ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
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Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: AKW-19 FY2017

PROJECT NUMBER : 3.0

PROJECT TITLE: Black bear (*Ursus americanus*) abundance, harvest rate, and diet in the Kenai Peninsula coast and Prince William Sound regions

PERIOD OF PERFORMANCE: July 1, 2020-June 30, 2021

PRINCIPAL INVESTIGATOR: Sean Farley

COOPERATORS: Dave Saalfeld, Jeff Selinger

I. PROGRESS ON PROJECT OBJECTIVES DURING PERIOD OF PERFORMANCE

OBJECTIVE 1: Develop black bear abundance estimates in PWS and southern Kenai Peninsula with Close Kin Mark Recapture (CKMR), classic mark-recapture statistics, and pedigree reconstruction

ACCOMPLISHMENTS: Previously collected samples sorted and cleaned for analysis (Table 1; Figure 1) and we are awaiting results on SNP panel for black bear IDs. If panel is not successful we will use microsatellite markers for individual ID. The following markers have been selected for microsatellite analysis, if needed: G1A, G10B, G10C, G1D, G10J, G10L, G10M, G10P, G10X, MU26, MU50, MU59, and C203. However, a SNP panel is the better option for CMKR and pedigree reconstruction for abundance estimates. We will continue to collect samples from harvested bears from Kenai and PWS.

OBJECTIVE 2: Determine dispersal distances from maternal area by black bears in PWS and southern Kenai Peninsula and estimate susceptibility to harvest based upon dispersion.

ACCOMPLISHMENTS: The 2020 PR report show GPS tracks for collared bears. A total of 479,001,600 accelerometer points were collected from the collars and are being investigated for use to determine true tracks across landscape as well as indications of behaviors. Until DNA samples can be analyzed we cannot estimate maternal area and any dispersal distances. Once paternity and maternal relationships have been determined

(see Objective 3) dispersal distances can be calculated. Accelerometer and location data tallies are presented in Table 2. It is anticipated that winter 2021 we will have DNA analyses complete.

OBJECTIVE 3: Determine levels of genetic diversity and population structuring in PWS and Kenai Peninsula black bears.

ACCOMPLISHMENTS It is anticipated that winter 2021 we will have DNA analyses complete. However for now the Covid-19 Pandemic has severely reduced work capability in the DNA lab.

OBJECTIVE 4: Determine the facultative dietary niche breadth and depth of black bears on Kenai Peninsula (south) and PWS using stable isotope analyses of black bear hair, muscle, and bone.

ACCOMPLISHMENTS Body composition was determined spring and fall of 2019 on 9 bears 11 times, with two bears having both spring and fall compositions measured (Table 3).

We have video-camera collar for 3 adult males starting at the time of their deployment in late May. Two of those have associated date and time but one failed to convert properly and we do not have dates and time. Those can be inferred however from the date of capture/start of the video and the number of videos. Video data was collected for 10 seconds every 10 minutes for the duration of the deployment with a range of approximately 373-415 total minutes of camera video footage per bear. The video did not record for a 5-hour period at night during darkness.

Behavioral codes have been applied to about half of the video to date. Because behaviors could not be assigned when it was dark, time budgets are based on daytime behaviors only. Excluding time when the bears behavior could not be determined and was coded as unknown, bears spent 32% of their daytime eating and drinking and 45% moving. Mating was frequently observed but represented only 3.1% of the time budget. Salmonberry plants and berries were the primary foods consumed during the observation period between late May and mid-July representing 48.5% of all feeding behaviors. The second most common food consumed was deer lettuce (28.8%). Bears also consumed cow parsnip, ferns, other herbaceous vegetation, and grasses. Thus far, no bears were observed consuming foods in tidal areas or animal foods. Bears fed heavily on the leaves and flowers of salmonberry until the fruits became available in July. Movement rates were high likely because of apparent tracking and pursuit of mates in June and into early July. Bears moved readily between the slopes of coastal areas and upper elevations above treeline through the months observed. Data are preliminary until all videos are coded. We hope to increase our sample size, including obtaining video from adult females.

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

Collars were deployed and recovered and body compositions determined for all bears. Initial video analysis underway. Samples are processed for isotope and DNA work. DNA analysis is awaiting completed determination of SNP panel. Isotope samples are completing processing in the lab prior to shipping to isotope lab. Harvested bears are being sampled for bone/hide/muscle. Samples for isotope work have been processed (cleaned, debrided) and prepped for loading into silver boats. Video and accelerometer analysis are continuing.

Table 1 Sample breakdown by GMU and gender

Sample			
Type	GMU	Female	Male
Hair/hide	6D	16	65
Hair/hide	15C	29	129
Hair/hide	7	3	7
Bone	6D	7	27
Bone	15C	13	48
Bone	7	1	3
tissue/muscle	6D	6	8
tissue/muscle	15C	7	31
tissue/muscle	7	1	3
Blood	15	10	12
Biopsy	15	unknown gender:102	

Figure 1.

