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-23

PROJECT NUMBER: 14.30

PROJECT TITLE: Wolf population estimation on Prince of Wales Island, Alaska

PERIOD OF PERFORMANCE: 1 July 2015–30 June 2019

PERFORMANCE YEAR: July 1, 2017 - June 30, 2018; year 4 of a 4-year grant

REPORT DUE DATE: 1 September 2018

PRINCIPAL INVESTIGATOR: Gretchen Roffler

COOPERATORS: USFS Tongass National Forest, National Genomics Center for Wildlife and Fish Conservation, The Nature Conservancy, Hydaburg Cooperative Association

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Authorities: 2 CFR 200.328
2 CFR 200.301
50 CFR 80.90

I. PROGRESS ON PROJECT OBJECTIVES DURING PERFORMANCE YEAR

OBJECTIVE 1: DNA-based population estimates.

ACCOMPLISHMENTS: We used spatially-explicit capture-recapture (SECR) of individual wolves identified from non-invasively collected hair samples to estimate wolf density in the study area, and wolf abundance in GMU 2. This was the 6th annual monitoring season conducted using these methods. The estimate of wolf abundance during autumn 2016 was used to establish a harvest quota for the 2017–2018 harvest season and estimates from data collected during the autumn 2017 monitoring period will be used to guide harvest management strategies for the 2018–2019 harvest season.

In autumn 2017 we established an array of 82 hair trap stations throughout the expanded northcentral POW study area used during 2014–2016. Stations were monitored weekly during 9 October–20 December 2017 by two ADF&G and one Nature Conservancy (TNC) field crew staff. We collected 1,210 hair samples at 72 (88%) of the 82 stations. The HCA established 61 stations in the same area monitored in 2016 south of the ADF&G and TNC study area (Fig. 1). Stations were monitored weekly by 3 HCA field

crew staff during 23 October–8 January 2017. They collected 95 hair samples at 35 (57%) of the 61 stations. In addition, 5 hair snare stations were established and monitored by citizen science volunteers (POW public school teachers, students, and other community members) in an area adjacent to the northcentral POW study area and overlapping with the HCA study area. They collected 28 hair samples at all 5 stations. In January 2017, we sent the hair samples collected from the snares to USFS Rocky Mountain Research Station in Missoula, MT for genotyping. The objectives of sample analyses were to genetically identify unique wolves from the hair samples using 10 microsatellite loci and compare these individuals to those identified during 2012–2016. DNA extractions were performed on the hair samples using the standard protocols (targeting up to 20 good hairs with follicles for the extraction). We determined that 463 hair samples had DNA of sufficient quality to successfully genotype individual wolves using the microsatellite loci panel. These loci provide an acceptable cumulative probability of individual identity (PID= 5.35×10^{-7}, or 1 in 2,298,318 chance that two samples are identified as the same individual when they are instead from different individuals). We identified 61 individual wolves, including 27 females and 34 males. There were 63 recaptures in the northcentral POW study area, 4 in the HCA study area, and 3 wolves detected in both study areas.

OBJECTIVE 2: Monitor wolves with trail cameras.

ACCOMPLISHMENTS: We established trail cameras in GMU 2 during the reporting period. Cameras were monitored in the SECR study area, at active den sites, in travel corridors, and other areas of interest.

During the hair-snare monitoring period we established 37 cameras at the hair-snare stations (in the northcentral POW study area). We set up 28 of the hair-snare stations with at least 1 camera, and 10 of the stations had sufficient cameras to record wolf activity at all 5 of the hair boards at the station. Cameras were monitored weekly, photos were downloaded, and data recorded in a data management system.
During the hair snare monitoring period, wolves were captured on camera on 97 occasions investigating and rolling on the hair boards. Eighty-three of those events resulted in hair being deposited at a hair board.

OBJECTIVE 3: Live-capture and radio collar a sample of wolves on Prince of Wales Island (POW).

ACCOMPLISHMENTS: We ended wolf capture and radiocollar attempts in FY2016 after an extensive evaluation of the effectiveness of population estimation methods in GMU2. We determined that the non-invasive SECR method was more efficient, precise, robust, and economical for estimating wolf densities.

We continued to monitor the remaining 2 radiocollared wolves until one died in October (unreported human-caused mortality) and the radio collar of the other wolf stopped transmitting in December.

OBJECTIVE 4: Assess effectiveness of methods for application to region-wide monitoring.

