Wolf Management Report and Plan, Game Management Unit 2:

Report Period 1 July 2015–30 June 2020, and

Plan Period 1 July 2020–30 June 2025

Tessa R. Hasbrouck

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Alaska Department of Fish and Game Division of Wildlife Conservation

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Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and through state hunting license and tag fees.

Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Richard Nelson, Management Coordinator for the Division of Wildlife Conservation.

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Cover Photo: Wolf rolling on ADF&G hairboard. ©2015 ADF&G. Photo taken with Reconyx Hyperfire HC600.

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Purpose of this Report

This report provides a record of survey and inventory management activities for wolves (*Canis lupus ligoni*) in Game Management Unit 2 for the 5 regulatory years 2015–2019 and plans for survey and inventory management activities in the next 5 regulatory years, 2020–2024. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY14 = 1 July 2014–30 June 2015). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game's (ADF&G, the department) Division of Wildlife Conservation (DWC) launched this 5-year report to report more efficiently on trends and to describe potential changes in data collection activities over the next 5 years. It replaces the wolf management report of survey and inventory activities that was previously produced every 3 years.

I. RY15–RY19 Management Report

Management Area

Game Management Unit (Unit) 2 includes Prince of Wales Island (POW) and adjacent islands bounded by a line drawn from Dixon Entrance in the center of Clarence Strait, Kashevarof Passage, and Sumner Strait north to and including Warren Island (Fig. 1). Land area is approximately 3,582 mi^2 (9,277 km^2) with extensive shoreline and marine influenced habitats. Total human population on POW fluctuates seasonally between 4,000 and 5,000 residents.

Unit 2 is a temperate rainforest with a mild, maritime climate which receives an average of 101.6 inches (2.6 m) of precipitation annually (NOAA 2022). Wind and landslide events are the primary source of disturbance (Harris 1989, Ott 1997). There is a high density of karst and cave features caused by the chemical weathering of limestone and marble bedrock (Baichtal and Swanston 1996) which impact the hydrology and ecology of the unit. Land cover consists of well-drained areas that have historically been old-growth forest which include Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), red cedar (*Thuja plicata*), and Alaska yellow cedar (*Chamaecyparis nootkatensis*). On flatter terrain, as soil moisture increases, forest cover transitions to low-volume forest including shore pine (*Pinus contorta*), and eventually muskeg. Above approximately 2,000 ft (610 m) in elevation the forest transitions to a subalpine zone consisting of predominantly mountain hemlock (*Tsuga mertensiana*) and eventually consisting of isolated areas of alpine vegetation. In forested habitat, understory consists of shrubs and forbs dominated by blueberry (*Vaccinium spp.*), salal (*Gaultheria shallon*), devil's club (*Oplopanax horridus*), and western skunk cabbage (*Lysichiton americanus*).

Land ownership in Unit 2 is a mix of federal, state, and private ownership; all of whom have different management strategies. Unit 2 is 80% Tongass National Forest lands which are managed by the United States Forest Service (USFS; Southeast Alaska GIS Library 2019) for sustainable multiple-use management including recreation, economic development, and subsistence activities. Sealaska Corporation, the largest private landowner in the unit, primarily manages their lands for economic development (e.g., timber harvest) and hunting opportunities for shareholders.

Figure 1. Map of Game Management Unit 2 boundaries, Southeast Alaska.

A disproportionate amount of clear-cut logging occurs in Unit 2 compared to the remainder of the Tongass National Forest (USDA 2016). Logging increases hunter and trapper access to previously inaccessible portions of the interior of Prince of Wales and other islands through the development of an extensive road system. This road system also degrades wildlife habitat.

Summary of Status, Trend, Management Activities, and History of Wolves in Unit 2

The Alexander Archipelago wolf (*Canis lupus ligoni*; hereafter referred to as wolf) is a subspecies present throughout Unit 2 and surrounding units. These wolves are typically smaller than wolves inhabiting mainland Alaska with shorter more wiry hair (Person et al. 1996). Unit 2 wolves are genetically distinct from others in Southeast Alaska and show signs of inbreeding depression due to their relative isolation (Zarn 2019). They are capable swimmers and regularly travel among islands within the unit; however, emigration and immigration to other units is minimal. Wolves in Unit 2 feed primarily on deer (*Odocoileus hemionus*) but also black bear (*Ursus americanus*), marine mammals, salmon (*Oncorhynchus* spp.), mustelids, beaver (*Castor canadensis*), and birds (Roffler et al. 2021). Unit 2 has long been assumed to support the highest densities of wolves in the state due to relatively high prey density (Porter 2018). Wolf population estimates ranged from 108 to 316 animals in the past 5 years (ADF&G 2021).

Unit 2 wolf management has undergone many changes through time. Federal agents poisoned wolves in the 1950s and paid cash bounties for wolves through the early 1970s (Regelin 2002). ADF&G and USFS jointly manage wolves, and USFS ends federal wolf trapping and hunting seasons at the same time that ADF&G closes the state season. Alaska Department of Fish and Game (ADF&G) created a management strategy that used a harvest guideline level (HGL) from 1990–2018. During this time, seasons were managed with quotas derived from the HGL, and both federal and state agencies would close the season when harvest approached the quota. In 2019, the Board of Game (BOG) established a population objective of 150–200 wolves for Unit 2. ADF&G and USFS now manage state and federal hunting and trapping through season length and establish a joint season end date prior to the start of the season. Quota systems are no longer used to determine the end the season.

Concerned environmental organizations petitioned to list wolves in Southeast Alaska under the Endangered Species Act (ESA) in 1993, 2011, and 2020. However, the U.S. Fish and Wildlife Service (USFWS) found the 1993 and 2011 petitions "not-warranted." In response to the 1993 petition, USFS assessed the status of wolves in the Tongass National Forest and included wolf conservation measures in the land management plan for the Tongass National Forest (USDA 1997, Person et al. 1996). ADF&G also began assessing the wolf population using a new DNA-based mark-recapture method in 2012 (Flynn et al. 2014). ADF&G used the fall population estimates in conjunction with HGLs to establish annual quotas and consequently closed the 2013–2019 trapping seasons by emergency order. Despite these conservation efforts, environmental groups petitioned again in 2020 to list the wolf under ESA across Southeast Alaska.

Management Direction

ADF&G manages for sustainable harvest and viewing opportunities of wolves in Unit 2.

Existing Wildlife Management Plans

- Alaska wildlife management plans: A public proposal for the management of Alaska's wildlife: Southeastern Alaska (ADF&G 1976).
- ADF&G Unit 2 wolf harvest strategy for RY2019-2021 (Appendix A).

Goals

Maintain a wolf population that supports sustainable harvest and viewing opportunities through regulation of hunting and trapping seasons, bag limits, and harvest guidelines.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

The customary and traditional use determination finding for wolves in Unit 2, listed in 5 AAC 99.025, and established by the Alaska Board of Game in 2004, is as follows: 90 percent of the harvestable portion of the Unit 2 wolf harvest.

Intensive Management

There is no intensive management program in Unit 2.

Management Objectives

The RY15–RY18 management objective was to provide for a sustainable harvest while maintaining total human-caused mortality at no more than 20% of the estimated autumn population. The RY19 management objective was to provide for a sustainable harvest while maintaining a fall population objective of 150–200 wolves.

Management Activities

1. Population Status and Trend

ACTIVITY 1.1. Estimate the preseason wolf population in Unit 2 annually.

