Kenai (Units 15A & 15C) Moose Research Summary, March 2019

Alaska Department of Fish & Game

Moose research was initiated in the spring of 2012 coincident with the Board of Game calling for wolf control in GMUs 15A and 15C. Acquisition of essential information to inform Intensive Management (IM) actions for moose should begin with assessments of the nutritional condition of the population and, in turn, the potential for population growth. Maintaining a population near its nutritional carrying capacity will dampen productivity and recruitment, thereby reducing population growth and sustainable harvest. Conversely, maintaining a moose population well below nutritional carrying capacity would allow for optimal sustained yield. Determining the nutritional status of the moose population can also inform if predator mortality is primarily additive or compensatory in nature, and hence, allow for predicting the efficacy of predator removals.

GMU 15A: Despite the moose population in 15A being well below IM size thresholds, there are multiple metrics indicating that the population is near nutritional carrying capacity.
These include:

- Low twinning of 3-year old cows (0, n=7)
- Low parturition rate in general (74%, n=320)
- Depressed fecundity (1.02 calves/cow, n=320)
- Low body fat of cows with calves in the spring (27% of sampled cows had no subcutaneous fat)
- Prevalence of the ultimate cause of mortality due to malnutrition (28% of mortalities of collared cows)
- Low bone marrow of roadkill moose in late winter — both adult cows and calves
- Relatively poor browse quality (fecal nitrogen measures).

These qualitative comparisons were made using Boer's 1992 review of moose productivity and from comparisons of metrics from other research across Alaska.

The moose population has been declining in 15A since the early 1990s due to a decline in habitat quality. Annual adult cow survival from 2012-2018 has averaged 88%, which is on the low side of normal. Eleven-month-old calf survival has averaged 15%, which is low and is indicative of a declining population.

GMU 15C: Despite having triple the moose densities in 15C compared to 15A, nutritional condition indices show the moose population is in better shape than in 15A, but there are still indications of nutritional constraints.
These include:

- Low twinning of 3-year-old cows (8%, n=24)
- Low parturition rate of 2-year-old cows (i.e., age-at-first-reproduction; 29%, n=24)
- Relatively low fecundity (1.05, n=335)
- Relatively low parturition rate (79%, n=335)
- Low neonate birth mass (n=54)

- Prevalence of the ultimate cause of mortality due to malnutrition (22% of mortalities of collared cows)
- Low bone marrow of roadkill calves in late winter
- 89% deficiency levels in the essential element of selenium.

The annual adult cow survival from 2012-2018 has averaged 90%, which is normal. Eleven-month-old calf survival has averaged 27% and coupled with high yearling survival (90%, n=20) has likely resulted in a stable population size. Our data show that years when snow depths are <20 inches in late winter, 11-month-old calf survival is >30%. When snow depths exceed 25 inches, calf survival declines. For example, the deepest snow conditions during this time frame in 2013 of >30 inches from January-April resulted in 11-month-old calf survival of 15%. On average, snow depths in Unit 15C exceed 25 inches in March and April. Snow also restricts the habitat use of cows. From our study animals, when snow depths exceed 20 inches, moose tend to restrict their range to habitat <1000 feet in elevation. This results in a late-winter density of moose in Unit 15C of nearly 5 moose/mile^2.

Data from this research has been used in 2 publications on moose genetics and 1 publication on research techniques. Two other techniques manuscripts are in preparation, and the main manuscript on predicting parturition based on nutritional condition is in preparation. Detailed summaries of survival and productivity measures are available and are continually being updated as this research project continues to collect information.