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 2019

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, 2017, 2018, 2019; Roffler et al. 2016, Roffler et al. 2019). We collected wolf hair using hair traps on northcentral Prince of Wales Island (POW) during autumn 2012–2019 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 2016–2019, 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 2019 Wolf Density Estimates

We used SECR models to estimate the density and population size of wolves in our area of analysis (6,436 km^2, 71% of GMU 2) and in GMU 2 (Figure 1). The density estimate from the autumn 2019 top-ranked SECR model was 35.0 ± 4.1 wolves/1,000 km^2, 95% CI [27.7–44.1 wolves/1,000 km^2], CV = 0.119. Using this density estimate to predict the number of wolves in the area of analysis resulted in an estimate of 225.3 ± 26.4 wolves, 95% CI [178.3–283.8], and an autumn 2019 population size for GMU 2 of 315.9 ± 37.0 wolves, 95% CI [250.0–398.1] (Table 1, Figure 2). The autumn 2018 density estimate was 20.7 ± 2.5 wolves/1,000 km^2, 95% CI [16.3–26.1 wolves/1,000 km^2], which yielded a GMU 2 population size of 186.8 wolves, 95% CI [147.1–235.6] (Roffler 2018; Table 1, Figure 2).

In autumn 2019 we established an array of 83 hair trap stations throughout the POW study area used during 2014–2018. Stations were monitored weekly during 30 September–19 December 2019 by ADF&G field crew staff. The HCA established 62 stations in the same area monitored during 2016–2018 south of the ADF&G study area (Fig. 1). Stations were monitored weekly by HCA field crew staff during 8 October–20 December 2019.

We collected 834 hair samples for analysis. After removing hair samples identified as originating from species other than canids, we tested 584 hair samples for individual identification using a panel of 15 microsatellite loci. We obtained genotypes to identify individuals from 355 of the samples using standard DNA extractions, and 179 individuals from single-hair re-extractions (performed in triplicate). We identified 92 unique wolves from hair collected at the hair trap stations (80 at the stations monitored by ADF&G and 12 at the stations monitored by the HCA).

Twenty-two 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.

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 wolf teeth to estimate the age structure of the harvested wolves. It will also be desirable to have accurate dates of wolf harvest reported so this information may be used to improve the population estimate models. 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 (6,436 km^2) and hair trap stations used during autumn, 2019 in Game Management Unit 2.