Data Needs

ADF&G uses a DNA-based spatial capture-recapture model to determine wolf hunting and trapping season lengths for Unit 2.

Methods

Since 2013, ADF&G has estimated abundance of the wolf population in Unit 2 (Fig. 1) using a DNA-based technique (Roffler et al. 2016, Roffler et al. 2019). ADF&G collected wolf hair using hair snares on north and central POW during autumn 2013–2019 (Fig. 2). During each

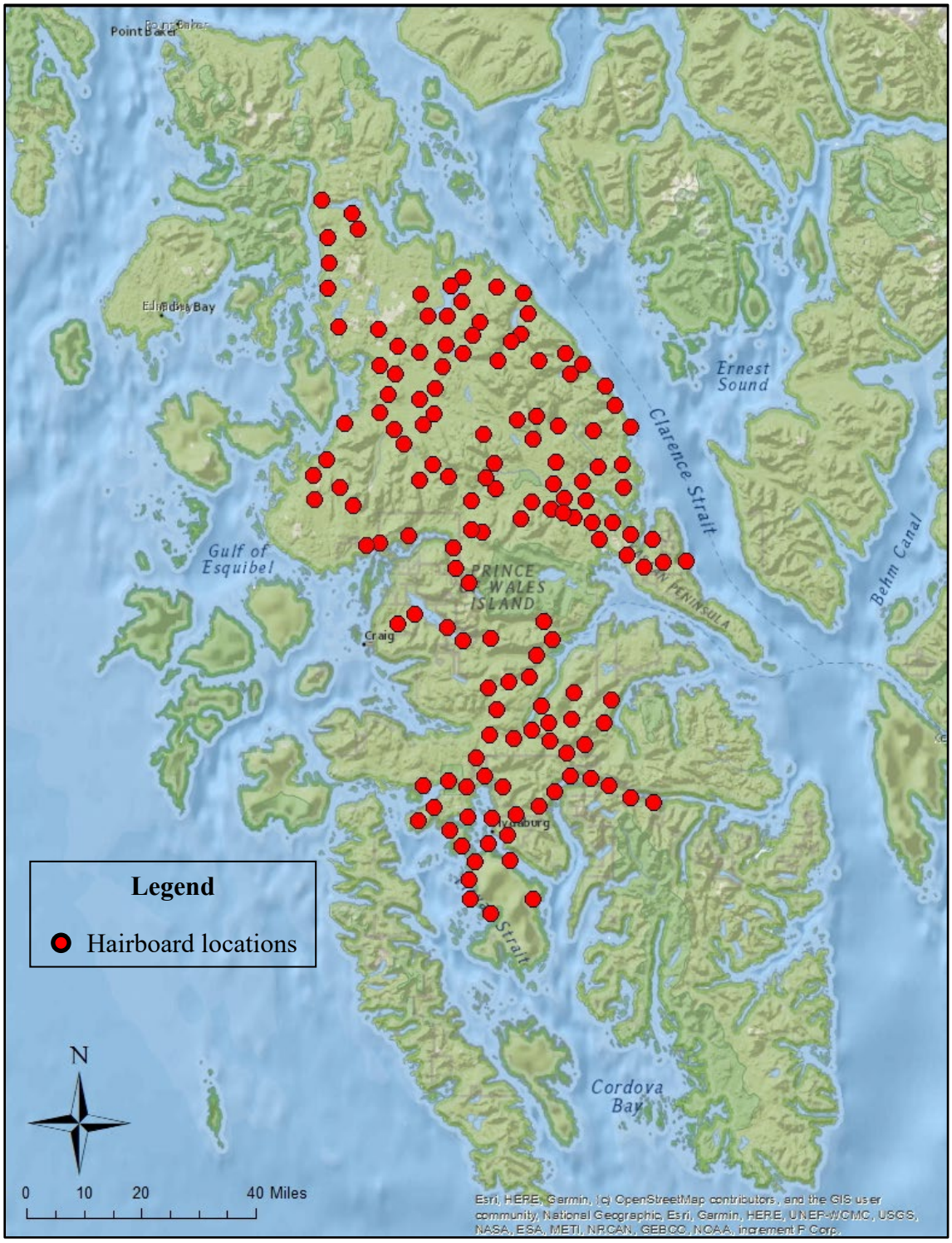

Figure 2. Wolf hairboard locations for Unit 2, Southeast Alaska.

autumn in 2016–2019, ADF&G collaborated with the Hydaburg Cooperative Association (HCA) to establish hair-trap stations for wolf monitoring on POW, resulting in an expanded study area. The study area covers 80% of Prince of Wales Island and 60% of the entire unit. The National Genomics Center for Fish and Wildlife Conservation in Missoula, Montana extracted DNA from hair follicles and tested samples for individual identification using a panel of 15 microsatellite loci. Those individual identifications along with dates and locations where individual wolves were detected were used to calculate a population estimate using a spatial capture-recapture model (SECR; Efford et al. 2004). This method requires multiple recaptures of individual wolves in different locations. Using the SECR method, a density estimate was created for the study area, and ADF&G extrapolated the estimate across the entire unit to estimate the Unit 2 wolf population.

Results and Discussion

The wolf population estimate ranged 108–316 wolves during RY15–RY19 (Fig. 3). Wolf populations are dynamic and annual fluctuation in population estimates are the result of reproduction, hunting and trapping effort, and sampling effort. Wolves have high reproduction potential, which allows populations to increase even in harvested systems.

