

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

GRANT NUMBER: AKW-29

PROJECT NUMBER: 11.0

PROJECT TITLE: The role of sex and age composition in muskox population dynamics.

PERIOD OF PERFORMANCE: 3/23/2018 – 6/30/2021

PERFORMANCE YEAR: March 23, 2018 – March 23, 2019; year 1 of a 4-year grant

REPORT DUE DATE: Submit to Coordinator June 1, 2019

PRINCIPAL INVESTIGATOR: Brynn Parr

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: Investigate techniques used to evaluate secondary effects of selective harvest on demographics and abundance.

ACCOMPLISHMENTS: We began a literature review on secondary effects and super additive harvest. The literature search is ongoing.

OBJECTIVE 2: Estimate recruitment rates across spatial and group-specific composition scales relative to the proportion and abundance of mature bulls.

ACCOMPLISHMENTS: Overall recruitment across the entire Seward Peninsula for the 2018 cohort (i.e. short yearlings as of spring 2019) was estimated at 15%. We have not yet estimated recruitment rates across group-specific composition scales.

OBJECTIVE 3: Establish methods for marking and following muskox ages 2 and less.

ACCOMPLISHMENTS: We conducted a pilot study to mark neonatal muskoxen, proceeding in stepwise fashion to establish techniques for the hand-capture, sexing and weighing of neonates. We started with a ground-based hand-capture technique to capture the first 5 neonates. Nitrile gloves were worn to minimize scent transfer. Calves were collared with an expandable VHF radiocollar adapted from collars used on 4-month-old caribou. Muskox neonates were captured, collared, and released immediately. Total handling time was kept under 15 seconds, but reuniting calf/cow pairs averaged 61 minutes and

required the use of a snowmachine to quickly leave an area to prevent neonates from following us. We waited a week to determine if any abandonment occurred; none did. We then switched to helicopter-based captures due to deteriorating snow conditions to capture another 5 neonates. Once again, we wore nitrile gloves to minimize scent transfer and total handling time to collar calves was kept under 15 seconds. On average, calf/cow pairs were reunited within 4.16 minutes. We waited a week to determine if any abandonment occurred, then captured a final 3 neonates using the helicopter. On this last round of captures, we weighed all 3 neonates (average 26.67 pounds) and sexed 2 of the calves (1 male, 1 female). Total handling time was kept under 1.5 minutes.

The helicopter-based captures appeared successful and will be the method used to capture neonates in future years of this project. In the next reporting period, we plan to collar a minimum of 60 neonates. We will obtain sex and weights for all calves. We plan to capture calves when they are ≥ 3 days old in order to allow the calf/cow pair time to form a bond. We will spread out the deployment of collars throughout the anticipated calving period (~April 25 through May 20); no more than 3 collars will be deployed in any single group of muskoxen.

We worked closely with our wildlife management and veterinarian staff in October to conduct a drug trial to determine a safe and effective dose of a new drug combination (thiafentanil/xylazine) for various age classes/sizes of muskoxen. As the need for effective new drug doses was universal, management staff paid for the drug trial. Doses were determined for mature adult cows (≥ 60 months), calves (6-12 months), and juvenile cows (18-24 months). This work will allow us to capture 18-24-month-old muskox cows in future years of this project.

We are currently working with collar manufacturers to develop an expandable collar to use on 18-24-month-old muskox cows. Upon development of this collar prototype, we will conduct a small pilot trial to capture and collar a minimum of 10 muskox under the age of 24 months; upon confirming the collar will expand and contract with the cow's changing seasonal weight and will not slip over the horn boss, we will deploy an additional 20 collars.

OBJECTIVE 4: Estimate age-specific survival rates across spatial and group-specific composition scales relative to the proportion and abundance of mature bulls.

ACCOMPLISHMENTS: We have not yet estimated age-specific survival rates, pending sample sizes of collared individuals of known age. A preliminary attempt to estimate age-specific survival from historical composition data proved ineffective as inconsistencies were found tracking individual cohorts through time, particularly among females.

OBJECTIVE 5: Estimate group and age-specific fecundity across spatial and group-specific composition scales relative to the proportion and abundance of mature bulls.

ACCOMPLISHMENTS: Group and age-specific fecundity will be estimated as cows are captured. We will focus initially on pregnancy rates of 18-24-month-old muskox using pregnancy tests from captured individuals. We will also explore the utility of focal

observations of groups and fecal progesterone tests as additional tools for estimating pregnancy rates.

OBJECTIVE 6: Identify causes of mortality during peak periods of mortality.

ACCOMPLISHMENTS: We monitored neonate collars deployed in our pilot study daily for one-week post-capture, weekly through one month of age, and monthly thereafter. We were unable to monitor collars weekly after one month of age due to limitations in aircraft and personnel availability. Brown bear predation accounted for 75% ($n = 3$) of muskox calf mortality. Peritonitis, the result of being hooked by another muskox likely as the result of human interference, caused the other ($n = 1$) mortality.

In the future, we will aim to monitor neonates daily during peak periods of mortality and will work to understand when mortalities have slowed enough that we can reduce our monitoring efforts.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Year 1 of a 4-year project.

We evaluated two separate techniques for capturing neonatal muskox: a ground-based hand capture, and a helicopter capture. The helicopter captures were more efficient, as they were faster overall, required fewer people, and animals reunited quicker post-capture. The total average time (including travel time to calf, capture attempt, and time to reunite) spent on a ground-based hand captured calf was 104 minutes; helicopter capture times averaged 38 minutes. Average time to reunite the calf and cow pair after ground-based hand captures was 61 minutes; calf/cow pairs reunited in an average of 4.16 minutes following helicopter captures. Of the 13 calves collared, 2 animals were censored from analysis due to the collars slipping off, 3 calves were preyed on by brown bears, and 1 calf was killed by peritonitis after being hooked by another muskox, likely as a result of human interference.

We are working with the collar manufacturer (Telonics) to develop an expandable collar (range of 24–34 inches in diameter) to use on 18-24-month-old muskox cows.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

None.

IV. PUBLICATIONS

No publications have resulted from this project to date.

V. RECOMMENDATIONS FOR THIS PROJECT

This project will continue 3 more years.

Date: