Species Management Report and Plan ADF&G/DWC/SMR&P–2020–5

Deer Management Report and Plan, Game Management Unit 4:

Report Period 1 July 2011–30 June 2016, and

Plan Period 1 July 2016–30 June 2021

Stephen W. Bethune

2020

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 approved for publication by Thomas Schumacher, Regional Supervisor for the Division of Wildlife Conservation.

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Please contact the authors or the Division of Wildlife Conservation at (907) 465-4190 if you have questions about the content of this report.

Cover Photo: Two velvet antlered bucks feed in an alpine meadow overlooking salt water during an August evening in Southeast Alaska. ©2017 ADF&G. Photo by Stephen Bethune.

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Purpose of this Report

This report provides a record of survey and inventory management activities for deer in Unit 4 for the previous 5 regulatory years and plans for survey and inventory management activities in the 5 years following the end of that period. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY16 = 1 July 2016–30 June 2017). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts, but is also provided to the public to inform them of wildlife management activities. In 2016 the Alaska Department of Fish and Game's Division of Wildlife Conservation launched this 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the deer management reports of survey and inventory activities that were previously produced every 2 years.

I. RY11–RY15 Management Report

Management Area

Game Management Unit 4 encompasses Admiralty, Baranof, Chichagof and adjacent Islands (Fig. 1). It consists of approximately 5,820 square miles of land and over 5,000 miles of shoreline. Approximately 90% of the unit is Tongass National Forest lands. Sitka, located on Baranof Island, is the largest community in the unit with 9,000 residents. Other communities include Hoonah, Pelican, Elfin Cove and Tenakee Springs on Chichagof Island and Angoon on Admiralty Island. All residents of Unit 4 are qualified to deer hunt under federal subsistence regulations.

Northeast Chichagof Island east of Port Frederick and north of Tenakee Inlet is treated separately from the remainder of Unit 4 with a slightly more conservative bag limit (three deer total versus four deer total; Fig. 2). This area traditionally has higher than average (for Unit 4) snowfalls and is highly roaded due to past logging activity.

Unit 4 has three large and one small federally protected wilderness areas. The West Chichagof-Yakobi Wilderness was Alaska's first federally designated wilderness area and was the result of a citizen petition led by Chuck Johnstone. Johnstone co-founded the Sitka Conservation Society in opposition to large scale commercial logging taking place in Southeast Alaska. It encompasses 265,286 acres and includes most of Yakobi Island and the entire west side of Chichagof Island as well as numerous smaller associated islands. The 956,255-acre Kootznoowoo Wilderness is all of Admiralty Island with the exception of the Mansfield Peninsula and Alaska Native Corporation lands on the west shore associated with the village of Angoon. The South Baranof Wilderness is 319,568 acres and encompasses much of the south half of Baranof Island. All three of these wilderness areas were designated by Congress in 1980 as part of the Alaska National Interest Lands Conservation Act. The fourth designated wilderness is the Pleasant/Lemesurier/Inian Islands Wilderness. The 23,151 acres are situated in Icy Straits between the north end of Chichagof Island and Glacier Bay National Park to the north. These islands were designated as wilderness areas by Congress in 1990.

