NWRT Final Report

NWRT Project Number:2-19-08

Project Title: Understanding the Spatial, Temporal, and Behavioral Effects of Wolf Predation on Mainland Migratory Barren-Ground Caribou Dynamics

Project Leader:

Mitch Campbell
Kivalliq Regional Wildlife Biologist Department of Environment
Government of Nunavut
Box 120 Arviat, NU, X0C 0E0
(867)857-3171
mcampbell@gov.nu.ca

Summary:

Project not completed. Project cancelled due to Covid-19 pandemic.

Barren-Ground caribou were recommended to be listed as threatened by COSEWIC in 2016. To assess potential effects of predation on barren-ground caribou subpopulations it is necessary to collect information on changes to distribution and abundance of both predator and prey. Our project will provide distribution and behavior of wolves across all seasonal caribou range. This proposed work will improve our understanding of predation on mainland migratory barren-ground caribou by determining wolf distribution and an index of predation rates. To investigate wolf distribution and predation rates we plan to deploy GPS collars on 20 wolves in April 2019 and use GPS locations from the collars along with telemetry locations for barren-ground caribou from and ongoing program to determine wolf movements and behavior on caribou seasonal range, and identify kill and den sites. Throughout the year 2019 a field crew will visit accessible kill sites to determine the prey species.

Partnerships with Kivalliq HTO's are a core component to this research program. In Jan 2019, all Kivalliq HTOs will be consulted on this project and others. During these meetings the GN DOE will be seeking input ot on all aspects and phases of this project and will be continually involved in the assessment of its results.

Project Objectives:

The objective of this project is to investigate the spatial and temporal extent of predation on the annual range of the Qamanirjuaq subpopulation over a 4 year period commencing June 2019 and terminating June 2023. Additionally digital photographic technology will be sought, and if deemed reliable, employed to provide insight into predation behavior and extent. Results of the study will contribute to the overall scientific understanding of predator-prey relationships in tundra ecosystem and provide the DOE and associated management boards and agencies with information on which to base future conservation decisions and effective management actions.
The specific objectives of the study are:

(1) To investigate the spatial extent of wolf predation using GPS collar telemetry: **Biological Rational**: Recent studies have shown increased wolf abundance and predation on spring migratory corridors and ACCA. During 1984-87, Adams et al. (1995), while studying the extent, timing, and causes of calf mortality in the Denali Caribou Herd, observed that overall, 39% (n= 226 calves; ≤3 days old) of radio-collared calves died as neonates (≤15 days old), and 98% of those deaths were attributed to predation. Miller et al. (1988) and Williams (1995) described that wolf predation was the important detected cause of death for newborn caribou calves during their first week of life on the Beverley calving grounds. Overall rates of neonatal mortality/calf crop in their first week of life for Beverley calving ground was estimated to be 5-7% in 1981-83 (Miller et al. 1988) and 9% in 1993-94 (Williams 1995).

(2) To determine predatory behavior, selection and extent utilizing GPS collars equipped with digital cameras: **Biological Rational**: No photographic evidence of wolf predation exists on Nunavut caribou populations. Understanding predatory behavior is key to understanding predation as a mechanism effecting subpopulation decline and recovery. Additionally, insight into denning sites and activity on Qamanirjuaq and Beverly annual range relative to caribou seasonal use of their range, would help identify and predict the potential impacts on the Beverly and Qamanirjuaq subpopulation as they cycle. Case et al. (1996) estimated that 55,500 caribou in the Bathurst herd are taken annually by wolves, or 16% of the 1990 population estimate of Bathurst caribou. Most studies of food habits of wolves at high latitudes indicate that ungulates are their primary prey (Petersen 1998). Clarkson and Liepins (1992) collected and analyzed 177 wolf scat samples from 9 dens in 1989 in Inuvik region, western Arctic. Caribou was the main prey in 55% of the scats. Since wolf predation could be decreasing caribou recruitment, using systematic observations of wolf predation would answer important questions on prey selection and as a result the overall role of wolf predation on caribou survival.

Materials and Methods:

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Wolf capture

Although non-invasive techniques have become popular methods for monitoring wildlife populations, the most effective and reliable way to investigate the behaviour of highly mobile species in remote areas remains GPS telemetry.

Wolf density within the Qamanirjuaq and Baker Lake subpopulations ranges is largely unknown. Within Qamanirjuaq calving range 27 wolves were sited in June 2014 and 22 in June 2017. Within the Baker Lake range local hunters regularly observ large numbers of wolves along the meadowbank all weather road during caribou migration. Wildlife officer reports have indicated wolf observations in the same vicinity north of baker Lake reaching an estimated 40 in one 48 hour period. Through deliberate efforts to search for and track wolves in areas suggested by local hunters in Baker Lake, Arviat, Rankin Inlet, and Whale Cove, we believe we can improve our ability to locate and capture wolves.

