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-R3-2020

PROJECT NUMBER: P1.73

PROJECT TITLE: Long-term effects of predator reductions on moose abundance, survival, nutrition, and hunting harvest in the Unit 19D East moose management area

PERIOD OF PERFORMANCE: July 1, 2019 - June 30, 2021

PERFORMANCE YEAR: July 1, 2020 - June 30, 2021; year 2 of a 2-year grant

REPORT DUE DATE:

PRINCIPAL INVESTIGATOR: Danny Caudill, Wildlife Research Biologist, ADF&G

COOPERATORS: None

I. PROGRESS ON PROJECT OBJECTIVES DURING PERIOD OF PERFORMANCE

OBJECTIVE 1A: Estimate moose numbers and population composition in the Unit 19D East MMA.

ACCOMPLISHMENTS: No survey or activity was planned during the report period per the project statement. However, management staff conducted a GSPE survey in the fall of 2020 and these data will be incorporated into ongoing research analyses and archived with the research data.

OBJECTIVE 1B: Determine annual survival rates and primary causes of mortality of moose calves.

ACCOMPLISHMENTS: No capture or activity was planned during the report period per the project statement.

OBJECTIVE 1C: Determine condition, survival rates, and causes of mortality of yearling moose.

ACCOMPLISHMENTS: We monitored the previously captured (in previous reporting periods) moose. This sample of moose has become skewed (toward old age) as no captures have been conducted recently and as a consequence unlikely to be representative

of the population. However, these moose should be monitored to ensure all the collars and animals reach the end of their lives without the equipment (i.e. radiocollars) causing harm to the individuals. Remaining collars should go off air within the next few years. If problems with the equipment are detected the animal should be captured and the equipment should be removed from the individual.

OBJECTIVE 1D: Determine twinning rates of moose in the MMA.

ACCOMPLISHMENTS: We conducted a twinning survey 24–27 May 2021. We observed 32 cows with a single calf and 9 cows with twins.

OBJECTIVE 2: Conduct moose browse surveys.

ACCOMPLISHMENTS: No survey was planned during the reporting period per the project statement.

OBJECTIVE 3: Wolf population estimation.

ACCOMPLISHMENTS: No survey was planned during the reporting period per the project statement.

OBJECTIVE 4A: Bear population estimation.

ACCOMPLISHMENTS: No capture or survey was planned during the report period per the project statement. However, marked bears should be monitored to ensure all the collars and animals reach the end of their lives without the equipment (i.e. radiocollars) causing harm to the individual. Remaining collars should go off air within the next few years. If problems with the equipment are detected the animal should be captured and the equipment should be removed from the individual.

OBJECTIVE 4B: Estimate black bear harvest rates.

ACCOMPLISHMENTS: No radio-marked bears were harvested in the study area during the report period.

OBJECTIVE 5: DNA analysis.

ACCOMPLISHMENTS: No analysis was necessary during the reporting period. However, we may submit historic samples to evaluate the assumption among stakeholders that predation is skewed towards a particular bear sex.

OBJECTIVE 6: Literature review, data analysis, report writing, and publication of results.

ACCOMPLISHMENTS: The principal investigator reviewed the literature and completed reports. Data from the moose population survey and twinning surveys were compiled. Previously, all of the population size estimates have been analyzed as stand-alone surveys

and trends have been calculated from those results. The preceding project 1.62 (see results in Keech et al. 2011) was largely able to ignore a burn that occurred in the study area in 2002 because the effect of the burn on moose habitat was minimal at that point in time (see Keech et al. 2011). However, during the course of this project the burn has reached an age where it could have produced enhanced moose habitat and accordingly an optimal analysis on the effect of predator control should attempt to "control" for the effect of this variable. We analyzed the moose population data to explore the correlations between predator removal and habitat changes (i.e., burned areas). We did this by treating burned survey units and unburned survey units as separate analysis areas and then compared changes in overall population size and density. We also estimated a linear rate of change within each survey unit and then compared those rates between the burned and unburned survey units. Both analysis paths seem to indicate that most of the current growth has occurred in burned survey units. The ADFG biometrician will conduct further analyses to finalize these results. However, while we cannot determine causation, it appears that the continued growth in the study area is more correlated with changes in habitat (i.e., burned areas) than with manipulations to predator abundance. We will write the results of the analyses into a manuscript to submit for peer review in the next reporting period. We will also likely use the results of the bear population surveys in both this manuscript and in the federal aid project 4.46 (grand number: AKW-B-R3-2021 Amendment #1) where applicable.

There is a persistent belief among stakeholders that predation of moose calves is skewed towards a particular sex of bears. We plan to use data collected during this and the previous project to evaluate this question. The result of these analyses will be an observational evaluation to submit to a peer-reviewed journal as a research note detailing the data collected over the life of this and the previous (1.62) project.

Several authors have criticized aspect of managing predators in Alaska, both under general management of predator harvest and targeted predator control (e.g., Miller et al. 2011, 2017; Ripple et al. 2019). Due to the significant knowledge collected under this project and its predecessor (1.62), we have prepared a manuscript to submit to a peer-reviewed journal outlining the current state and knowledge surrounding predator harvest and control measures in Alaska. Within that manuscript, aspects associated with Intensive Management (sensu predator management) are associated with this project, whereas aspects associated with predator harvest are largely associated with the concurrent federal aid project on bear harvest dynamics (grant number: AKW-B-R3-2021 Amendment #1; project number 4.46).

While not explicitly stated in this objective, the data collected over the life of this project and its predecessor (1.62) should be compiled into a single source for each objective (i.e. one database for all twinning data). This is particularly important because this project and its predecessor have spanned 3 PIs and multiple changes to data collection protocols. Doing so will ensure the usability of the nearly 2 decades of data collected by individuals not directly involved with the field collection of the data. Due to the large volume of data collected we are still working to complete this task.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

All accomplishments completed to date are outlined in the specific objectives above or in previous years' annual reports (2012–present). The black bear population has returned to pre-translocation size. Moose density has increased since predator populations were manipulated. Moose twinning rate has declined recently and browse removal has increased. For specific accomplishments see the specific objectives in accomplishments sections of this and previous years. During this reporting period a moose twinning survey was planned and implemented. Upon completion of the field portion of the surveys, the collected data were compiled and summarized. Bears and moose that were radiomarked in previous reporting periods were monitored. Relevant literature was reviewed, and annual reports were completed. The data collected during this reporting period were compiled and integrated with data collected over the life of the project. Creating a single database containing all of the data for each objective over the life of the project is ongoing.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

This project is nearing completion and several papers on the results should be submitted in the next year. Compilation of data and outstanding analyses should be completed over the next year. Some funds should be allocated to this or another relevant project to monitor, and when necessary remove collars, from individual animals marked over the course of this project. While these individuals are no longer relevant from a scientific standpoint (i.e., they are not a representative sample) their welfare should be considered.

IV. PUBLICATIONS

None during the reporting period.

V. RECOMMENDATIONS FOR THIS PROJECT

The project should continue as planned and this should represent the last substantial year for the project. Funds should be set aside in this or other S&I projects to ensure the welfare of previously (during the course of this study) marked animals. The final analysis of this project should attempt to incorporate changes to the study area that have occurred over the last 20 years. Funds for publications resulting from this project should represent the bulk of this project going forward. Funds (i.e. staff time) should be allocated to archive the data collected over the course of this and its predecessor (1.62) project to ensure future usability.

Prepared by: Danny Caudill

Date: 8/14/2021