MEMORANDUM

State of Alaska

Department of Fish and Game
Division of Wildlife Conservation

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SUBJECT: GMU 2 Wolf Population Estimate Update, autumn 2017

Since 2012, the Alaska Department of Fish and Game (ADF&G) and the U.S. Forest Service (USFS) have collaborated on abundance estimates of the wolf population in Game Management Unit (GMU) 2 (Figure 1) using a DNA-based technique (Roffler 2016, Roffler et al. 2016, Roffler 2017). We collected wolf hair using hair traps on northcentral Prince of Wales Island (POW) during autumn 2012–2017 and extracted DNA from follicles. Individual wolves were identified via genotyping which enables the estimation of wolf densities using a spatially-explicit capture-recapture technique (SECR; Efford et al. 2004). This method requires multiple recaptures of individual wolves in different locations. During autumn 2016 and 2017, we collaborated with the Hydaburg Cooperative Association (HCA) to establish hair trap stations for wolf monitoring on POW, resulting in an expanded study area (Figure 1).

Autumn 2017 Wolf Density Estimates

We used SECR models to estimate the density and population size of wolves in our area of analysis (6,714 km^2) and in GMU 2 (Figure 1). The density estimate from the autumn 2017 top-ranked SECR model was 22.9 ± 2.6 wolves/1,000 km^2, 95% CI [18.3–28.6 wolves/1,000 km^2], CV = 0.114. Using this density estimate to predict the number of wolves in the area of analysis (6,714 km^2, 74% of GMU 2) resulted in an estimate of 167 ± 12.3 wolves, 95% CI [147.1–196.1], and an autumn 2017 population size for GMU 2 of 224.5 ± 16.5 wolves, 95% CI [197.7–263.5] (Table 1, Figure 2). There was no significant difference at the 95% confidence level between the 2016 and 2017 estimates (Figure 2). The autumn 2016 density estimate was 25.5 ± 3.1 wolves/1,000 km^2, 95% CI [20.2–32.3], which yielded a GMU 2 population size of 231.3 wolves, 95% CI [123.0–169.2] (Roffler 2017; Table 1, Figure 2).

In autumn 2017 we established an array of 82 hair trap stations throughout the 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 2017–8 January 2018. 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.

After removing hair samples identified as originating from black bears, we extracted DNA from 1,137 hair samples. Of these, 459 standard hair extracts (≥10 hairs) and 4 single-hair extracts were suitable for individual identification. A total of 449 hair sample extracts (445 standard hair extracts and 4 single-hair extracts) amplified with wolf alleles, providing individual genotypes of 61 wolves (27 females and 34 males). Fifty-one individual wolves were detected at the hair trap stations monitored by ADF&G and TNC, and 12 individual wolves were detected at the stations monitored by the HCA. One wolf was detected at hair trap stations monitored by citizen science volunteers. Of these wolves, 3 were detected in both the ADF&G/TNC and HCA monitoring areas during the study period, bringing the total number of unique wolves identified across the study area to 61. We summarized the capture statistics (Table 2) and the number of detections (Table 3) for the 2017 survey.

Thirteen wolves detected from hair collected at hair traps were subsequently harvested during the study period and identified using DNA extracted from samples collected during the sealing process. Because hunters and trappers could not provide precise harvest locations, for this analysis we assigned harvest locations for these wolves to grid points overlaid on the area of analysis. We were thus able to include these harvested wolves in analyses as recaptures which expanded the area of analysis to 6,714 km^2 and included all of Prince of Wales, Goat, and Sukkwan Islands (Figure 1).

Recommendations

Following autumn 2016 and autumn 2017 Unit 2 population estimates of 232 wolves and 225 wolves, respectively, the department considers the Unit 2 population recovered from an estimated low of 89 wolves in autumn 2014. We believe the conservative harvest management strategy in place since autumn 2015 promoted growth of this population and that it is now appropriate to change how harvest is managed.

The department will propose a new harvest management strategy based on establishing a population objective for Unit 2 wolves at the January 2019 Board of Game meeting. By adopting that proposal the Board would make the regulatory changes needed to implement that new harvest management strategy.

Ongoing and Future Research

ADF&G's research efforts will continue collecting tissue samples from harvested wolves for diet and genetic analyses. In addition, we will request that hunters and trappers donate foreleg bones and skulls to estimate the age structure of the harvested wolves. We will also continue to assess the effectiveness of our population estimation technique and refine our approach for continued monitoring of wolves in GMU 2 and in other Southeast Alaskan locations.

Figure 1. The wolf population area of analysis (6,714 km^2) used during autumn, 2017 in Game Management Unit 2. Wolves detected at hair trap stations and then subsequently harvested during the study period were included in analyses, expanding the area of analysis used in 2016 (5,423 km^2).