ACCOMPLISHMENTS: We continued to evaluate the effectiveness of the non-invasive SECR method for monitoring wolves in Southeast Alaska. We initiated a series of simulations to evaluate the effects of hair-snare station density, the number of sampling occasions, and the number of boards at a station on the measure of precision around the population estimate. The overall objective of these analyses is to assess the cost and effort required to obtain population estimates of an acceptable level of precision for future wolf monitoring efforts. These analyses are ongoing.

OBJECTIVE 5: Data synthesis and preparation of publications.

ACCOMPLISHMENTS: We published a survey memorandum in September 2017 to report the autumn 2016 wolf population estimate for GMU 2. We published one manuscript in a peer reviewed journal and submitted 2 other manuscripts to journals (details below).

II. SUMMARY OF WORK COMPLETED ON PROJECT TO DATE.

We used SECR to estimate wolf abundance in GMU2 during 2012–2016. We monitored 36–82 hair snare stations weekly for 11 weeks during fall. The noninvasive study area was expanded over the course of the study from 1,683 km^2 during 2012–2013, to 3,281 km^2 during 2014–2015, and 5,423 km^2 during 2016. We identified 139 individual wolves during this period using DNA from hair follicles genotyped at 10 microsatellite loci. We used population density estimates using SECR (2013: 24.5 wolves/1,000 km^2 [95% CI = 14.4–41.9 wolves/1,000 km^2], 2014: 9.9 wolves/1,000 km^2 [95% CI = 5.5–17.7/1,000 km^2], 2015: 11.9 wolves/1,000 km^2 [95% CI = 7.7–18.5 wolves/1,000 km^2], 2016: 25.5 wolves/1,000 km^2 [95% CI = 20.2–32.3 /1,000 km^2],) to predict the fall population for the POW management unit (2013: 221.1 wolves [95% CI =130–378]; 2014: 89.1 wolves [95% CI = 49.8–159.4]; 2015: 107.5 wolves [95% CI = 69–167]; 2016: 231.3 wolves [95% CI = 191.8–284.7]).

Increasing the hair sampling intensity and area in 2014–2016 resulted in more wolf detections and redetections and increased the number of unique wolves detected and the precision of the density estimate. Our results demonstrate that estimating wolf abundance using noninvasive sampling and SECR was feasibly and reliably applied and produced a statistically robust population estimate for monitoring wolf populations in densely forested areas. These methods have promise for application to widely-ranging carnivores at population-level scales and may be especially useful when regular estimates are necessary for management and conservation.

Analyses to estimate wolf density for autumn 2017 are ongoing. Preliminary estimates and model rankings have been conducted, and results were shared with ADF&G managers and leadership in August 2018. Final estimates will be available in October 2018 and published in a survey memorandum.

III. SIGNIFICANT DEVELOPMENT REPORTS AND/OR AMENDMENTS.

IV. PUBLICATIONS

Survey memorandum (August 2016): Autumn 2015 wolf population estimate for GMU 2.

Roffler, G. H., D. P. Gregovich, and K. R. Larson. 2018. Resource selection by coastal wolves reveals the seasonal importance of seral forest and suitable prey habitat. Forest Ecology and Management 409:190–201.

Roffler, G. H., J. N. Waite, K. L. Pilgrim, K. E. Zarn, and M. K. Schwartz. Estimating abundance of a cryptic social carnivore using spatially explicit capture-recapture. – Submitted June 2018.

Roffler, G. H. and D. P. Gregovich. Evaluation of wolf space use during denning season on Prince of Wales Island, Alaska. – Submitted June 2018.

Popular press article:
http://www.earthisland.org/journal/index.php/elist/eListRead/wolves_losing_ground_industrial_logging_southeast_alaska/

V. RECOMMENDATIONS FOR THIS PROJECT

This project ends in FY2019. We recommend transitioning wolf population monitoring activities to the Region I management program. The main activities of a long-term wolf monitoring program should consist of a SECR population estimate every 3 years, collecting DNA (skin, hair, muscle tissue), diet (hair, frozen muscle tissue), and age (teeth/skulls and leg bones) samples from all wolves harvested in GMU2. Sufficient data should be collected to conduct integrated population models to assess the age structure of harvested wolves and estimate survival from individuals identified across time periods from DNA. It will be necessary to ensure that there are adequate dedicated staff to conduct all aspects of the monitoring project.

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Submitted by: Susannah Woodruff, Research Coordinator

Date: August 21, 2018