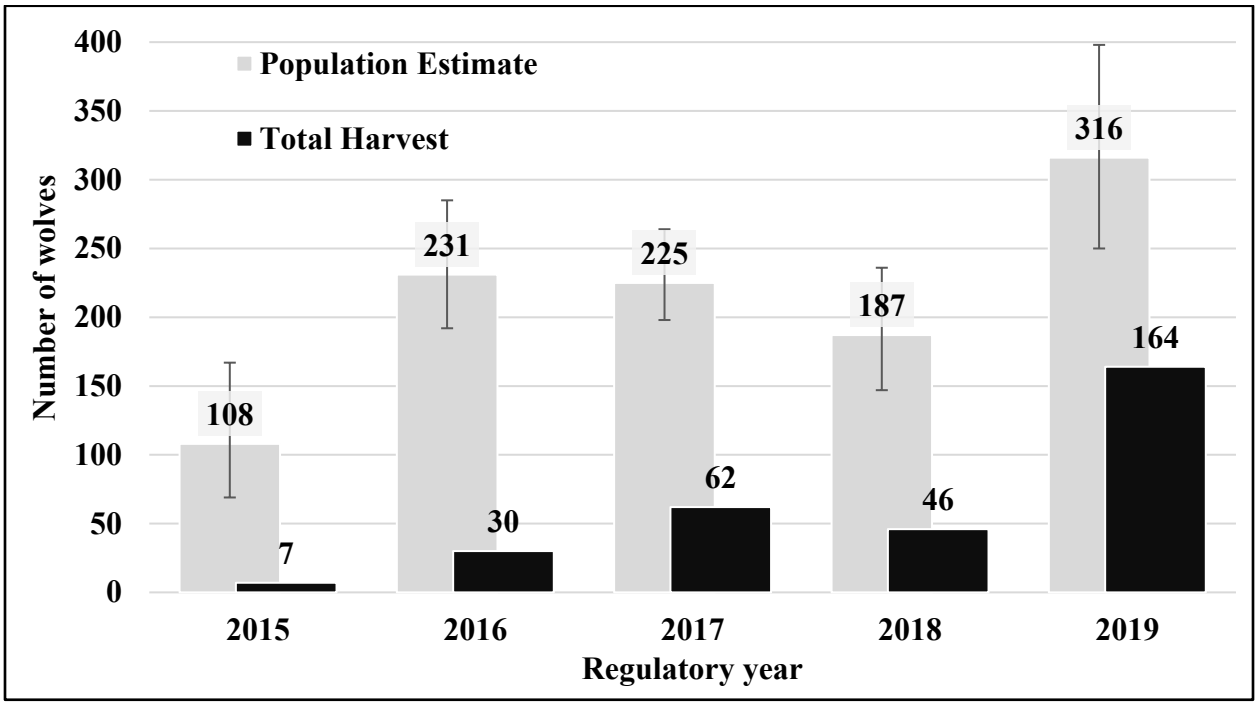

Figure 3. Wolf population estimates and harvest during regulatory years 2015–2019 for Unit 2, Southeast Alaska. Error bars represent a 95% confidence interval.

Poor weather conditions limit harvester (i.e., hunters and trappers) effort and genotyping success from the sampling effort. High rains can wash away lure before wolves have a chance to encounter boards and may cause DNA to rapidly degrade. Further, high snowfall may cover boards and make them inaccessible to wolves. High snow may also make nodes inaccessible to samplers, causing delays between sampling periods which could contribute to poor quality DNA

samples. Additional details on past density estimates are available at: https://www.adfg.alaska.gov/index.cfm?adfg=wolf.resources.

During regulatory years 2015–2018, the prior year's population estimate was used to set harvest quotas. In 2019, the prior year's population estimate was used to set the season length.

Recommendations for Activity 1.1.

ADF&G should continue to estimate the wolf population in Unit 2. Continued training should be provided to enhance genotyping success among all collaborators. Current SECR methods should be continued until a more robust, cost-effective method is developed.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor and document hunter and trapper harvest.

Data Needs

ADF&G uses wolf sealing data to inform management decisions.

Methods

The Unit 2 wolf population is monitored through mandatory sealing of wolves harvested by trappers and hunters. Sealers record the trapper's personal information, number of wolves harvested, harvest locations, month of kill, harvest method, sex, transportation method, pack count, and pelt color. After collecting this information, the sealer attaches a CITES[1] locking tag to the pelt for legal transportation across state and international borders. Beginning in RY16, sealers collected tissue samples for genetic information to aid in estimating the population. Foreleg bones were also collected for basic age structure analysis of a portion of the total number of wolves harvested.

Season and Bag Limit

State hunting and trapping season dates changed every year during RY15–RY19 (Table 1). The state trapping season started 1 December every regulatory year, except in RY19. At the 2019 BOG meeting, a proposal was adopted to align the state and federal trapping seasons to both begin 15 November. Hunting and trapping seasons ended 31 March, but ADF&G closed the hunting and trapping seasons early every year by emergency order. State hunting and trapping seasons were closed each year during RY15–RY19 by emergency order on the same date. During RY15–RY18, state hunting and trapping seasons were closed through emergency orders when the number of harvested wolves approached the quota that was established before the start of the season. The quota system was abandoned beginning in RY19. In RY19 the trapping season length was predetermined in accordance with the new management strategy (Appendix A). Prior to the start of the trapping season, an emergency order was issued that stated the end date for the hunting and trapping seasons in RY19. During RY15–RY19, the bag limit for hunting was 5 wolves, but there were no bag limits for trappers. USFS ended federal hunting and trapping seasons synchronously with ADF&G.

[1] CITES stands for the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Table 1. State hunting and trapping season dates during regulatory years 2015–2019 for Unit 2, Southeast Alaska.

Regulatory year	Quota	Hunting season start	Trapping season start	Season end[a]
2015	9	1 December	1 December	20 December
2016	11	1 December	1 December	21 December
2017	46	1 December	1 December	16 December
2018	45	1 December	1 December	21 December
2019	–[b]	1 December	15 November	15 January

[a] Season end date was the same for both hunting and trapping during RY15–RY19.
[b] There was no quota in regulatory year 2019 because ADF&G changed the management strategy from a quota system to a season-length system.

Results and Discussion

Harvest by Hunters and Trappers

During RY15–RY19 annual harvest ranged 7–164 wolves (Fig. 4). A low population estimate in RY14 led to a reduced quota for hunting and trapping combined in RY15. This resulted in a decreased harvest in RY15. Conversely, a higher population estimate in RY18 led to a longer trapping season which subsequently led to increased harvest, an increased number of trappers, and likely increased effort. Overall male and female harvest were similar, with slightly more females harvested every year except in RY15 (Fig. 4). The number of successful harvesters

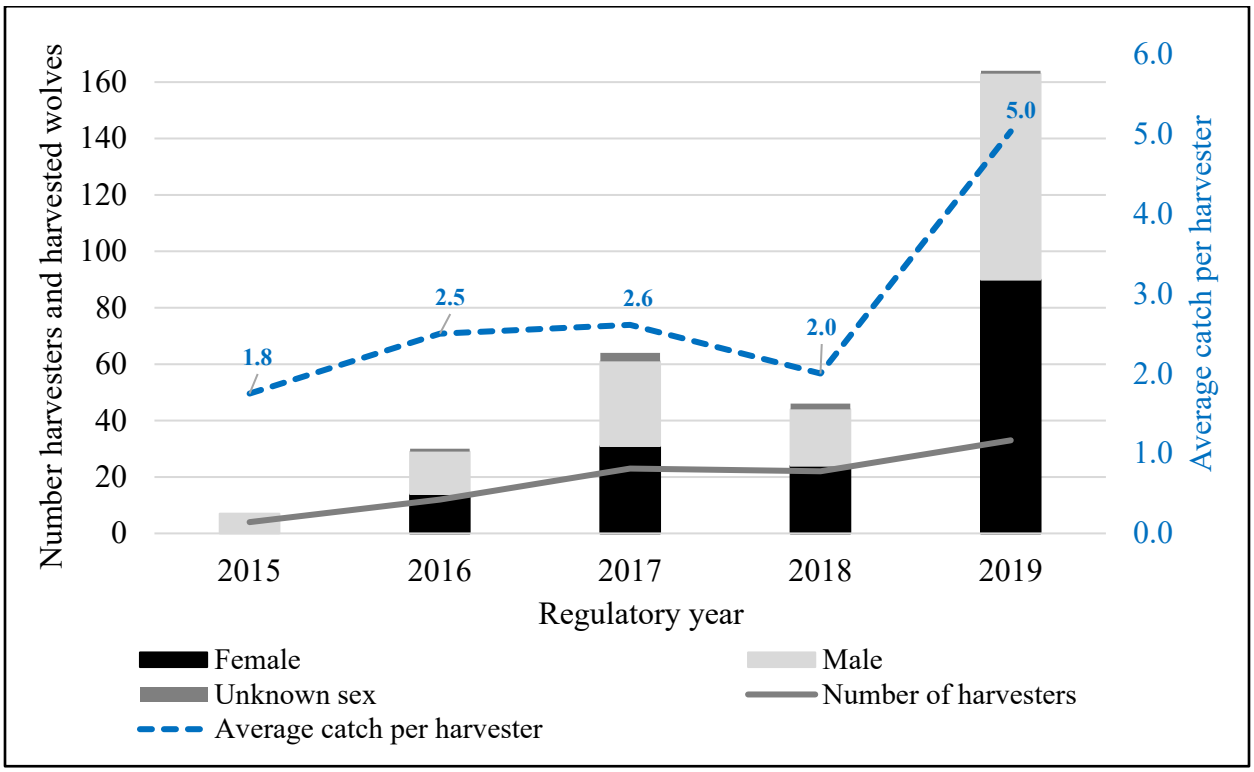

Figure 4. Annual wolf harvest by sex and harvester effort during regulatory years 2015–2019 for Unit 2, Southeast Alaska.

increased within the RY15–RY19 reporting period with a record 32 individuals reporting harvest in RY19. Annual average catch ranged 2–3 wolves per harvester with a high in 2019 of 5 wolves per harvester. Harvest exceeded the season quota in RY16, RY17, and RY18.