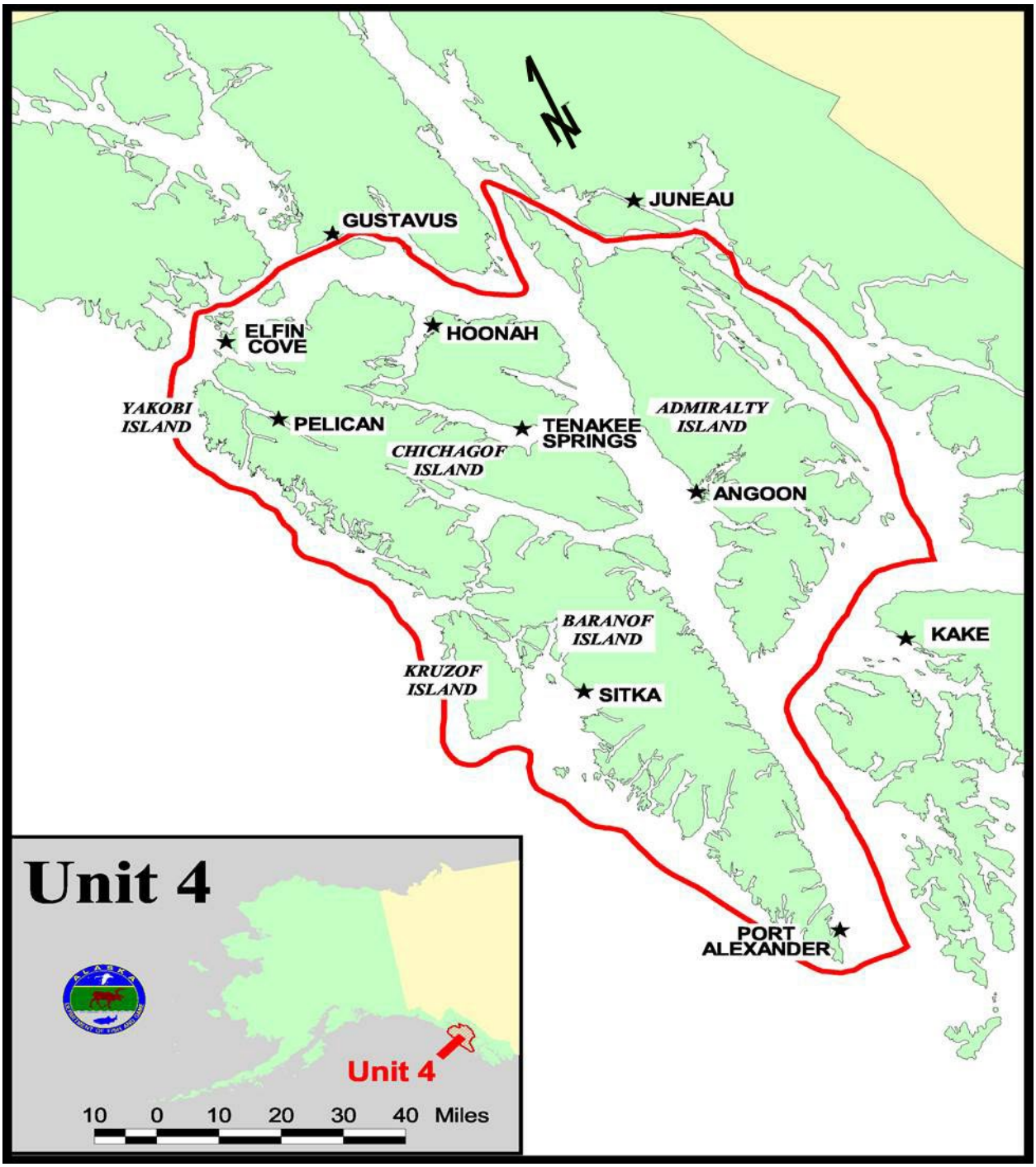

Figure 1. Map of Game Management Unit 4, Southeast Alaska.

