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-R-16-2020

PROJECT NUMBER:

PROJECT TITLE: Evaluating Stress Hormones of Caribou in Areas with Planned Development

PERIOD OF PERFORMANCE: April 01, 2020 through June 30, 2022

PERFORMANCE YEAR: April 01, 2020 through September 30, 2020; year 1 of a 3-year grant

REPORT DUE DATE: December 29, 2020

PRINCIPAL INVESTIGATOR: Shawna Karpovich

COOPERATORS:none

Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: April 2020 – Fecal collections within 20-mile buffer around proposed development

ACCOMPLISHMENTS: On April 23 and 24, 2020, 123 fecal pellet groups were collected from 37 sites within the boundaries of the Willow geofenced area. Due to the hardships associated with the Covid-19 pandemic, the cost for charters increased beyond what we predicted in the original budget. This will likely lead to a budget deficit in year 3.

OBJECTIVE 2: May 2020-April 2021– Process samples, run validations, extract hormones, and run EIAs

ACCOMPLISHMENTS:

a) The 123 fecal pellet groups were processed, this includes freeze drying, measuring volume of a subset of 5 pellets/group, homogenizing the pellet group, weighing out a subsample of homogenized fecal material and extracting hormones via methanol.
b) Parallelism and accuracy validations were conducted for both cortisol and corticosterone (stress-related hormones, cortisol is the primary stress-related hormone

in caribou and analyses for corticosterone will detect cortisol metabolites in the fecal material).

c) Subsamples of the methanol extracts have been analyzed for cortisol.
d) Analyses for corticosterone is pending and will be completed before April 2021.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Prior to receiving funding, a pilot season was conducted and during April 17 and 18, 2019, 71 fecal pellet groups were collected from 30 sites within the geofenced area, the pilot study data are included in Figures 1 and 2 below.

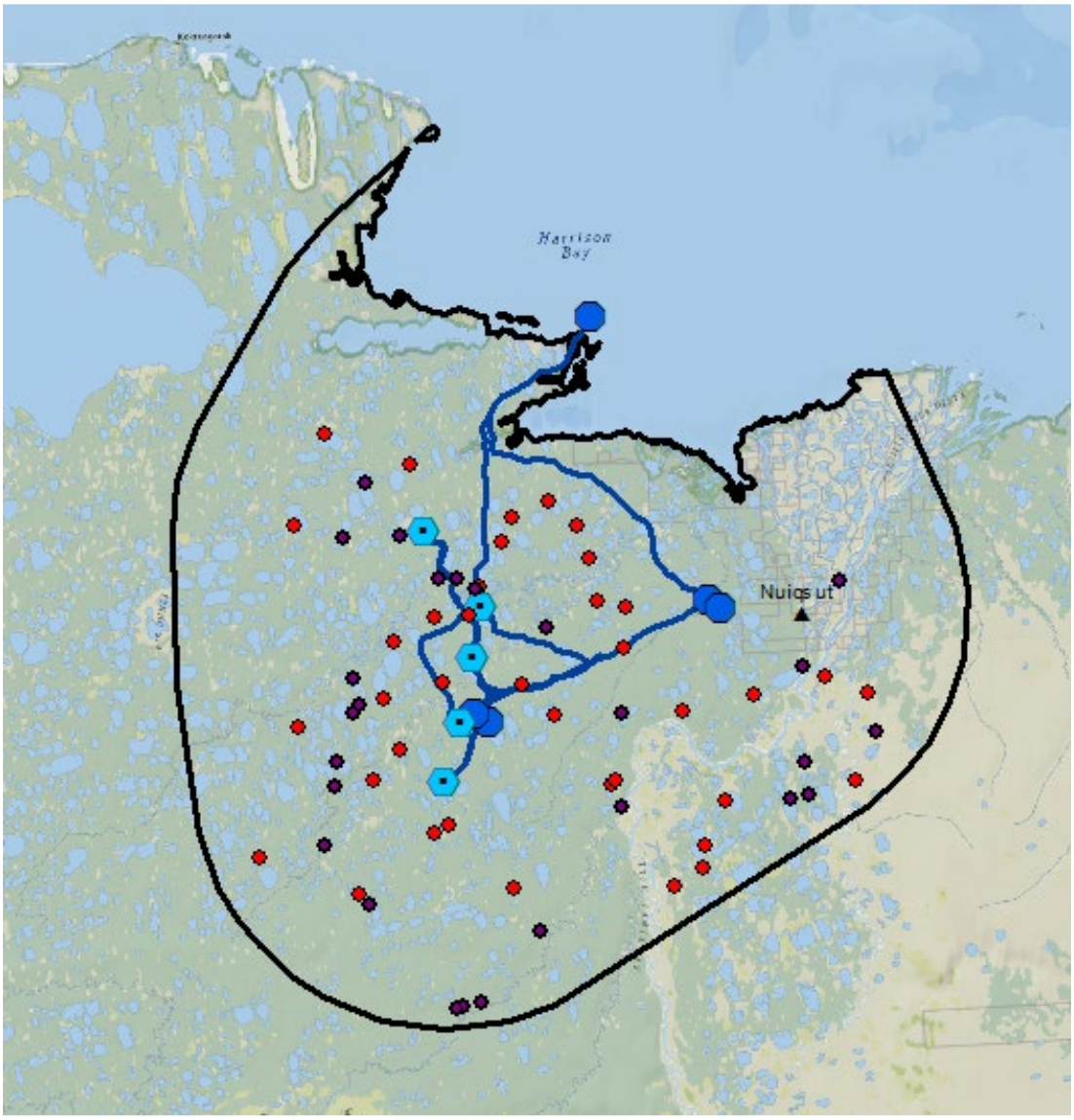

Figure 1. Proposed sites for Willow Development oil wells (blue hexagons), gravel pits, airport, and dock (blue octagons), and ice or gravel roads (blue lines). Black outline is the geofence, placed ~20 miles around the proposed development. When GPS collared caribou are within this border the collars switch from collecting locations every 12 hrs to every 2 hrs or from every 2 hrs

to every 30 mins (depending on the collar). Purple dots are the 2019 fecal collection sites and red dots are the 2020 fecal collection sites.