We plan to deploy GPS collars on up to 10 wolves in the vicinity of the Qamanirjuaq spring range and up to 10 collars in the vicinity of the Baker Lake subpopulations spring range. Attempts will be made to distribute 3 to 4 collars within 3 packs in each of the study areas. Wolves will be captured by net gun or chemically immobilized by dart gun from a helicopter. Collars will be programmed to acquire locations every hour and will be collected through the Iridium satellite network. Collar batteries should last 3 years on this schedule and remote drop-offs on the collars will be programmed to release at 3 years post capture. Dropped collars will be retrieved and and store on board data downloaded and collars sent away for refurbishment.

Kill site visits

Identifying prey species at kill sites can be used to infer predation rates on prey species. Investigating wolf kill sites also reveals patterns of predation pressure on specific age or sex classes, differences in seasonal predation risk, and habitat or landscape variables that increase predation risk. The relative importance of different prey species to wolf diet, and the potential for functional responses in shifting between preferred prey, further inform predation risk. We would aim to examine kill rates based on number of animals and total biomass consumed per pack and per wolf.

Work by researchers from the GN and Utah State University on Ellesmere and Axel Heiberg islands adapted a cluster algorithm to identify wolf kill sites in the High Arctic. We will attempt to deploy this method to identify kill sites within the Qamanirjuaq and Baker Lake study areas. This method has been assumed to be unable to identify kills of small prey such as hares, but cluster searches in 2018 did locate about 40 hare kill sites and kill sites of neonate muskoxen, so adjusting the algorithm may allow us to quantify the importance of small prey to wolf diets. Collection of hair, whisker, nail, and blood samples at capture also allows us to further investigate diet through stable isotope analysis. Cluster analysis has been successfully used to identify large

prey like muskoxen and caribou. To augment these methods in the instance that sites cannot be visited, we hope to deploy 4 collars with digital cameras, 2 per study area. These collars will have a 2 year life span but may open significant insight into preferred prey species across seasonal ranges.

Incorporation of IQ

We plan to prioritize areas based on local knowledge and IQ, caribou collar locations and seasonal range information, and survey observations of wolves. Information from community members on where to search for wolves is of particular importantance. Results are shared with the communities as they come in, and the final analysis will be reported back to the community HTO in-person as well as in a comprehensive report. Discussion and interpretation of results will also rely on community consultations. Any application of the results for management or recovery planning is done in the context of IQ and local input and co-managemnt consultations.These surveys will be conducted with rotary winged aircraft and consist of high grading areas where caribou are known to occur based on existing collar data, previous survey location data, and IQ. We propose to complete 60 hours of rotary wing flight time to survey the South Baffin study area and provide appropriate coverage of the main aggregations of caribou in this region.

Survey flight paths and specific areas flown within the study areas will be heavily determined with the aid of local hunters and elders as wildlife observers in the aircraft. Standardized, pre-determined transects will not be flown. Instead biologists will be relying on the local advice and expertise to fly areas where there are expected to be caribou. The survey will occur in mid to late March and possibly into early April. The technique will require quick low-level flying and recording caribou sex and age while passing caribou groups, with the following age categories divided by sex; adult, yearling and calf. Observers will search for groups of caribou or fresh tracks that will lead them to caribou. Once caribou are observed, they will be approached at low level and image stabilizing 14x binoculars will be used to determine the age and sex of individuals. The use of binoculars further increases the distance observers can be from the caribou to reduce overall stress on the animals. The time required to accurately determine age and sex will depend on terrain and group size but normally this process is completed in less than 1 minute and is intended to place minimal stress on the animals. At each location where caribou are observed a GPS waypoint is taken and demographic survey data is recorded. Survey data will be analyzed and compared to current caribou demographics of mainland migratory herds until enough data has been collected to determine Baffin specific thresholds. For example, we will compare calf:cow ratios to that of similar herds in NWT and other regions where it is suggested that for increasing or stable populations, ratios were 70-90:100 at calving, 50-70:100 in the fall and 30-50:100 following winter.

Results:

Project not completed. Project cancelled due to Covid-19 pandemic.

No results to provide since the project was not completed.

Discussion/Management Implications:

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There are no potential management implications due to the results of the survey because it was not completed. However, there are potential management implications as a result of the incomplete research program. Without completing the wolf telemetry program, wildlife managers are unable to asses wolf movements and potential corridors, making management of this species difficult should the need arise. We hope to complete this research program following the cessation of Covid-19 restrictions.

Reporting to communities/resource users:

Project not completed. Project cancelled due to Covid-19 pandemic.

Communities consulted in early 2019 and support letters provided to NWMB. Additional HTO in-person consultations will occur in fall of 2020 and winter of 2021 to provide an update on the status of this project. No report will be provided to the communities since the project was not completed nor initiated.

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No references to include.