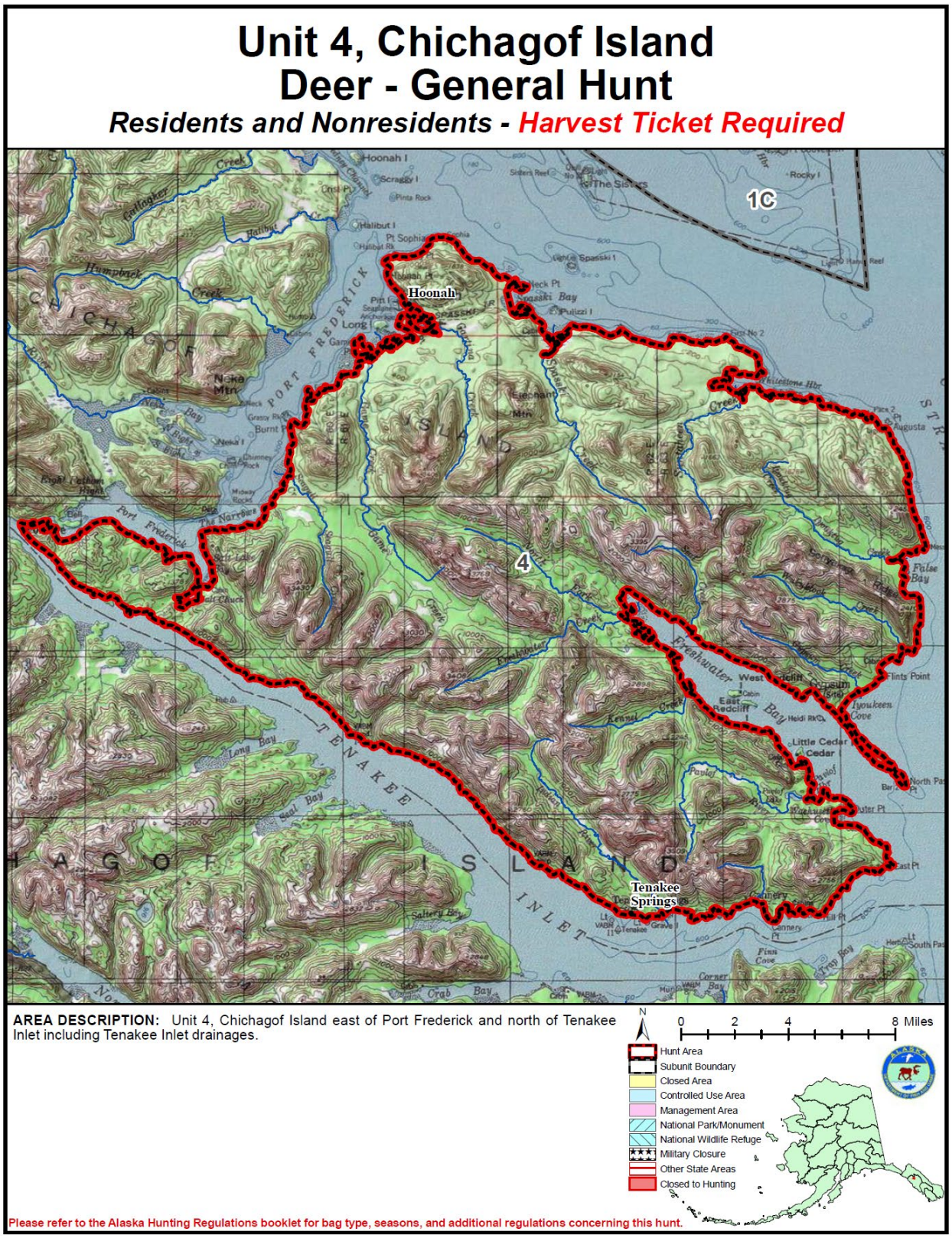

Figure 2. Northeast Chichagof Island Alaska General Deer Hunt Area.

Some of the protections afforded these wilderness areas include prohibitions on commercial enterprises (except guides and outfitters), building new roads, timber harvest, and use of motorized land vehicles (except snow machines) and helicopters.

Unit 4, like most of Southeast Alaska, has a maritime climate with moderate summer and winter temperatures and high precipitation (U.S. climate data 2019). Temperatures range from the mid-30's (Fahrenheit) in the winter to low-60's in the summer. Rainfall in Sitka averages approximately 85 inches per year, but totals are highly variable from year to year and within the unit. For example, Little Port Walter on the southeast coast of Baranof Island, one of the rainiest places in North America, recorded 216 inches of rainfall in 2019 (NOAA weather station data 2020). Sitka averages 33 inches of snow annually, but again, annual snowfall is highly variable across the unit and from year to year. In some years deep and persistent snow can accumulate at sea level in the northern and eastern portions of the unit.

The landscape of Unit 4 is characterized by steep and rugged terrain with mountains, fjords, wetlands, estuaries and short, swift rivers. Elevation within Unit 4 ranges from sea level to 5,328 feet. Predominant vegetative communities occurring at low-moderate elevations (<1500′) are dominated by western hemlock (*Tsuga heterophylla*) and Sitka spruce (*Picea sitchensis*), with western red cedar (*Thuja plicata*) and Alaska yellow-cedar (*Chamaecyparis nootkatensis*) old-growth coniferous forests. Mixed-conifer muskeg and deciduous riparian forests are also common. Mountain hemlock (*Tsuga mertensiana*) dominated forest comprises a subalpine, timberline band between 1,500–2,500 feet elevation. Because of the high rainfall, natural disturbance to the forest occurs via wind-throw events rather than fire.