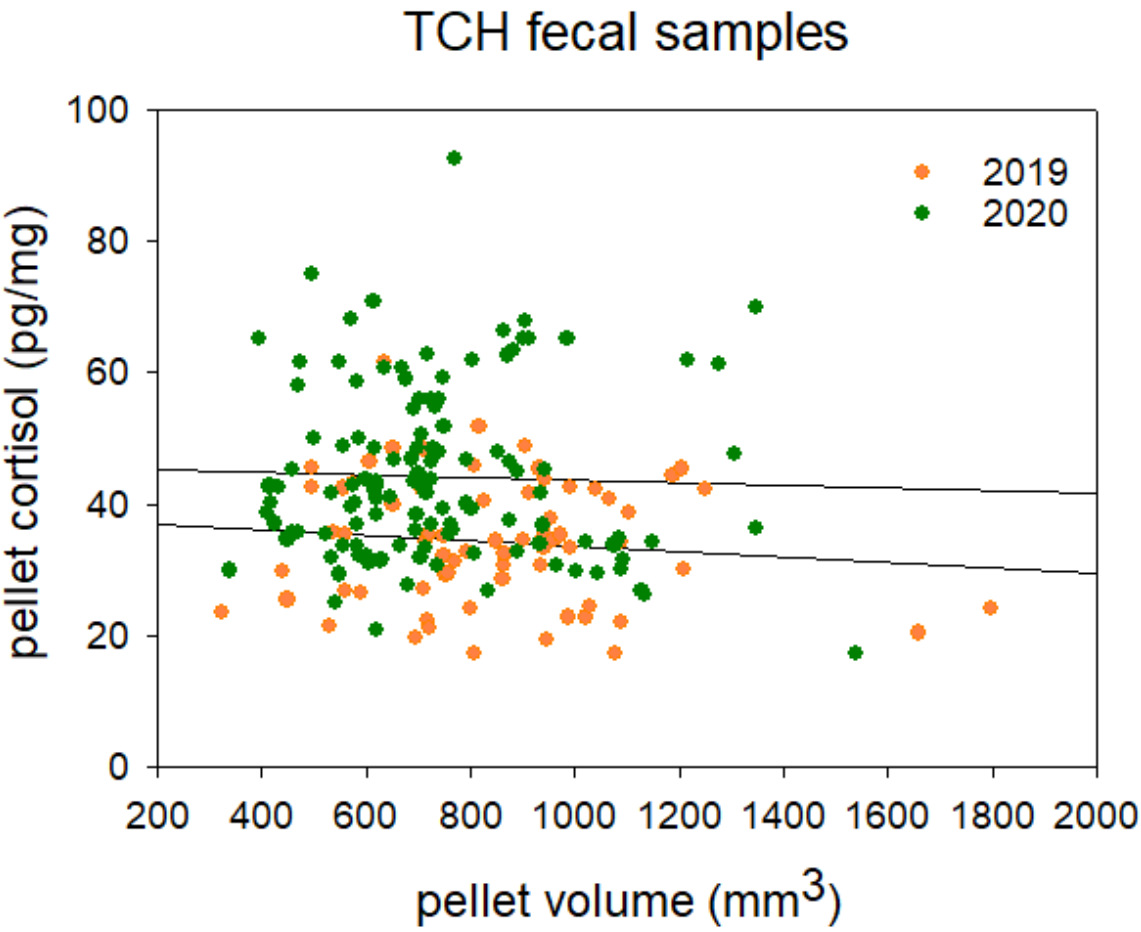

Figure 2. Fecal pellet cortisol concentrations in 2019 (orange) and 2020 (green). Results from a One-way ANCOVA, with fecal pellet volume as a covariate (index of age), show that fecal cortisol concentrations in 2019 were significantly lower than in 2020 ($p<0.001$). In 2020, an increase in oil development-related activity was seen in the study area, however it is difficult to draw conclusions with a single year to year comparison as other factors such as weather, herd health, or food availability may have also differed between these two years.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

Problems:

1) Due to the hardships associated with the Covid-19 pandemic, the cost for charters increased beyond what we predicted in the original budget. This will likely lead to a

budget deficit in year 3. Consequentially, we will likely ask for some additional funding to complete year 3.

2) The commencement of the development was delayed, overall, this may be beneficial for this project as we now have data from a pre-development year (2019 pilot study before this project was funded) and a "minor development beginning" year in 2020, however, it would be most informative if we can continue this project throughout the development period until development ceases and switches to the "just operation" phase. Therefore, we will likely seek to extend this project for a few more years depending on the status of development by year 3.

IV. PUBLICATIONS

None currently.

V. RECOMMENDATIONS FOR THIS PROJECT As stated above, construction of the Willow Development was delayed and seems to be moving forward slowly, so we will likely seek to extend this project. We will have a better idea of the status of the construction phase of the Willow Development Project in years 2 and 3 and will ask for an extension at that time.

Prepared by: S. Karpovich

Date: 21-December-2020