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-7

PROJECT NUMBER: 3.0

PROJECT TITLE: Statewide Intensive Management for Deer Populations Identified as Important for Providing High Levels of Harvest for Human Consumptive Use and Predators Influencing Deer Population Status.

PERIOD OF PERFORMANCE: April 1, 2015-June 30, 2018

PERFORMANCE YEAR: April 1, 2017 – March 31, 2018; year 2 of a revised 2-year grant

REPORT DUE DATE: Sept 1, 2018

PRINCIPAL INVESTIGATOR: Tony Carnahan (separated from State of AK employment 7/5/2017)

COOPERATORS: Nicole DeLuca, Alaska Pacific University and ADFG; Dr. Roman Dial, Alaska Pacific University

WORK LOCATION: Reg 2 Game Management Unit 6

This is the final report for a multi-year project. This template is applicable to both:

- the final closeout report of a multi-year grant; or
- the final closeout report of a multi-year *project* within the annual operating grant, summarizing all accomplishments for all objectives.

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. SUMMARY OF WORK COMPLETED ON PROJECT

Objective 1: *Conduct more frequent and more robust surveys to estimate the population size and fall composition (bucks, does, and fawns) of deer to evaluate if IM treatments are successful.*

Accomplishments: Due to adverse weather conditions we were not able to capture enough individuals to establish a baseline sample for a genetic mark-recapture population estimate.

Thick vegetation and tree canopies preclude standard aerial sampling methodology such as used for other species. Future work will need to account for these difficulties and develop and/or apply other techniques.

Objective 2: *Estimate fawn production, survival, and causes of mortality using radio-collars and or camera-collars to determine if a) fawn mortality can be reduced to meet IM population and/or harvest objectives or b) to evaluate the effects of the IM treatment.*

Accomplishments: Lotek video camera GPS collars were purchased in February 2016 with the intention of placing collars on preparturient does. Capture attempts were unsuccessful in the spring of 2017 due to severe weather, so no video camera collars were deployed. Deployment will be attempted again in spring 2018.

We attempted to assess body condition and reproductive status (both pregnancy and twinning) in periparturient does using a portable ultrasound device; however, due to severe weather, our capture attempts in March 2017 were unsuccessful.

Objective 3: *Estimate adult deer survival rates using radio-collars to evaluate the effects of the IM treatment.*

Accomplishments: In November and December 2015, 60 GPS GlobalStar collars were purchased for monitoring deer survival rates, home range size, and resource selection. Ground-based deer captures were attempted on Green Island in June 2016. No deer were captured during this period. We were successful capturing 16 deer by net-gunning from a helicopter in July 2016. Of those 16 deer, nine were fitted with GPS collars. Of those nine deer, two were lost during hunting season and a third (2 year-old doe) died in early February 2017, likely due to malnutrition. Ground-based deer captures were attempted on Green and Hawkins Islands in March 2017. Although we did capture three subadults, no deer were collared. The use of helicopters during the March 2017 captures was not possible due to inclement weather. We will attempt more helicopter captures in 2018 and will coordinate with two other ungulate capture projects in hopes of better aligning with good weather. We tried using Clover traps during March 2017; however, the deer would not respond to bait provided (including alfalfa, sweet corn, and apples). We placed bait out in the open and along the beach with trail cameras to see if the deer were avoiding traps. No deer on camera showed any interest to bait in the open.

Objective 4: *Monitor deer nutritional status to evaluate the influence of nutrition on deer population status and evaluate IM population objectives.*

Accomplishments: Deer nutritional status will be monitored using ultrasound measurement of rump fat thickness (MAXFAT) and body condition scores (BCS). The deer population of PWS suffered a major population decline during the winter of 2011-2012, where an estimated 60% of the population died due to an abnormally high snow accumulation that

lasted well into the spring. Since that winter, deer in PWS have enjoyed four years of relatively mild winters. This past winter (2016-2017) was a relatively typical snow year regarding depth and persistence. Of the 16 deer captured in July 2016, subadults averaged 14.9% (n=5), does averaged 13.1% (n=8), and bucks averaged 11.5% (n=3) MAXFAT. Only four deer (3 subadults and one doe) were captured in March 2017; of those deer, the subadults averaged <4% MAXFAT (average BCS score of 1.0) and an adult doe had 50% kidney fat and a BCS score of 2.25. Nine deer were collared in July 2016. Although our sample size is low, the body condition of deer captured in July 2016 is indicative of high-quality summer range. Alternatively, the body condition of deer caught in March 2017 (including the young collared doe that died February 2017) might indicate that younger deer have a harder time meeting nutritional needs on winter range during normal winters, while older deer might be more successful on a normal winter range.

Trace mineral analysis was conducted on blood samples from captured deer. All deer (n=20), when compared to typical mule deer levels, were deficient in one or more trace minerals; 95% were deficient in copper, 80% were deficient in iron, 35% were deficient in Selenium, 35% were deficient in Phosphorous, and 30% were calcium deficient.

Objective 5: *Monitor forage abundance and utilization to evaluate browse abundance and quality and determine habitat capability to develop reasonable IM population objectives.*

Accomplishments: We evaluated habitat characteristics and forage production in June-August 2016 and again in July and August 2017. In 2016, five plots were inventoried on Hawkins Island and three plots were inventoried on Green Island using 1,630 volunteer hours in addition to ADF&G staff time.