Method of Take

Traps and snares were the most common method used for harvesting wolves throughout RY15–RY19 (Fig. 5). In RY15 a higher percent of wolves were harvested with a firearm, but this is likely skewed due to the low number (n = 7) of wolves harvested that regulatory year. Wolves harvested under a firearm were likely taken opportunistically while pursuing other outdoor opportunities (e.g., deer hunting, firewood collection).

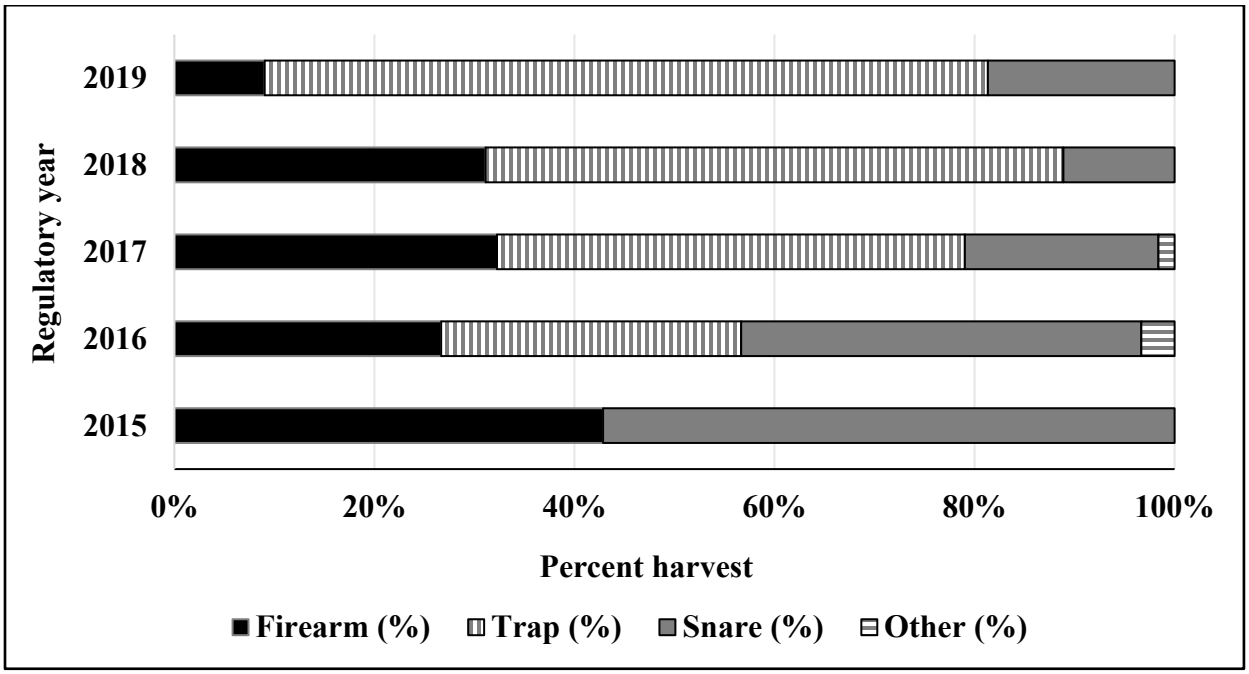

Figure 5. Method of wolf take during regulatory years 2015–2019 for Unit 2, Southeast Alaska.

Hunter Residency and Success

Residents of Unit 2 (local) harvested more wolves than Alaska residents that reside outside of Unit 2 (nonlocal) or nonresidents of Alaska in every regulatory year during RY15–RY19 (Fig. 6). Less harvest by both nonlocal and nonresident harvesters was a result of less effort. In 2019 there was a larger number of nonlocal harvesters which were primarily Ketchikan residents.

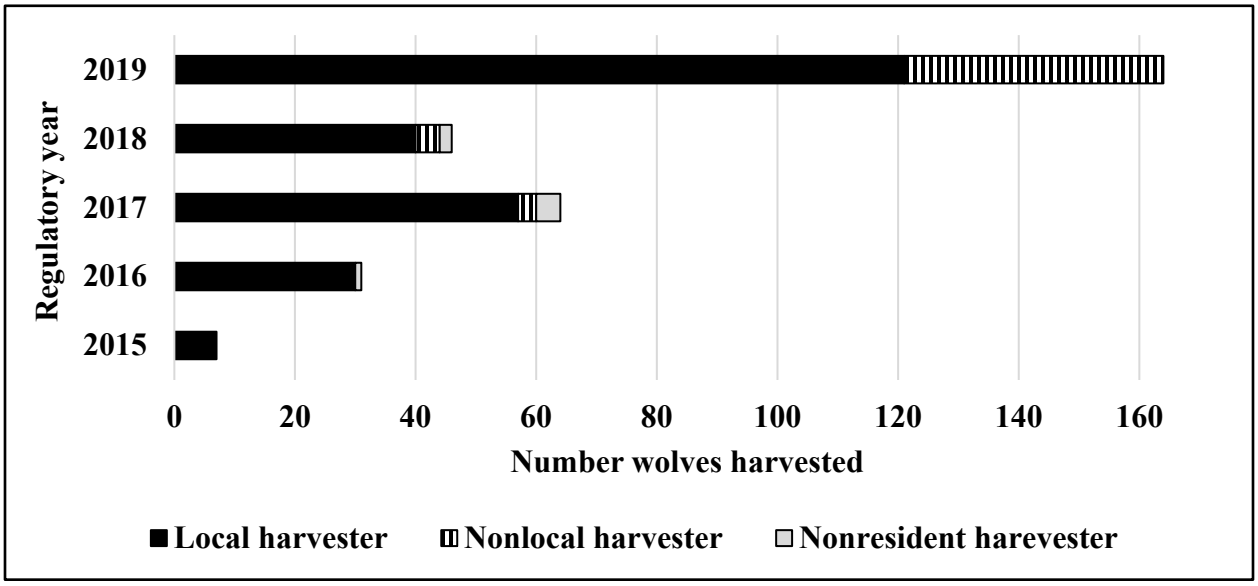

Figure 6. Hunter residency during regulatory years 2015–2019 for Unit 2, Southeast Alaska. Local harvesters are people who reside in Unit 2. Nonlocal harvesters are people who live in Alaska, outside of Unit 2. Nonresident harvesters reside outside Alaska.

