for trace minerals. Results were comparable to other muskox populations. Femurs were sampled in an ADF&G laboratory to test for percent water loss; both sexes had fatty marrow indicating they were in good health. Hair samples were cut, cleaned, and submitted to the stable isotope lab at the University of Alaska Fairbanks to determine growth rates; results were not yet received by the end of this reporting period.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

There have been no significant developments or amendments to this project during this reporting period.

IV. PUBLICATIONS

No publications have resulted from this project to date.

V. RECOMMENDATIONS FOR THIS PROJECT

This project will continue 2 more years.

Prepared by: Brynn Parr