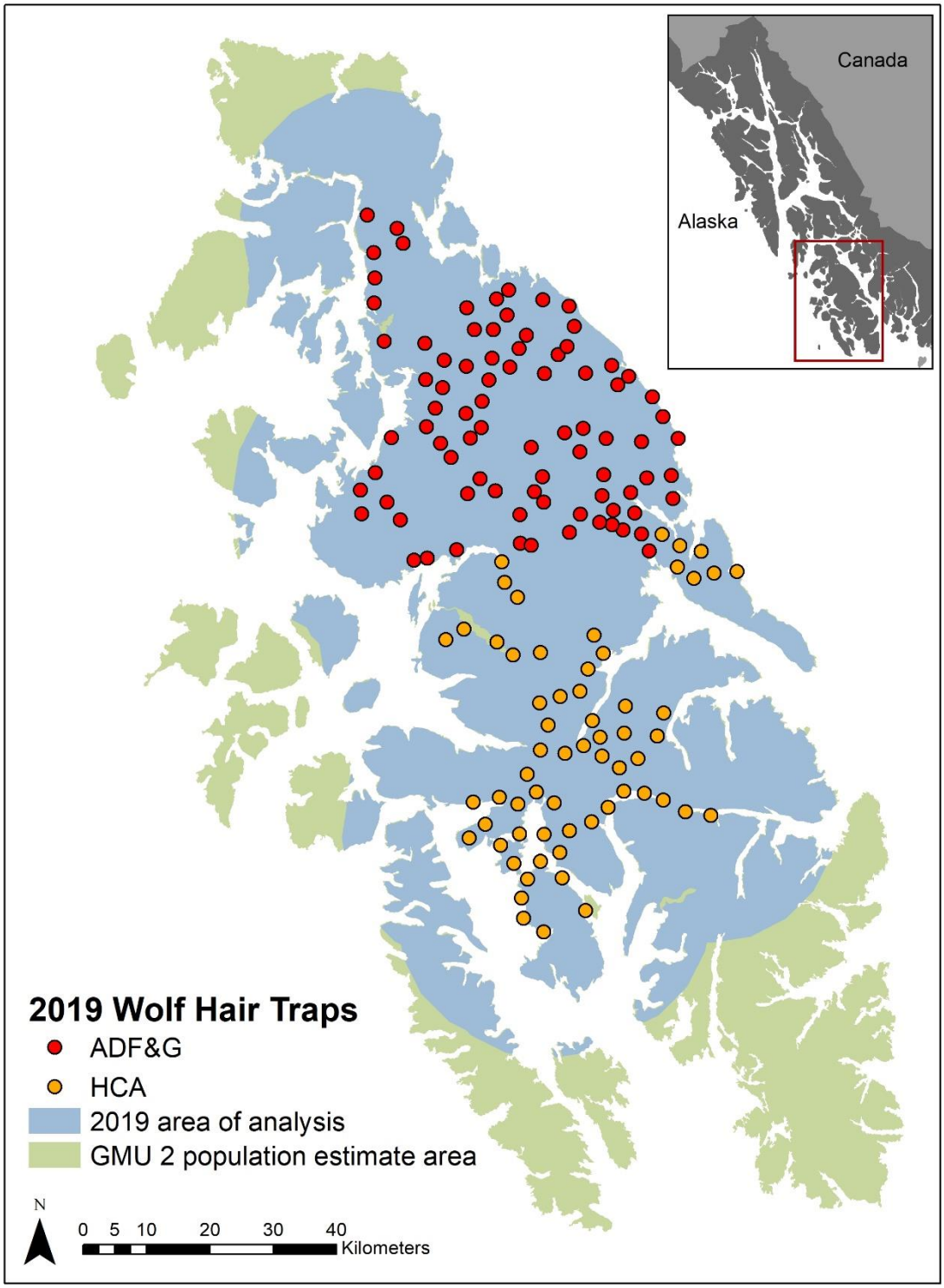

Figure 2. Violin plot of autumn wolf population estimates during 2013–2019 for Game Management Unit 2. White dots represent the point estimates used for managing harvest, black bars represent the 95% confidence intervals, and violin plots (grey shapes) represent the probability density of the population 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.

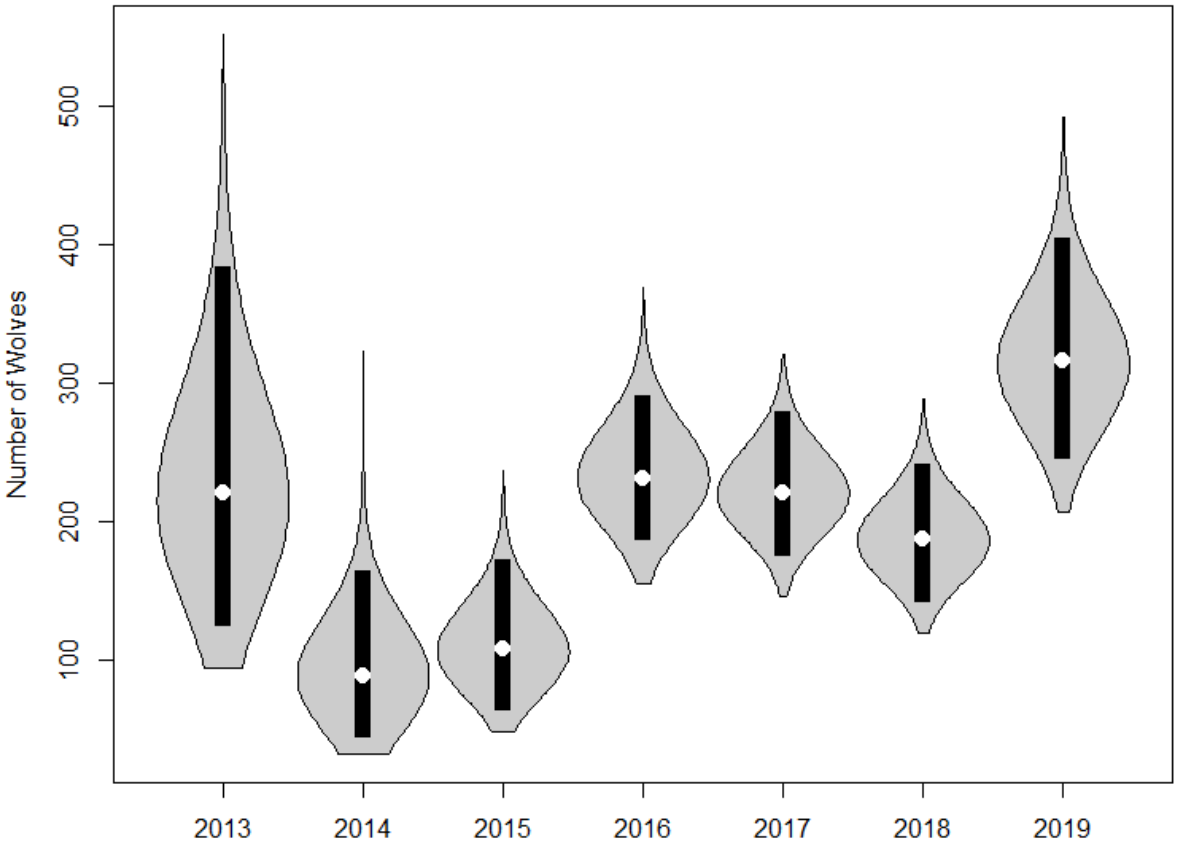

Table 1. Autumn wolf population estimate and 95% confidence intervals (CIs) during 2013–2019 for Game Management Unit 2.

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	187	147–236
2019	316	250–398

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