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 2018

Since 2012, the Alaska Department of Fish and Game (ADF&G) has estimated abundance 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, Roffler 2018, Roffler et al. 2019). We collected wolf hair using hair traps on northcentral Prince of Wales Island (POW) during autumn 2012–2018 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 2016–2018, 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 2018 Wolf Density Estimates

We used SECR models to estimate the density and population size of wolves in our area of analysis (5,423 km^2, 60% of GMU 2) and in GMU 2 (Figure 1). The density estimate from the autumn 2018 top-ranked SECR model was 19.5 ± 2.1 wolves/1,000 km^2, 95% CI [15.7–24.2 wolves/1,000 km^2], CV = 0.108. Using this density estimate to predict the number of wolves in the area of analysis resulted in an estimate of 107.9 ± 5.2 wolves, 95% CI [100.0–120.9], and an autumn 2018 population size for GMU 2 of 169.7 ± 13.9 wolves, 95% CI [146.6–201.8] (Table 1, Figure 2). The autumn 2017 density estimate was 22.9 ± 2.6 wolves/1,000 km^2, 95% CI [18.3–28.6 wolves/1,000 km^2], which yielded a GMU 2 population size of 224.5 wolves, 95% CI [197.7–263.5] (Roffler 2018; Table 1, Figure 2).

In autumn 2018 we established an array of 83 hair trap stations throughout the POW study area used during 2014–2017. Stations were monitored weekly during 1 October–10 December 2018 by three ADF&G and one Nature Conservancy (TNC) field crew staff. The HCA established 62 stations in the same area monitored in 2016 and 2017 south of the ADF&G and TNC study area

(Fig. 1). Stations were monitored weekly by 3 HCA field crew staff during 2 October–14 December 2018.

We collected 1,184 hair samples for analysis. After removing hair samples identified as originating from species other than canids, we extracted DNA from 801 hair samples. Of these, 412 standard (≥10 hairs) and single-hair hair extracts were suitable for individual identification. We identified 78 individual wolves from hair collected at the hair trap stations (56 at the stations monitored by ADF&G and TNC, 17 at the stations monitored by the HCA, and 4 individual wolves detected at both ADF&G/TNC and HCA stations). We summarized the capture statistics (Table 2) and the number of detections (Table 3) for the 2018 survey.

Twenty-five 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.

Management Update

Following autumn 2016, 2017, and 2018 Unit 2 population estimates of 232, 225, and 170 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 from autumn 2015–2018 promoted growth of this population.

At the January 2019 meeting of the Alaska Board of Game the department proposed a change in how Unit 2 wolves are managed that included setting a population objective. The Board established a fall Unit 2 wolf population objective of 150–200 wolves and endorsed a written and publicly available department management strategy. The goal of that is to maintain the Unit 2 wolf population within the objective range by adjusting season length relative to the most recent fall population estimate. The new strategy will be implemented beginning in autumn 2019.