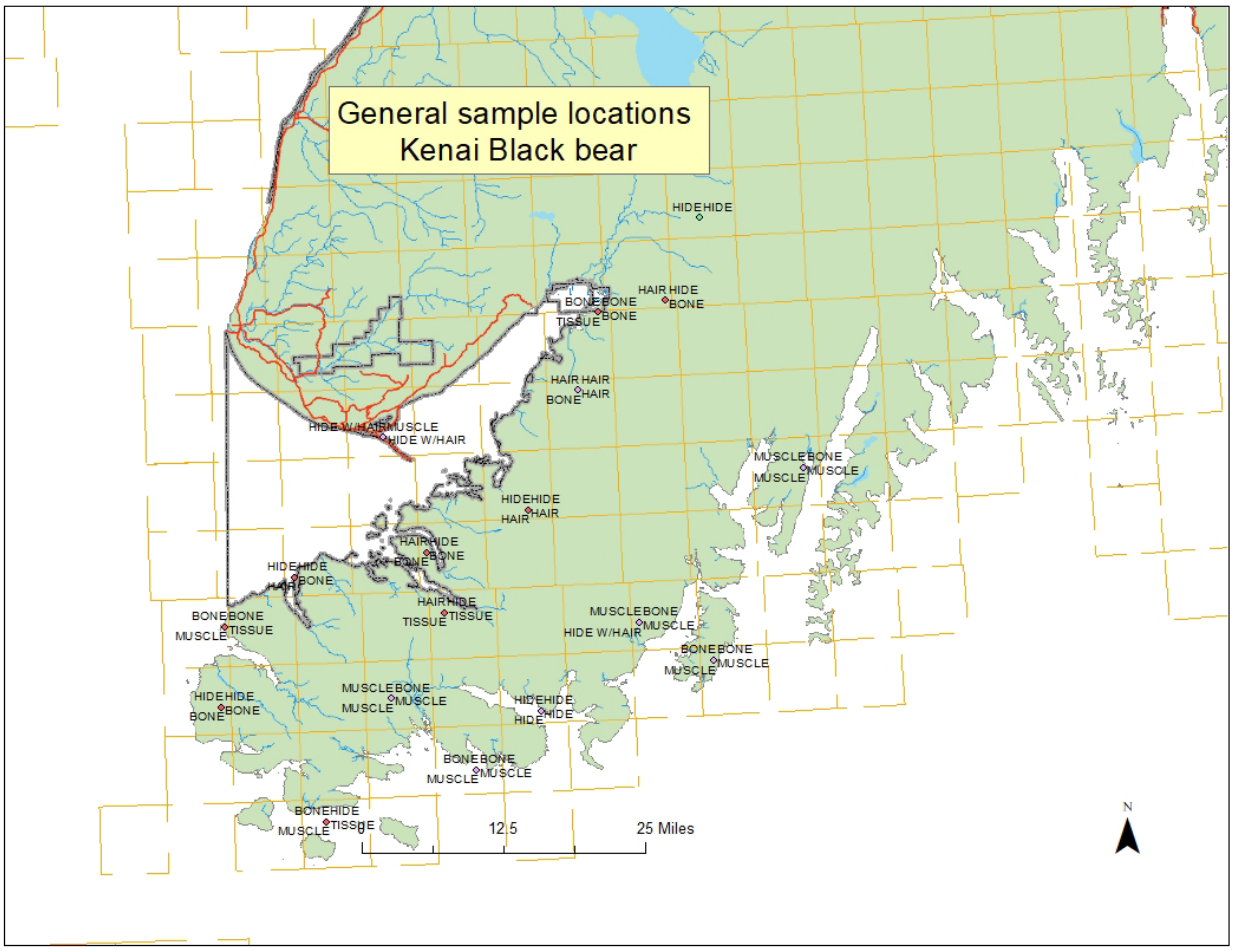

Table 2

Accelerometer data And GPS locations				
Bear ID	Gender	Collar ID	Total Accelerometer points	GPS locations
204	Male	26166	44755200	5257
207	Male	31888	147571200	17401
206	Male	31907	142732800	16885
203	Male	31908	143942400	17059

Table 3 Body composition measurements on collared bears

Bear ID	Inj date	Bear mass (kg)	TBW %	TBLipid %	TBLean %
200	9/13/2018	107.2	42.4	40.5	57.7
201	9/14/2018	87.9	49.0	31.7	66.8
202	9/16/2019	86.9	48.1	32.8	65.6
203	5/26/2019	58.1	67.9	6.6	92.5
203	9/23/2019	100.1	54.1	24.9	73.7
204	5/28/2019	97.4	61.1	15.6	83.2
205	5/28/2019	51.4	63.1	12.9	86.0
206	5/29/2019	70	68.2	6.2	92.9
206	9/24/2019	107	53.9	25.1	73.4
207	5/31/2019	106	68.2	6.1	92.9
208	9/28/2019	125.5	38.3	45.8	52.2

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

1. None

IV. PUBLICATIONS

None

V. RECOMMENDATIONS FOR THIS PROJECT Project will continue as outlined in study plan.

Prepared by: Sean Farley

Date: August 27, 2021