In 2017, a total of 41 sample plots were sampled within our study sites; Green Island (n = 15) and Hawkins Island (n = 26). We collected environmental features (i.e., elevation, slope, and aspect) at the center point of each 30m x 30m plot and recorded vegetation attributes along three transects using a point-intercept method. At each 1m interval along the transect, we recorded canopy closure, vegetation height, species cover, and stratum type. We are currently using the data to develop a unique habitat classification system based on a set of criteria to determine vegetation communities pertinent to deer foraging behavior.

We assessed the quality of each of our habitats by quantifying forage availability and nutritional quality. We employed the same point-intercept method to record height and cover for each species at 10cm intervals from four 1-m^2 random microplots. We harvested, dried, and weighed vegetation from two microplots and used a double sampling method to estimate available biomass. We used the samples collected in 2016 to determine digestible energy and digestible protein. However, the samples we collected yielded limited species to be used for the analysis. This was due to either date of collection, samples collected in August had already senesced and therefore could not be used, or the plots sampled either did not produce the species needed or had a small sample size (< 20g). As a result, we pooled species for each plot type (e.g., forest, shrub, etc.) but kept the islands separate. Due to time and budget constraints, we did not conduct nutritional analyses for samples collected in 2017. The nutritional values of the species

analyzed will instead serve as a comparative basis for species data available in the Forage Resource Evaluation System for Habitat – deer (FRESH-deer) program to aid in developing a carrying capacity model for deer.

We conducted orthoimagery flights in September 2016 and again in June 2017 for Green and Hawkins Islands using two Nikon D810 cameras: one color and one near-infrared. Due to inclement weather, we were not able to complete our flight transects for Hawkins and therefore conducted an additional orthoimagery flight for Hawkins in July 2017 the capture the remaining part of the island. We concurrently collected ground-truth data points for Green (n = 108) and Hawkins (n = 152) in June to coincide with vegetation phenology during the time the images were taken. We were unsuccessful in ground truthing alpine sites on Hawkins island since the vegetation within these sites had either not yet emerged or were covered in snow. We completed the ground-truthing for these sites in August. We used the final corrected and georeferenced images to generate a 4-layer color-infrared (CIR) orthomosaic for each island. The vegetation and environmental data collected from our 30m x 30m plots will serve as training data to classify habitat types based on the final vegetation classification. We will then test the accuracy of our classified map using the ground-truth data. The finalized habitat map will then be used to determine availability of critical habitats for deer for summer and winter and aid in developing a carrying capacity model for each season.

Two Lotek® video camera collars were deployed in July 2016 and will be used to identify diets of deer in different habitat types. We will use the program BORIS to identify plants in the diet to the species level and create an activity budget for deer in PWS.

Objective 6: *Investigate and monitor wolf, black bear and brown bear abundance relative to defined IM objectives.*

Accomplishments: No progress was made on this objective during the duration of this project.

No natural predators for deer occur on Green Island, which will be used as a control for predation on Hawkins Island. No predator abundance surveys have been conducted in Prince William Sound; however, a black bear exploitation rate project using genetic mark-recapture is planned to start in 2019.

Objective 7: *Report findings in appropriate scientific and popular publications.*

Accomplishments: No publications have been submitted for this project.

II. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

T. Carnahan departed State of Alaska employment 7/5/2017. N DeLuca completed fieldwork effective September 2017; data analysis is ongoing.

USFWS approved an amendment to decrease the grant duration, ending the grant on June 30, 2018. After extensive investigation by DWC and USFWS staff into performance reporting and financial accounting of the 5-year AKW-7 Intensive Management award for projects Caribou 1.0, Moose 2.0, and Deer 3.0, it was determined it is in the State's best interest to cease work on and terminate the entire AKW-7 award, first Caribou on Dec. 1, 2017, and then moose and deer projects on June 30, 2018.

III. PUBLICATIONS

No publications have been submitted for this project.

IV. REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR NEED

Sitka black-tailed deer in Prince William Sound (PWS, GMU 6D) are an introduced population which exist at the northernmost latitude of their range. Introduced on Hawkins and Hinchinbrook Islands between 1916 and 1923 from at least 24 translocated animals, the deer population in PWS grew quickly and expanded to neighboring islands and the mainland. The population peaked in 1945, causing long-term habitat damage. Since 1945, the deer population in PWS has experienced crashes virtually every decade, usually coinciding with heavy snow years. In 2001, the Board of Game designated deer in GMU 6 as a big game prey population for intensive management with the following objectives: 1) population of 24,000 – 28,000, 2) annual harvest of 2,200 – 3,000, 3) minimum harvest of 60% male, and 4) hunter success rate of 50%. Population trends are monitored through annual pellet-group surveys; these counts are used as indices of a population size, not an actual density. From 2001-2012, the harvest objective was reached only 55% of the time (n=11 years, RY04-05 was not included due to lack of hunter survey); reported harvest from these years also include 15% illegal/unrecoverable harvest. Buck harvest greater than 60% from 2001-2012 was achieved 64% of the time, and hunter success greater than 50% was achieved 82% of the time.

Prepared by: Thomas Lohuis and Nicole DeLuca

Date: 9/28/2018