Harvest Chronology

Harvest was highest in December for all regulatory years (Fig. 7). Although the season is 4.5 months long, management by quota or season length to achieve a specific level of harvest affects the harvest chronology. Wolves were harvested when the season was open, and during RY15–RY19 it was closed by emergency order in December or January of each year.

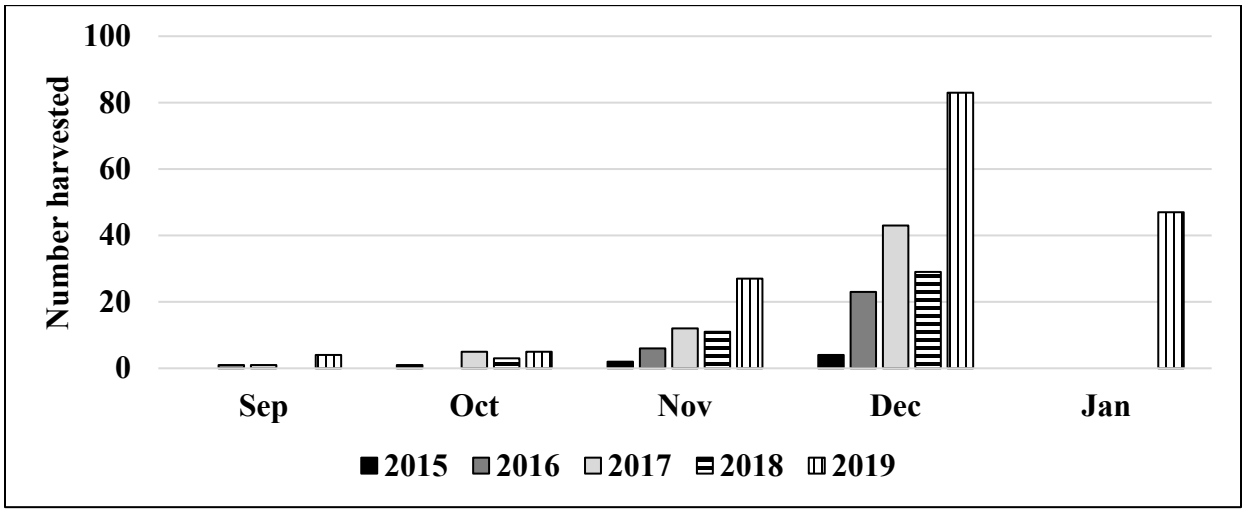

Figure 7. Wolf harvest chronology during regulatory years 2015–2019 for Unit 2, Southeast Alaska.

Transport Methods

Most wolves were harvested by boat during RY16–RY19 except in RY15 (Fig. 8). RY15 had a higher percent taken by highway vehicle, which is likely due to the short season when only 7 wolves were taken. Boats allow easy access to preferred trapping locations on Prince of Wales shoreline and outer islands. Mild autumns during RY15–RY19 allowed harvesters to target the Prince of Wales shoreline and outer islands. Years with harsher weather (e.g., heavy rainfall, early snowfall, high winds, icy bays) may cause harvesters to shift from boat-based harvest to road-based harvest.

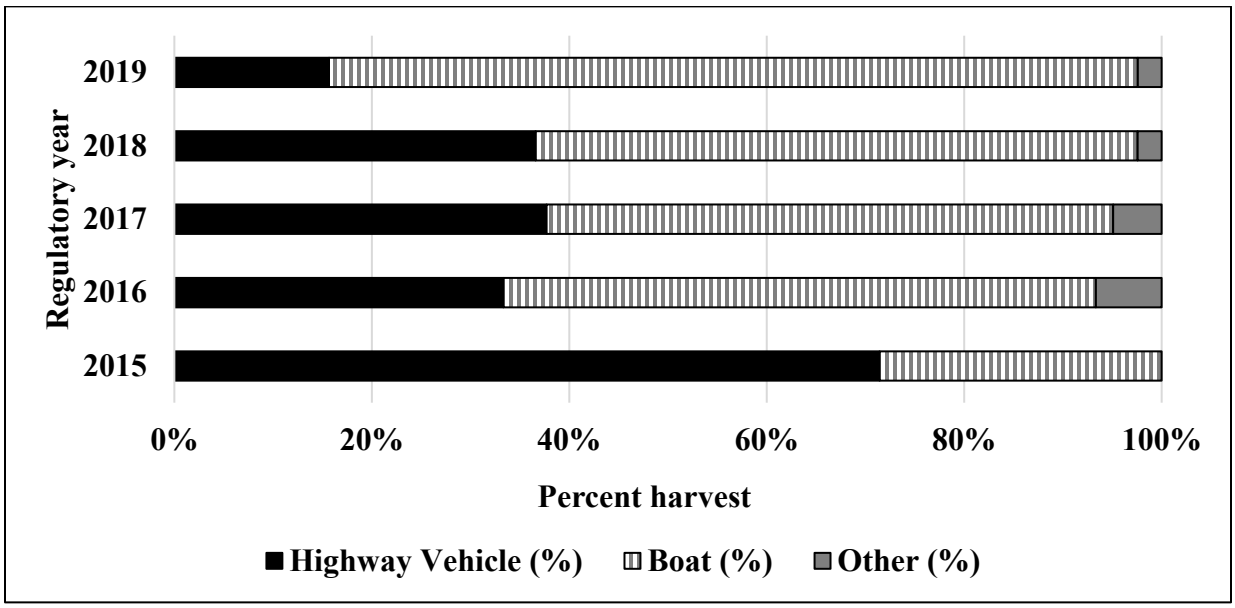

Figure 8. Wolf harvest transportation methods during regulatory years 2015–2019 for Unit 2, Southeast Alaska.

Alaska Board of Game Actions and Emergency Orders

- ADF&G closed the harvest season by emergency order (EO) each year during RY15–RY19 (Table 1).
- At the 2015 meeting, BOG reduced the harvest guideline level from 30% to 20% of the fall population estimate.
- At the 2019 meeting, BOG established a fall population objective of 150–200 wolves for Unit 2. The length of season depended on the previous season's population estimate (Appendix A). Additionally, BOG altered the sealing period from within 14 days of take to within 30 days after the end of the season. State and federal trapping seasons were aligned to open on November 15.

Recommendations for Activity 2.1

Continue sealing wolves in Unit 2, including collecting hunter harvest data and genetic samples from harvested wolves.

ADF&G recommends modifying the sealing period to be within 7 days of take to obtain more accurate locations and dates of harvest. In 2019 ADF&G submitted a BOG proposal to eliminate the 14-day sealing requirement for wolves harvested in Unit 2. As a result of this proposal, sealing requirements reverted to within 30 days of harvest under a hunting license, and within 30 days of the close of the season under a trapping license. Since that change, the department determined that the previous 14-day sealing period provided increased accuracy of harvest dates and locations which increased the precision of population estimates. Accurate population estimates are key to setting annual season length and maintaining the population within the objective range.

3. Habitat Assessment-Enhancement

Habitat was altered during RY15–RY19 through timber sales and precommercial thinning practices. In 2015, USFS issued the first young-growth timber sale on POW. The Dargon Point timber sale was 57.7 acres and estimated at 4,250 million board feet. In 2016, USFS created a plan to a transition away from old-growth logging practices.