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 (5,423 km^2) and hair trap stations used during autumn, 2018 in Game Management Unit 2.
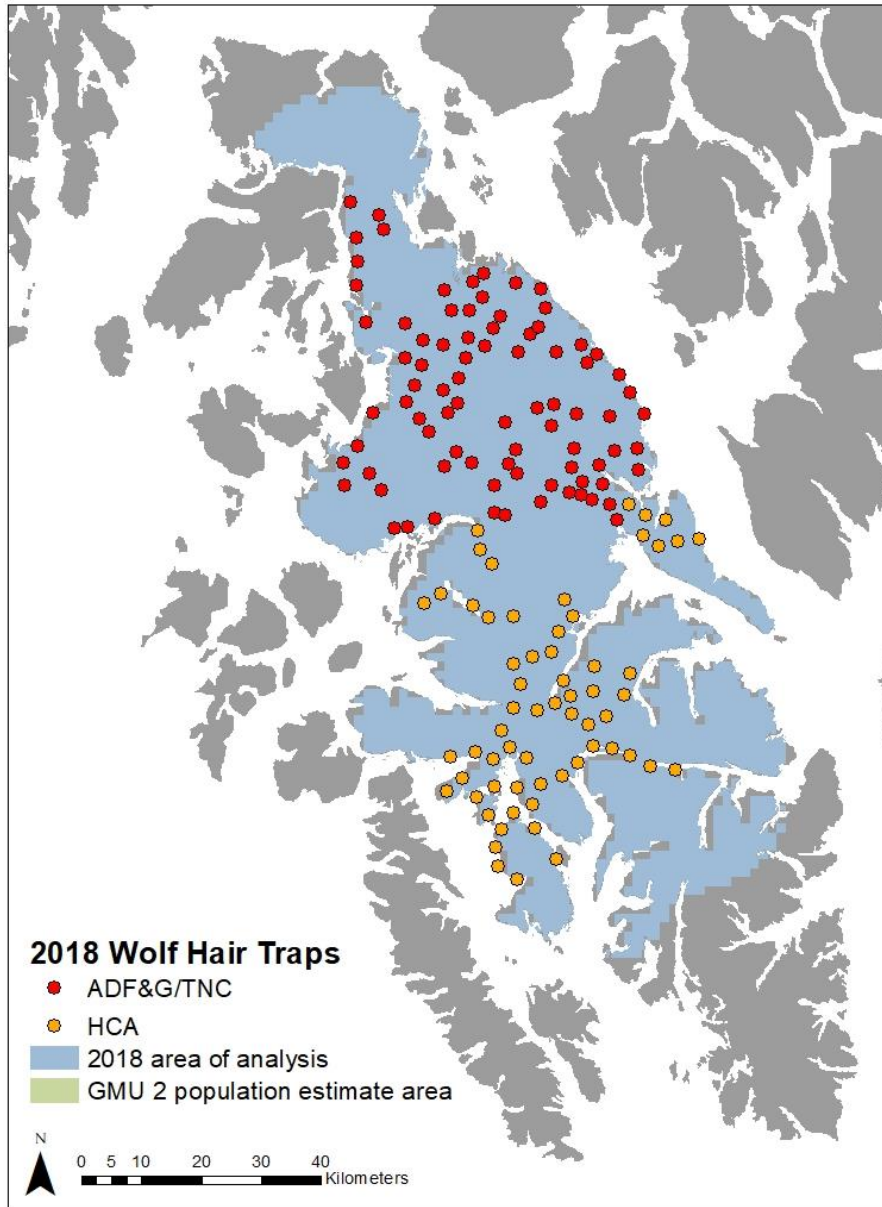
Figure 2. Violin plot of autumn wolf population estimates during 2013–2018 for Game Management Unit 2. White dots represent the point estimates used for managing harvest, black bars represent the 95% confidence intervals, and violin plots (grey shapes) represent the probability density of the population 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.
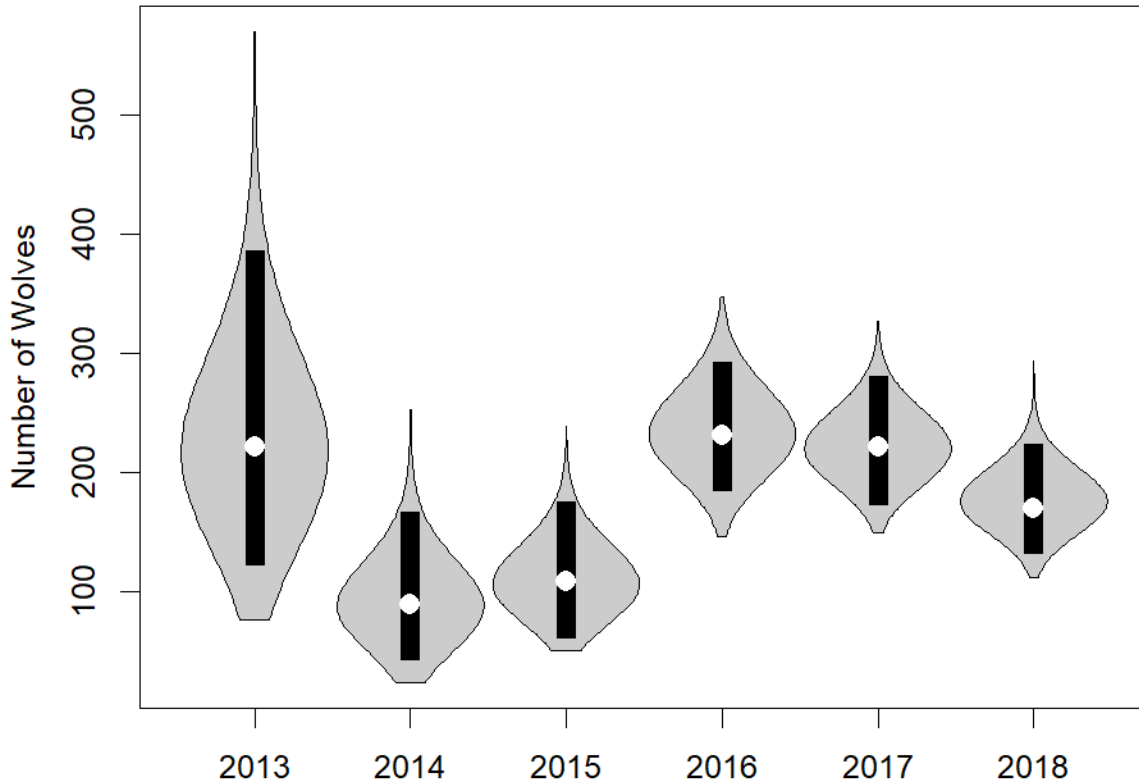
Table 1. Autumn wolf population estimate and 95% confidence intervals (CIs) during 2013–2018 for Game Management Unit 2.

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
2018	170	147-202

Table 2. Summary of 2018 capture effort.

Occasion	1	2	3	4	5	6	7	8	9	10	Total	Mean per occasion ± SD
Animals detected	16	16	17	24	13	12	19	15	13	25	170	17.0 ± 4.5
Unique animals detected	16	11	11	12	5	4	4	2	3	10	78	7.8 ± 4.8
Repeat detection frequency	37	19	7	7	5	2	0	0	1	0	78	
Cumulative detections	16	27	38	50	55	59	63	65	68	78	78	
Total detections	27	46	36	40	28	30	54	40	37	57	395	39.5 ± 10.3
Detectors visited	16	20	25	25	16	17	22	17	16	28	202	20.2 ± 4.5
Detectors used	705	725	724	725	720	722	720	725	709	715	7190	719.0 ± 7.1
Clusters used	141	145	145	145	145	145	145	145	142	143	1438	143.8 ± 1.4

Table 3. Summary of 2018 detection rate.

Occasion	1	2	3	4	5	6	7	8	9	10	Mean ± SD
Detection rate (detections/trap/100 trap days)	0.56	0.90	0.72	0.75	0.60	0.59	1.06	0.79	0.78	1.13	0.79 ± 0.19
Detection rate (unique animals/trap/100 trap days)	0.33	0.21	0.22	0.23	0.11	0.08	0.08	0.04	0.06	0.20	0.16 ± 0.10

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