Unit 4 is relatively isolated from the mainland of Southeast Alaska and supports a limited diversity of land mammals. Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) and brown bears (*Ursus arctos*) are the only large native land mammals. In 1923, mountain goats (*Oreamnos americanus*) were introduced to Baranof Island. However, recent genetic evidence (Shafer, et al. 2011, Shafer et al. 2011, and Shafer et al. 2012) suggests that the island may have supported a vestigial native population at the time of the introduction. Unit 4 supports a high density of brown bears, and brown bears occasionally take both fawns and adult deer. Wolves are absent from most of the unit and are only occasional visitors to Pleasant Island, a small island that supports deer adjacent to the Gustavus Forelands. Winter severity and range condition are thought to limit deer in Unit 4.

Summary of Status, Trend, Management Activities, and History of deer in Unit 4

Sitka Black-tailed deer are native to Southeast Alaska and present throughout Unit 4. Deer are extremely important to local residents for food and recreation and to a lesser extent for the commercial guiding industry. Bucks in Unit 4 generally develop smaller antlers than deer on nearby Prince of Wales Island or on Kodiak Island, so they are not typically targeted by trophy hunters. Nonetheless Unit 4 provides abundant deer hunting opportunity and a greater harvest than any other game management unit in Alaska. Over the past five years approximately 35% of the state-wide deer harvest has come from Unit 4 compared to 26% for Unit 8 (Kodiak Island) and 23% for Unit 2 (Prince of Wales Island; ADF&G WinfoNet).

Significant changes in deer density over time are normal in Unit 4. Periodic declines are attributable to severe winter weather, most importantly deep snow (Olson 1979). Deer populations were low in the late 1940s following years of high winter mortality. By 1956, deer increased to exceed carrying capacity (Klein and Olson 1960). In recent history severe winters appear to be on an 11-year cycle, with intervening mild winters. Most winters in Unit 4 were mild from the mid 1970's through 1987–1988, with high survival of fawns and adult deer. However, during the winter of 1988–1989 persistent deep snow caused significant deer mortality, but that was a short-term setback. A series of mild winters beginning in 1999 and extending through 2005 allowed the population to rebuild to a point where it likely approached or exceeded the habitat capability needed even during a moderate winter (Mooney 2015).

The winters of 2006–2008 set new records for snow depth not only in Unit 4 but throughout much of Southeast Alaska. Based on data collected from aerial surveys, boat-based shoreline condition surveys, mortality surveys, road surveys, as well as anecdotal information from hunters who saw few deer in alpine areas during fall 2007 and 2008, guides, and project crews working in the area, deer mortality on heavily logged northern Chichagof Island was very high, estimated at about 75% by the area management biologist. During late winter and spring of 2007, multitudes of deer were found dead on the beaches and floating in the bays revealing just how devastating the winter had been. Other areas within the unit with more intact natural habitats (i.e. lack of industrial-sized clear-cut logging units) and favorable topographic features didn't appear to be hit quite as hard (Mooney 2015).

The winters of 2009–2010 had substantially less snowfall than the previous 3-year period and significantly fewer deer succumbed to winter mortality. We saw noticeable increases in the numbers of fawns and yearlings during our survey and research work, as did hunters. Above average snowfall with a persistent snowpack extending into early May occurred again in 2011 and 2012. However, it appeared that the snow accumulation was more gradual and allowed deer to maintain open paths from the beach fringe timber and the shoreline.

Most recently, Unit 4 has experienced four consecutive mild winters (winters of 2013–2014 through 2016–2017) and deer are abundant throughout the unit and are likely exceeding severe winter carrying capacity in some watersheds.

Most land in Unit 4 is managed by the U. S. Forest Service, Tongass National Forest. Since 1990, both state and federal subsistence hunting regulations have been in effect on federally managed lands in Unit 4. Regulations adopted by the Alaska Board of Game apply on all lands in Unit 4. The Federal Subsistence Board promulgated regulations that apply only on federal lands and ensure a subsistence priority on those lands, usually through more liberal season dates and bag limits. Although the two sets of regulations were initially similar, they have diverged over time. This dual management authority is a management concern because it confuses hunters and makes enforcement problematic.

During this reporting period the annual state hunting season in Unit 4 was from 1 August–31 December. Prior to 15 September, only bucks may be harvested. The total bag limit is 4 deer except for the extensively roaded northeast portion of Chichagof Island east of Port Frederick and north of Tenakee Inlet, which has a limit of 3 deer. Under federal subsistence regulations,

qualified rural residents may take up to six deer on federal lands and may hunt through 31 January.