Precommercial thinning was performed in some stands and USFS has attempted to add a wildlife component to thinning prescriptions. However, slash remains an unresolved issue associated with thinning practices. Slash creates barriers to wildlife (especially deer, the primary prey of wolves in Unit 2) and due to the additional operating cost, slash is seldom removed. These barriers may last 20–25 years, after which canopy closure again results in loss of understory plants. Extensive clear-cut logging causes thick second-growth stands that last for 150–200 years and lower carrying capacity for deer and subsequently wolf (Brinkman et al. 2011, Alaback 1982, Wallmo and Schoen 1980).

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Wolf management in Unit 2 is a contentious issue. ADF&G trapper questionnaires showed an increase in negative comments regarding Unit 2 wolf management from RY15 (n = 0) to RY19 (n = 12; Parr 2016, Parr 2017, Spivey 2019, Spivey 2020, Bogle 2021). Through these questionnaires, public meetings, and direct public feedback, Unit 2 locals have expressed increasing opposition to the current population estimate methods. They also frequently question the efficacy of the hairboard protocol. Every year, hairboard fieldwork receives minor vandalism (e.g., stolen boards, disturbed node sites) that is likely caused by people who do not support or understand the hairboard effort.

Further, a portion of hunters and trappers seek to reduce the wolf population to aid the deer population. Many harvesters attempt to reduce the wolf population through legal means during established seasons. However, unreported human-caused mortality exists annually at an unknown level. This mortality is difficult to quantify and likely changes on an annual basis. Unit 2 is a large area with an extensive road system making enforcement difficult. Enhanced patrols of Alaska Wildlife Troopers in conjunction with USFS law enforcement has been helpful in enforcing hunting and trapping laws in Unit 2.

ADF&G hosts multiple public meetings a year in Unit 2 to discuss wolf management and biology. These meetings need to be continued to help clarify research and management methods,

and to receive input from the public. ADF&G has created a project plan to help educate all stakeholders on population estimation methods. Department staff are hopeful that these materials will help contribute to a more positive perception of management strategies.

Data Recording and Archiving

ADF&G stores all data digitally, and all historic information is scanned and stored on the Ketchikan Area Office shared drive (S:\Wildlife Specific).

Agreements

Hydaburg Cooperative Association (HCA), USFS, the Nature Conservancy (RY16–RY19), and Craig school groups all aided in fieldwork and data collection. HCA continues to operate another study area to the south of ADF&G to greatly expand the study area. All participants contributed data to the project through formal agreements.

From RY16–RY18 ADF&G had a memorandum of understanding (MOU) with USFS which allowed department staff to stay in USFS bunkhouses. The MOU expired in 2019 and a new agreement has not been finalized yet.

ADF&G has a written agreement with Sealaska Corporation to access their lands in support of hairboard work. The agreement is updated annually, signed by the Ketchikan Area Biologist, and copies of the most recent survey memo are submitted to Sealaska annually.

Permitting

There were no permits required to conduct management activities in Unit 2 during RY15–RY19.

Conclusions and Management Recommendations

The management objective was not met during every regulatory year within this reporting period. Harvest was below the 20% harvest guideline level (HGL) during RY15 (6%) and RY16 (13%) but exceeded the 20% HGL during RY17 (28%) and RY18 (25%). Additionally, annual harvest exceeded the quota during regulatory years 2016, 2017, and 2018. The quota system was insufficient in maintaining harvest objectives and was burdensome to trappers.

BOG changed from an HGL to a population objective range in RY19 for Unit 2 to balance the need for conservation and appease Unit 2 trappers. The department allowed for a 2-month season beginning in RY19. This resulted in a 164-wolf harvest, which is indicative of a larger population. The 2019 wolf population estimate was also above the objective range, but the level of harvest during RY19 was too large to be sustained over multiple years.

With RY19 being the first year of the new management strategy, season length will likely be shortened in future years to account for projected harvester effort. This will likely be necessary to maintain a sustained yield harvest. As the department gathers more information (e.g., number of wolves harvested per week in this management structure), our ability to estimate the harvest for various trapping season lengths should improve. This will inform management decisions such

as setting sustainable season lengths that are adaptive to the previous year's population estimate. The current management strategy and the current population objective should be revaluated after more years of data have been collected.

Unit 2 wolf harvest is a contentious issue that will need to be addressed continually. Sustainable wolf harvest is a top priority for ADF&G and the best science will continue to be used to support management. In addition to reevaluating the population objective and season length criteria, ADF&G should continue to improve the hairboard protocol and analysis of data to continue to decrease the confidence intervals of the population estimate. Samples from harvested wolves will aid the population estimate, but only if harvesters provide accurate harvest locations and dates. A reduced sealing period (e.g., within 7 days of take) will likely help with harvester recall of harvest locations and dates.

II. Project Review and RY20–RY24 Plan

Review of Management Direction

Management Direction

The department will continue to manage for sustainable harvest and nonconsumptive uses of wolves in Unit 2.

Goals

Maintain a wolf population that supports sustainable harvest and viewing opportunities through regulation of hunting and trapping seasons, bag limits, and harvest guidelines.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

The customary and traditional use determination finding for wolves in Unit 2 listed in 5 AAC 99.025 and established by the Alaska Board of Game in 2004 is as follows: 90 percent of the harvestable portion of the Unit 2 wolf harvest.

Intensive Management

There is no intensive management program in Unit 2.

Management Objectives

Maintain a fall population estimate of 150–200 wolves in Unit 2.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Estimate the preseason population of the wolf population in Unit 2 annually.

Data Needs

ADF&G uses a DNA-based spatial capture-recapture model to determine wolf hunting and trapping season lengths for Unit 2.

Methods

Continue to use the same methods used during RY15–RY19 unless new methods are developed. ADF&G in collaboration with the University of Alaska Fairbanks Cooperative Research Unit started a pilot project in 2021 that used an array of trail cameras to estimate wolf density using Space-to-Event and/or Time-to-Event models. A PhD candidate will lead the project and the collaboration will compare the camera-based approach to the spatial capture-recapture model (SECR; Efford et al. 2004) method and evaluate the potential for combining data types to improve the monitoring strategy.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor and document hunter and trapper harvest.

Data Needs

ADF&G uses wolf sealing data to inform management decisions.

Methods

Continue to use the same methods used during RY15–RY19. Modify the sealing requirements to be within 7-days of take.

3. Habitat Assessment-Enhancement

No new activities are anticipated in RY20–RY24. As logging continues, and large tracts of previously logged habitat rapidly convert to second-growth forest, there may be reductions in the carrying capacity for Unit 2 wolves. ADF&G will continue to provide comments on projects that alter habitat.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

ADF&G will store all data digitally, and all historic information will be scanned and stored on the Ketchikan area office shared drive (S:\Wildlife Specific).

Agreements

ADF&G will seek to form a new MOU with USFS to share resources for field work in Unit 2. ADF&G will continue to work with HCA, USFS, Craig school groups, and Sealaska to support the wolf population estimate work.

Permitting

No permitting anticipated.

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Appendix A. ADF&G Unit 2 Wolf Harvest Strategy for RY2019-2021. Last updated March 21, 2019, by Tom Schumacher.