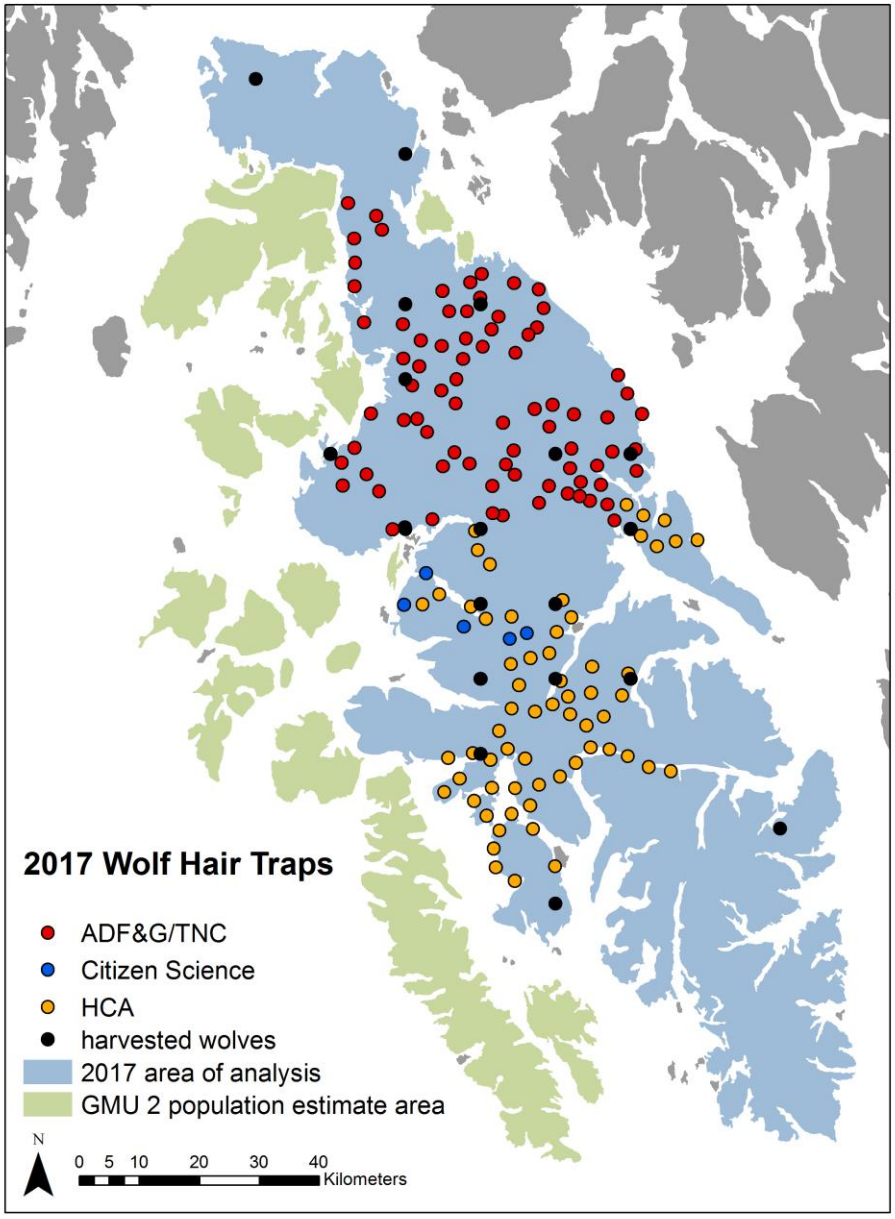

Figure 2. Violin plot of autumn wolf population estimates during 2013–2017 for Game Management Unit 2. White dots represent the point estimates used for managing harvest, black bars represent the 95% confidence intervals, and violin plots (grey shapes) represent the probability density of the population estimates. Wider horizontal ranges are associated with more likely values of the population estimate. The point estimates for each year are located at the widest portion of their respective violin plot.

Table 1. Autumn wolf population estimate and 95% confidence intervals (CIs) during 2013–2017 for Game Management Unit 2.

Year	Population estimate	95% CIs
2013	221	130–378
2014	89	50–159
2015	108	69–167
2016	231	192–285
2017	225	198–264

Table 2. Summary of 2017 capture effort.

Occasion	1	2	3	4	5	6	7	8	9	10	Total	Mean per occasion ± SD
Animals detected	17	15	13	17	8	15	12	13	22	13	145	14.5 ± 4.3
Unique animals detected	17	11	6	9	4	7	5	10	10	1	80	8.0 ± 2.6
Repeat detection frequency	48	13	10	5	3	1	0	0	0	0	80	
Cumulative detections	17	28	34	43	47	54	59	69	79	80	80	
Total detections	39	33	31	35	9	34	23	24	42	33	303	30.3 ± 4.5
Detectors visited	12	12	8	8	8	13	10	6	16	13	106	10.6 ± 3.1
Detectors used	82	144	141	145	146	144	146	132	144	121	1345	134.5 ± 6.0

Table 3**.** Summary of 2017 detection rate.

Occasion	1	2	3	4	5	6	7	8	9	10	Mean ± SD
Detection rate (detections/trap/100 trap days)	1.73	0.58	0.64	0.67	0.18	0.68	0.43	0.63	0.74	0.94	0.72 ± 0.41
Detection rate (unique animals/trap/100 trap days)	0.76	0.19	0.12	0.17	0.08	0.14	0.09	0.26	0.18	0.03	0.20 ± 0.21

Literature Cited

Alaska Department of Fish and Game. 2014. The status and outlook of Southeast Alaska's Unit 2 wolves. Division of Wildlife Conservation, Wildlife Management Report ADF&G/DWC/WMR-2014-2, Juneau.

Efford, M. G, D. K. Dawson, C. S. Robbins. 2004. DENSITY: software for analysing capture-recapture data from passive detector arrays. Animal Biodiversity and Conservation 27:217–228.

Roffler, G. H., J. N. Waite, R. W. Flynn, K. R. Larson, and B. D. Logan. 2016. Wolf population estimation on Prince of Wales Island, Southeast Alaska: A comparison of methods. Alaska Department of Fish and Game, Final Wildlife Research Report ADF&G/DWC/WRR-2016-1, Juneau, Alaska.

Roffler, G. 2016. Wolf population estimation on Prince of Wales Island, Alaska. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid Annual Research Performance Report 1 July 2015-30 June 2016, Federal Aid in Wildlife Restoration Project 14.30, Juneau.

Roffler, G. 2017. Wolf population estimation on Prince of Wales Island, Alaska. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid Annual Research Performance Report 1 July 2016-30 June 2017, Federal Aid in Wildlife Restoration Project 14.30, Juneau.