Although management actions will always be a secondary and distant factor to weather with regards to the influence on deer populations, hunting can be a limiting factor in local areas when deer are concentrated on beaches due to deep and persistent snowpack (Reynolds 1979). The Department may adjust season and bag limits by emergency order if needed to prevent additive harvest. This was done most recently in 2007 when the harvest of does was restricted in-season for the Northeast Chichagof Controlled Use Area. The Federal Subsistence Board also closed this area to the taking of does. This restriction to help the deer population recover remained in effect through the RY12 hunting season. By RY13, summer deer surveys indicated that deer numbers were sufficient to lift this restriction (Mooney 2015).

Summer and winter home range areas vary from 30–1,200 acres, and for radiocollared deer on Admiralty Island, they average about 200 acres (Schoen and Kirchhoff 1990). For comparison, a National Football League (NFL) football field is 1.3 acres. Migratory deer have larger annual home ranges than resident deer. The average distance between summer and winter home ranges is 5 miles for migratory deer, and half a mile for resident deer. During winter, movement of deer between watersheds appears to be minimal and the distribution of deer at various elevations is heavily influenced by changing snow depth. During extreme snow accumulation, many deer congregate in heavily timbered stands at lower elevations, and some may even move on to the beach where tides melt snow. McCoy et. al (2015) conducted one of the first home range analyses of Sitka black-tailed deer using GPS collars. She found deer on northern Chichagof Island to have mean summer and winter home ranges of 1,179 acres and 459 acres, respectively. Average migration distance between summer and winter ranges was 2.4 miles. However small sample sizes and partial-year data sets for some deer complicate these findings.

Sitka black-tailed deer density estimates on old growth winter range vary widely (10–57 deer/km^2 or 26-148 deer/mi^2); Smith and Davies 1975; Herbert 1979; Brinkman 2009). The best deer estimates to date for Southeast Alaska come from Brinkman et al. (2011), who estimated density using a fecal DNA-based mark-recapture design on Prince of Wales Island. In addition, McCoy et al. (2014) also estimated density using fecal DNA with both mark-recapture and spatial mark-recapture models on northeastern Chichagof Island. Brinkman et al. (2011) estimated 12 deer/km^2 (31/mi^2) in unmanaged (unlogged) forest lands with a range of 8.5–17 deer/km^2 (22-44 deer/mi^2) across all habitat types. McCoy et al. (2014) estimated densities ranging from 4.4 deer/km^2 (11.4 deer/mi^2) to 11.9 deer/km^2 (30.8 deer/mi^2) based on the year and analysis used. In comparison, Kirchhoff (1994) estimated an average density of 35.6 deer/km^2 (92 deer/mi^2) based on pellet group counts. Density estimate techniques using fecal DNA are some of the most advanced applications available to managers and can provide precise estimates but can be expensive, labor intensive and results are only applicable to small areas.

Predation likely has little effect on deer populations in Unit 4. Wolves are absent from Unit 4 with the exception of Pleasant Island near Gustavus. Brown bears occur at high densities throughout Unit 4 and can be effective predators of fawns but less so for adult deer (Zager and Beecham 2006). The effects of clear-cut logging have and will continue to reduce carrying capacity for deer in heavily logged landscapes including northern Chichagof and Baranof

Islands. Illegal hunting likely influences deer abundance in localized areas, generally logged landscapes with road systems that are close to villages.

Pellet group surveys are the most common way trends in deer populations are monitored by ADF&G. Reports from hunters, harvest data, deer harvest reports (which include effort even if no deer are harvested), and general observations also contribute to the overall picture. In some years, aerial surveys, deer body condition surveys and mortality surveys are also conducted. As of 2016, all samples collected from Alaska deer were free of chronic wasting disease.

Management Direction

Existing Wildlife Management Plans

Strategic Plan for Management of Deer in Southeast Alaska, 1991–1995 (ADF&G 1991).

Goals

There are currently no regional goals related to deer.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Harvest

The Alaska Board of Game has made a positive subsistence finding for deer in Unit 4 with an amount necessary for subsistence of 5,200–6,000 deer annually.

Intensive Management

As established by the Alaska Board of Game during its fall 2000 meeting in response to the Intensive Management Of Game Law (AS 16.05.255 (k)(4)), the management goal for deer in Unit 4 is to maintain a population of 125,000 deer and an annual harvest of 7,800 deer (5AAC 92.108).