Game Management Unit 2 (Unit 2) is a densely forested island archipelago in southern Southeast Alaska (Figure 1). The unit has a temperate, moist maritime climate and supports high numbers of deer and the highest density of wolves in Alaska. The Unit 2 wolf population is mostly isolated from other wolf populations. The most likely corridor for dispersing wolves to enter or leave Unit 2 is by relatively short swims between islands linking the northeastern end of Prince of Wales Island and Zarembo Island in Unit 3. However, since the 1990s about 60 wolves have been radiocollared in Unit 2, and although those wolves often traveled throughout the unit, none ever left Unit 2. A genetic analysis also suggested very little immigration into Unit 2, about one individual per generation. Because wolves in Unit 2 appear generally isolated from wolves in adjacent game management units, it is appropriate to manage the population using a population objective. Throughout this strategy the term "population objective" refers to the fall (September) population of wolves in Unit 2.

The Alaska Department of Fish and Game (ADF&G) manages deer and wolf populations in Unit 2, and federal subsistence regulations implemented by the U.S. Forest Service (USFS) ensure a rural priority for federally-qualified subsistence users on federal lands, which make up over 70 percent of Unit 2. Management of Unit 2 wolves has been contentious with two Endangered Species Act petitions submitted in 1994 and 2011. Both petitions were found not warranted, but management of this high-profile population remains controversial. Establishing a population objective will clarify goals for this population and provide managers with a bar by which to measure success of their management. Clarifying how management decisions are made in this written strategy will foster a common public understanding of expectations for the population and harvest management.

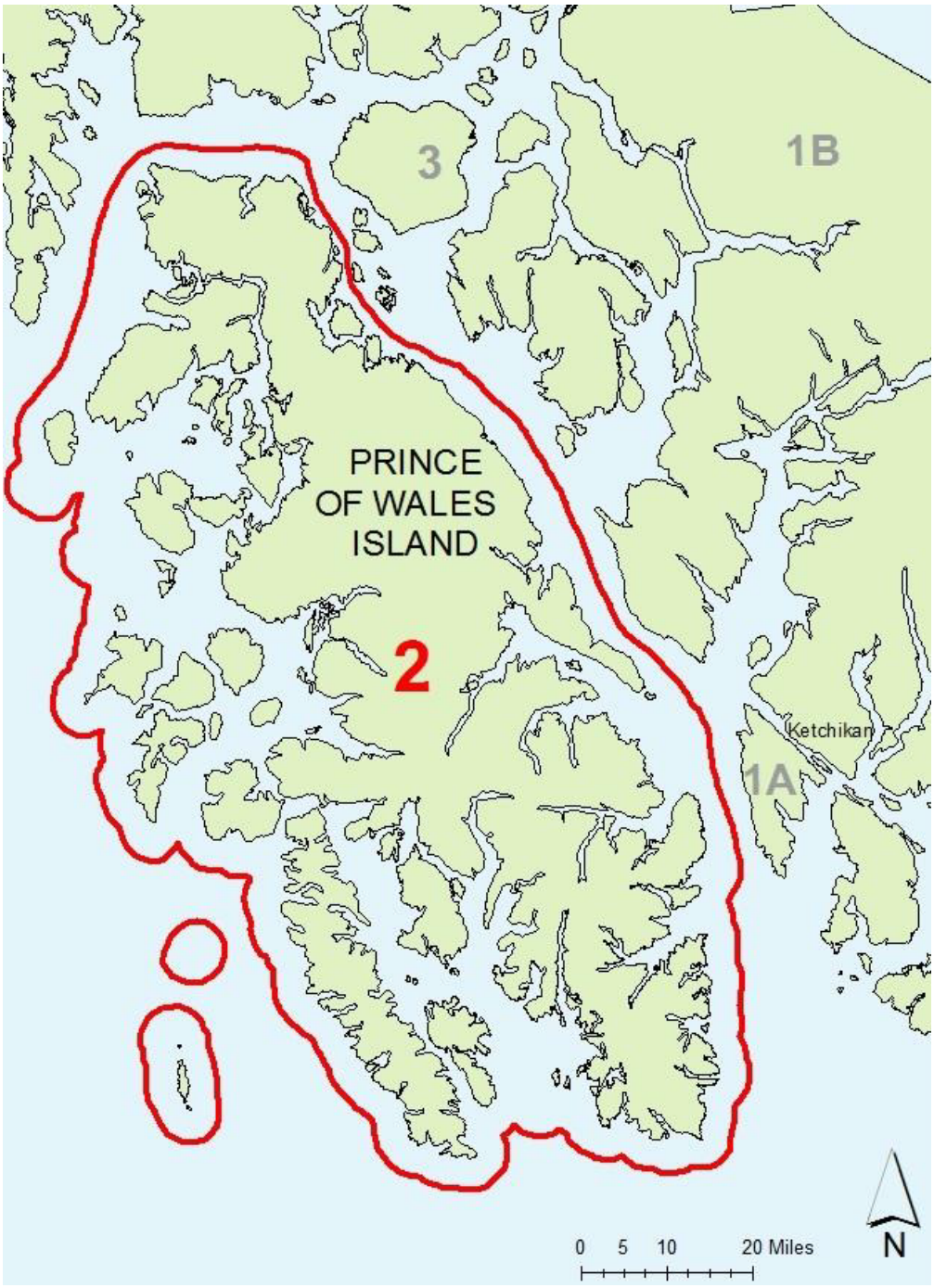

Figure 1. Game Management Unit 2 in southern Southeast Alaska. The Unit is comprised of Prince of Wales and associated islands.

Deer are the primary prey of Unit 2 wolves, but deer are also an important and highly valued species for hunters. Consequently, hunters commonly view wolves as competitors for deer and seek to limit their abundance. Extensive clearcut timber harvest throughout the unit has resulted in a decline in deer habitat capability, and a widespread network of logging roads has greatly

increased access for hunters and trappers. Although ADF&G and the USFS cooperatively manage harvest opportunity, an absence of explicit goals for the Unit 2 wolf population has resulted in ADF&G determining the appropriate size of the population. The department believes it is more appropriate for the public through the Alaska Board of Game (Board) to determine the appropriate size of the population. At the Board's January 2019 meeting ADF&G submitted Proposal 43 requesting guidance on managing the Unit 2 wolf population through endorsement of a new harvest management strategy based on a numerical fall population objective established by the Board. That proposal was adopted by the Board and this harvest management strategy describes the department's plan for managing the Unit 2 wolf population under a Board-established population objective including population thresholds that will trigger changes in harvest management.

A key advance that enables this new management strategy is development of a DNA-based spatially explicit capture-recapture (SECR) method for estimating abundance of Unit 2 wolves. ADF&G has used this method to estimate Unit 2 wolf abundance from 2013 to the present and used those estimates to manage harvest. Although the accuracy of these estimates is questioned by some members of the public, the SECR method is the most objective and conceptually sound way currently available to estimate wolf abundance in a forested environment.

The department will incorporate new population estimation techniques if they are demonstrated to provide more accurate estimates and are practical to apply in Unit 2.

