

**Wildlife Restoration OPERATING GRANT
FINAL 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-B-R2-2020

PROJECT NUMBER : P1.72

PROJECT TITLE: Identification of factors affecting calf production, calf survival, and survival of female adult moose in Game Management Unit 15C

PERIOD OF PERFORMANCE: July 1, 2011 – June 30, 2020

PERFORMANCE YEAR: July 1, 2019 – June 30, 2020; year 9 of a 9-year grant

REPORT DUE DATE: Submit to FAC August 28, 2020

PRINCIPAL INVESTIGATOR: Thomas McDonough

COOPERATORS:

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERIOD OF PERFORMANCE

OBJECTIVE 1: Quantify pregnancy rates, parturition rates, and parturition dates of adult cow moose.

ACCOMPLISHMENTS: We were successful in completing this objective of the project for the given year. We captured 25 female moose in February 2020 and continued to monitor all collared moose aerially throughout the year. Pregnancy rate was 96% of captured cows as determined through blood testing. Parturition rate of all collared cows was 80% based on aerially monitoring cows daily during calving. Parturition dates were from 12May through 10June. Parturition dates were determined through daily aerially monitoring. These data, along with those of the other objectives, are provided to ADFG wildlife managers to make critical decisions on management directions for this moose population. These data, outlined in all these objectives, has resulted in ADFG proposing important regulatory changes to this moose population, specifically adding additional harvest opportunities which is the ostensible goal of intensive management.

OBJECTIVE 2: Determine twinning rates of adult cow moose.

ACCOMPLISHMENTS: We were successful in completing this objective of the project for the given year. We conducted aerial surveys of radio collared cows during calving to determine a twinning rate of 39%. These data, along with those of the other objectives, are provided to ADFG wildlife managers to make critical decisions on management direction of this moose population. These data, outlined in all these objectives, has resulted in ADFG proposing important regulatory changes to this moose population, specifically adding additional harvest opportunities which is the ostensible goal of intensive management.

OBJECTIVE 3: Determine cow and calf mortality rates.

ACCOMPLISHMENTS: We were successful in completing this objective of the project for the given year. Radio collared cows were aerially monitored daily during calving. Annual cow and 10-month calf survival in 2019-20 was 92% and 23%, respectively. These data, along with those of the other objectives, are provided to ADFG wildlife managers to make critical decisions on management direction of this moose population. These data, outlined in all these objectives, has resulted in ADFG proposing important regulatory changes to this moose population, specifically adding additional harvest opportunities which is the ostensible goal of intensive management.

During investigations of cow mortalities, we have crudely assessed age structure, body condition, and systemic pathology of moose that are killed by predators as well as those killed via vehicle collisions. This work coincides with determining mortality rates and expands on this topic by looking more closely at whether wolves are killing moose of more vulnerable age classes and those that are predisposed to predation due to somatic pathology. This work will be expanded for FY2021.

OBJECTIVE 4: Determine seasonal movements of radio collared cows.

ACCOMPLISHMENTS: We were successful in collecting data for this objective for the project for the given year, but formal and rigorous analysis of the data has yet to occur. However, through our study, we have learned that moose move large distances throughout the subunit seasonally, as opposed to having localized home ranges. This information is important information as managers determine how to structure new harvest opportunities and divided the subunit into specific hunting areas.

OBJECTIVE 5: Assess nutritional condition of cow moose at the yearly peak and nadir.

ACCOMPLISHMENTS: We are reducing the amount of captures due to budgetary constraints and changing priorities of moose monitoring. Therefore, we did not capture moose during the fall of the reporting period to deduce nutritional condition via body condition. However, nutritional measures gained via productivity assessments continue to be measured. Data for this goal over years of the project have been important at showing the cost of reproduction in moose. Along with other data outlined above, nutritional condition of cows indicates that this population is experiencing initial stages of nutritional stress and needs to be managed accordingly. This information has resulted in

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an ADFG proposal to change the hunting regulations for moose to provide more opportunity and to not grow the population.

Additional work has been initiated to focus on the condition of moose during the most challenging time of the year in terms of nutritional stress; that is late winter-early spring. We are analyzing the bone marrow content of moose killed by predators and those killed by vehicle collisions during this window in time to see if predator tends to occur on moose in poor condition. This work will be expanded for FY2021.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Since the initiation of this ongoing project started in 2012, twinning rate has averaged 38%, parturition rate has averaged 78%, fecundity has averaged 1.08 calves/cow, 39% of sampled moose in the fall had <13% body fat while <2% of sampled cows in the spring had <6% body fat in the spring, adult cow annual survival has averaged 91%, and 10-month calf survival has averaged 27%. Calf survival appears to be negatively correlated with spring snow-depths. Adult cow movements appear to be constrained when spring snow-depths exceed 20 inches.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

All project goals/objectives are being met according to the planned timeframe. This project spent approximately \$50.4K more than budgeted in line 3000, contractual costs. These costs reflect hiring additional charter aircraft and pilots to gather parturition and twinning rate data, which require daily flights, location, and observation of all study animals, plus additional randomly located individuals to increase sample size, between mid-May and Mid-June. Additional charter flights were also required to collect detailed survival data on calves born to radio collared cows but that remained uncollared, and for helicopter flights to diagnose and collect samples from moose mortality events. These samples were used to develop targeted research hypotheses that will allow researchers to investigate the role of predation in influencing Kenai Peninsula moose herds.

This project also spent \$23.4K under line 4000, commodities, almost twice the \$12K that was originally budgeted to the project. These additional costs reflect supplies for sample collection and processing from moose mortalities from roadkill, predation, and other causes. These samples were used to develop targeted research hypotheses that will allow researchers to investigate the role of predation in influencing Kenai Peninsula moose herds.

IV. PUBLICATIONS

The following reports/publications have been accepted, submitted, or are close to being ready for submission.

Wilson, R. E., S. D. Farley, T. J. McDonough, S. L. Talbot, and P. S. Barboza. 2015. A genetic discontinuity in moose (*Alces alces*) in Alaska corresponds with fenced transportation infrastructure. *Conservation Genetics* 16:791-801.

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Wilson, R. E., T. J. McDonough, P. S. Barboza, S. L. Talbot, and S. D. Farley. 2015. Population genetic structure of moose (*Alces alces*) of south-central Alaska. *Alces* 51:71-86.

Thompson, D. P., J. A. Crouse, T. J. McDonough, O. H. Badajos, J. Adsem, and P. S. Barboza. 2018. Vaginal implant transmitters for continuous body temperature measurement in moose. *Wildlife Society Bulletin* 42:321-327.

Thompson, D. P., P. S. Barboza, J. A. Crouse, T. J. McDonough, O. H. Badajos, and A. M. Herberg. 2019. Body temperature patterns vary with pregnancy and condition in moose (*Alces alces*). *Journal of Mammalogy*. 100:1466-1478.

Thompson, D. P., J. A. Crouse, T. J. McDonough, P. S. Barboza, and S. Jaques. 2020. Acute thermal and stress response in moose to chemical immobilization. *Journal of Wildlife Management*. 84:1051-1062.

McDonough, T. J., J. A. Crouse, D. P. Thompson, B. W. Dale, and O. H. Badajos. In prep. An evaluation of short- and long-term impacts of vaginal implant transmitters in moose. *Wildlife Society Bulletin*.

V. RECOMMENDATIONS FOR THIS PROJECT

We recommend this project will be finalized after FY2020. New studies with different focuses will provide new management guidance for this moose population as information needs for this moose population continue to evolve.

Prepared by: Thomas McDonough

Date: Oct. 21, 2020