Management Objectives

- Maintain a population capable of sustaining a mean reported harvest of at least 1.5 deer per hunter.
- Maintain a population capable of providing a minimum reported success rate of 1 deer killed per 4 days hunting effort.
- Maintain the male component of the deer harvest at a minimum of 60%.

Management Activities

Methods for data collection and results for all activities during RY12 and RY13 are in Mooney (2015).

1. Population Status and Trend

ACTIVITY 1.1. Conduct deer pellet group transects

Data Needs

In terms of hunter interest and harvest, deer are by far the most important hunted species in Region I. Monitoring abundance and trend is particularly important for hunted wildlife populations because of the need to set appropriate seasons and bag limits. Pellet-group transects are the most common method used to monitor deer population trends in specific watersheds throughout the unit and region. They are intended to document large changes (>30%) in deer density. The data also permit general comparisons of deer abundance among areas and years (McCoy 2011).

Deer pellets can give a general index of population level. Kirchhoff and Pitcher (1988) recommended the following classifications for Southeast Alaska: <1.00 Mean Pellet Groups/Plot (MPGP) is a low-density population, 1.00–1.99 MPGP is a moderate-density population, and >2.00 MPGP is a high-density population.

Methods

Deer-pellet surveys have been conducted in Region 1 each spring since 1981. Biologists and technicians conduct these surveys by walking a transect line about a mile long, stretching from the beach to the subalpine and counting deer pellet groups in a meter-wide line. Deer defecate with great regularity, 12 times per day on average. Considering this rate as a constant, and that the pellets persist in the environment, it is possible to take information on the number of pellet groups observed and relate that back to the size of the deer herd in a particular area. The same areas are surveyed, so trends can be determined. Biologists consider anecdotal evidence as well as the pellet surveys when evaluating deer population trends.Transects have been established in fixed locations within value comparison units (VCUs) for each game management unit (GMU). VCUs are U.S. Forest Service (USFS) timber management units and are roughly equivalent to a watershed. Selected VCUs usually have three transects. These transects sample deer winter range from sea level to 1,500 feet elevation or 125, 20-meter segments, whichever comes first. Transect locations are chosen based on a number of different considerations, including habitat characteristics, harvest pressure, management concerns, and accessibility. VCUs of higher management concern are monitored on a yearly basis, while others are surveys at longer intervals. Over time the monitoring of some VCUs has been abandoned in lieu of monitoring other VCUs, usually in relation to changes in management concerns or habitat concerns such as logging (McCoy 2011).

We conduct annual pellet-group surveys after snow melt and before vegetation leaf-out, which is usually during late April or early May. Most pellet group transects begin at sea level, at a marked tree or other landmark, and follow a compass line. One member of a team drags a 20-meter long chain along the compass line, and an observer follows counting the number of pellet groups within half a meter on either side of the chain, thereby sampling a plot 20 meters long and 1 meter wide. Mean pellet groups per plot (MPGP) is calculated for each transect and for the VCU. Kirchhoff and Pitcher (1988) provided a detailed discussion of objectives, sample design, and field methodology of this program.

ADF&G and the U.S. Forest Service (USFS) cooperate to monitor the population trend in Unit 4. Historically up to 26 watersheds in Unit 4 have been monitored. These pellet counts were conducted off the live-aboard USFS Sitka Ranger boat. That boat has been decommissioned and as a result, reaching most historical survey areas in Unit 4 will be too difficult and/or expensive to conduct in the future. Surveys are now likely limited to watersheds that can be conducted on day trips with smaller vessels (McCoy 2017).

Results and Discussion

Due to budget restrictions, snow persisting late into the spring, and scheduling conflicts, few pellet surveys were completed during this reporting period. In 2011 surveys were completed at Finger Mountain (Chichagof Island, VCU 247), Kalinin Bay (Kruzof Island, VCU 305) and Nakwasina (Baranof Island, VCU 300). These same three VCU's were also surveyed in 2015 along with Pleasant Island (VCU 185). No surveys were completed in 2012–14.

Pleasant Island was the only VCU surveyed in 2016 due to staff turnover in the Sitka office. For 2017, Finger Mountain, Kalinin Bay, Nakwasina, Range Creek (Baranof Island, VCU 288), Hawk Inlet (Admiralty Island, VCU 128), and Pleasant Island surveys were completed. Realistically, in the future these six transects will be the ones monitored most regularly. These watersheds give us a snapshot of popular hunting locations on all the major islands in Unit 4 as well as Pleasant Island and can all be done in day trips from either Sitka, Gustavus or Juneau.