Population Objective

ADF&G recommends that in addition to a fall population objective range the Board also establish numerical thresholds for when the population is (1) below the objective range but can still support some harvest while growing back to the objective range, and (2) too low to support harvest. Each threshold should be accompanied by an explicit change in harvest management. Figure 2 illustrates the fall population thresholds and harvest management changes to maintain the Unit 2 wolf population within the objective range. Last updated March 21, 2019, by Tom Schumacher

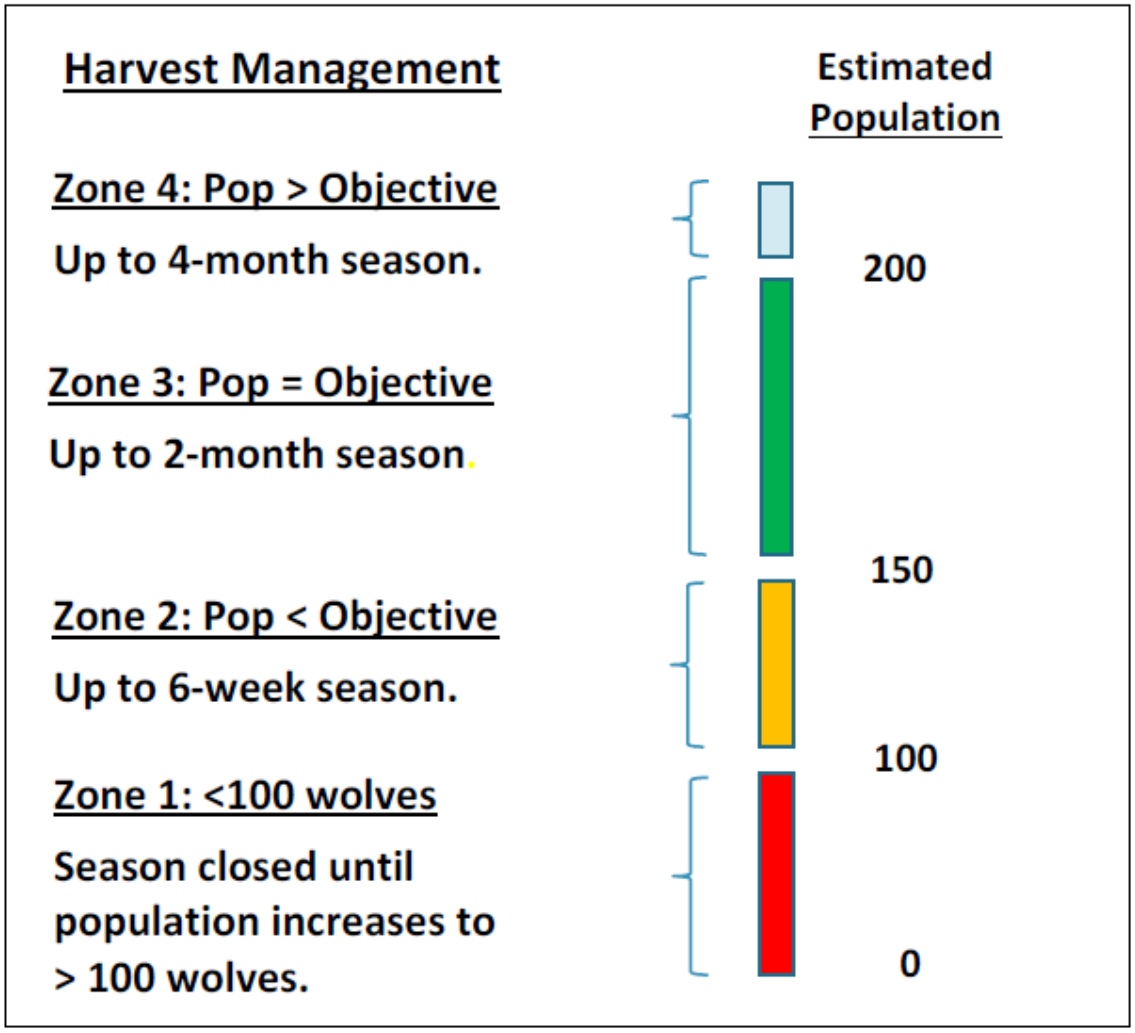

Figure 2. Fall population thresholds and harvest management changes to maintain the Unit 2 wolf population within the Board-established objective range.

Rationales for population thresholds:

Zone 1: Closed Season – When the point estimate (the value most likely to be correct given the data collected) for the most recent fall population estimate is fewer than 100 wolves, hunting and trapping seasons will be closed to encourage growth toward the objective range. Considering the 1-year lag between when data are collected and a population estimate produced (i.e., when managers would learn the population is <100 wolves) that includes an additional trapping season, the department recommends the threshold for closing the trapping season be no lower than 100 wolves. In fall 2014 the department estimated the population at 89 wolves and in fall 2015 it was estimated at 108 wolves. Through conservative harvest management the population rebounded to an estimated 231 wolves within two years. Fall population estimates will be done annually until the population has grown to the Objective Range.

Harvest Management – No harvest. Hunting and trapping seasons closed by emergency order.

Zone 2: **Conservation** – When the fall population is estimated at 100-149 wolves, the department proposes reducing season length to offer some harvest opportunity while allowing the population to grow back to the objective range. The department believes it is important to include this management zone to account for the 1-year lag to produce a population estimate. By adjusting harvest opportunity when the population is within this range managers can prevent the population from declining into the closure range (Zone 1) and allow it to grow back to the objective range (Zone 3). In RY2015 and RY2016 shortened seasons that still offered some harvest opportunity were effective at increasing wolf abundance. Population estimates will be done annually until the population has grown to the objective range.

> **Harvest Management:** Hunting and trapping seasons will open on dates in current regulation. Trapping season will be open for up to 6 weeks. Hunting and trapping season will be simultaneously closed by emergency order. The length of the trapping season will be based on the most recent population estimate and other indicators of trend and abundance. The goal will be for a minimal harvest, less than 20 percent of the estimated population. Trapping season length will be announced by news release prior to the season.

Zone 3: Normal Season – The department recommends a fall population objective of 150-200 wolves for Unit 2. We believe that range will allow ample sustainable harvest and viewing opportunity while limiting effects of predation on deer harvest. When the population is within the objective range population estimates will be conducted as the department determines they are needed.

> **Harvest Management:** Hunting and trapping seasons will open on dates in current regulation. Trapping season will be open for up to two months. Hunting and trapping season will be simultaneously closed by emergency order. The length of the trapping season will be based on the most recent population estimate and other indicators of trend and abundance. The goal will be to allow adequate harvest to maintain the wolf population within the objective range. Trapping season length will be announced by news release prior to the season.

Zone 4: Extended season – When a fall population estimate indicates the population exceeds the objective range (>200 wolves) the department may extend the trapping season to up to 4 months.

> **Harvest Management:** Hunting and trapping seasons will open on dates in current regulation. Trapping season will be open for up to four months. Hunting and trapping season will be simultaneously closed by emergency order. The goal of an extended season will be to reduce the wolf population to the objective range by offering additional harvest opportunity. Trapping season length will be announced by news release prior to the season.

Monitoring Abundance and Trend of the Unit 2 Wolf Population

The department will estimate Unit 2 wolf abundance using the SECR method developed by Roffler et al. (2016) (or a new technique) as often as deemed necessary to ensure the fall population remains within the objective range and harvest is sustainable. However, as Unit 2 hunters and trappers and department staff develop a better sense of what the objective abundance of wolves looks like on the ground, we anticipate being able to use other less intensive methods of monitoring trend, abundance, and distribution of wolves in the unit. We believe one key indicator will be confirming that new animals are being recruited into the population.

Other population monitoring techniques that the department may employ include:

- Arrays of trail cameras to confirm presence, reproduction, and relative abundance of wolves around the unit.
- Collecting foreleg bones to monitor ages (pup, yearling, adult) of harvested wolves.
- Local expert opinion.

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