Pleasant Island will be an interesting VCU to monitor on an annual basis. It is located less than a mile off the Unit 1C mainland near Gustavus. ADF&G crews conducting moose research in Gustavus can easily access Pleasant Island and conduct these surveys with cooperation from National Park service staff from Glacier Bay National Park. Pleasant Island is the only place in Unit 4 regularly visited by wolves. Only in recent years have wolves been documented on Pleasant island in any numbers and the deer pellet survey results and hunter harvests reflect this.

Deer pellet surveys conducted throughout Unit 4 from RY06–RY15 generally mirror what other indicators tell us about the deer population during this time. Severe winters beginning in 2006 and continuing for the next two winters resulted in die-offs, particularly in heavily logged landscapes. Although only a few surveys were conducted, they indicate that following those severe winters the population recovered, peaked again in 2011, and declined slightly by 2015. These results track with other monitoring efforts including discussions with local hunters, harvest reports, incidental observations during mountain goat surveys, mortality transects, and body condition surveys (Figs. 3–6).

Although pellet counts in 2015 declined from 2011 in the four VCUs sampled (Table 1), the 2014–2015 winter was very mild and deer may have been more dispersed on the landscape. In some VCUs confidence intervals overlap between years. Regardless, MPGP counts in Unit 4 remain among the highest in the region (McCoy 2017).

<u>Pleasant Island</u>

Mean Pellet Groups Per plot have declined 91% from 2015–2017 from 1.34 to 0.12. (McCoy 2017). Harvests (combined with Lemesieur Islands) have declined 89% from 112 in 2012, and to 12 in 2015 (ADF&G WinfoNet).

Recommendations for Activity 1.1

Continue.

Table 1. Unit 4 Alaska deer population trends as indicated by spring pellet-group surveys 2011–2015.

Area	Specific Location/VCU[a]	Survey Year	MPGP[b]	95% CI[c]	Number of Plots
Pleasant Island	185	2015	1.34	1.09–1.59	180
		2016	0.37	0.28–0.46	351
Chichagof Island	Finger Mountain	2011	4.13	3.48–4.78	209
	247	2015	1.86	1.58–2.14	197
Baranof Island	Nakwasina	2011	3.87	3.11–4.63	192
	300	2015	2.02	1.71–2.34	207
Kruzof Island	Kalinin Bay	2011	1.58	1.25–1.91	232
	305	2015	1.31	1.08–1.54	219

[a] Value comparison units (VCUs) are US Forest Service timber management units and are roughly equivalent to a watershed.
[b] Mean pellet groups/plot (MPGP).
[c] 95% Confidence Interval.

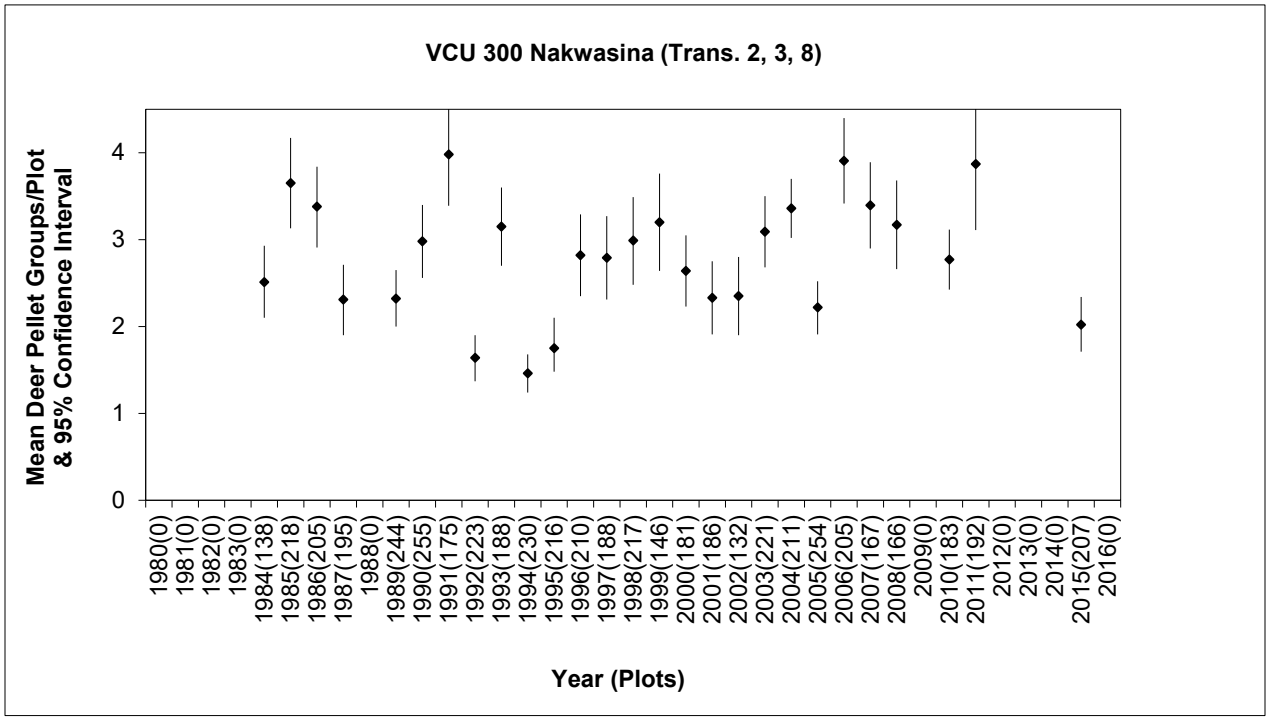

Figure 3. Historical Pellet Survey Results for Nakwasina Value Comparison Unit (VCU) 300.

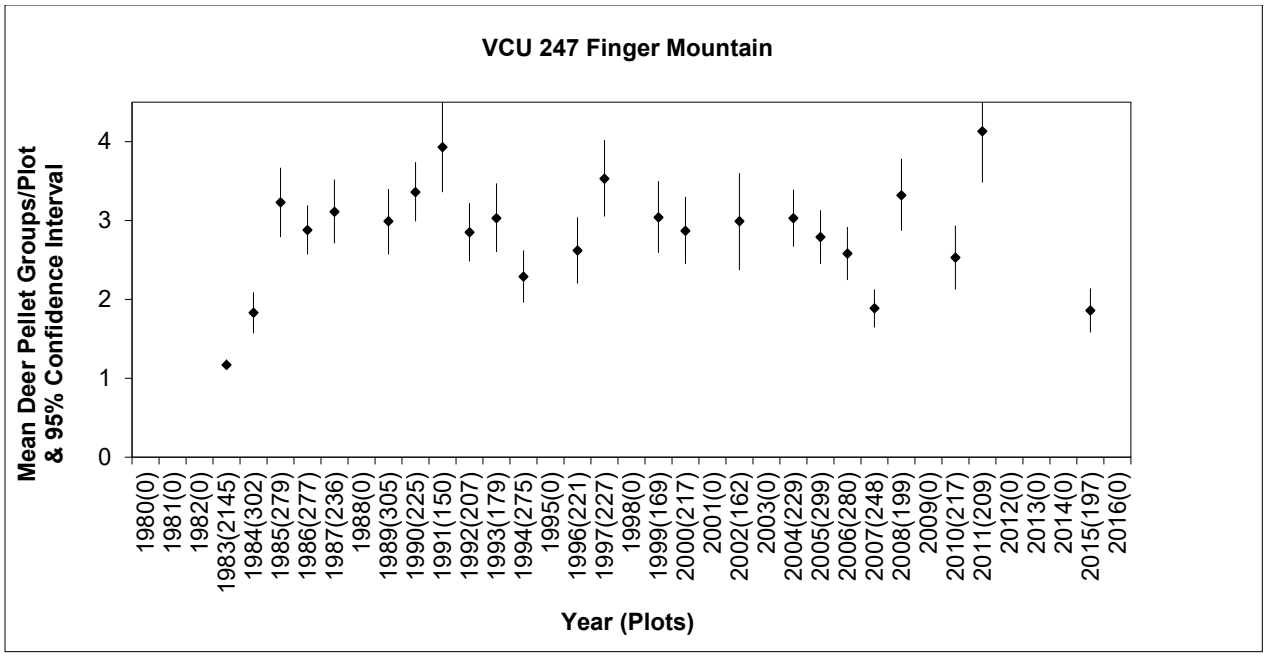

Figure 4. Historical Pellet Survey Results for Finger Mountain Value Comparison Unit (VCU) 247.

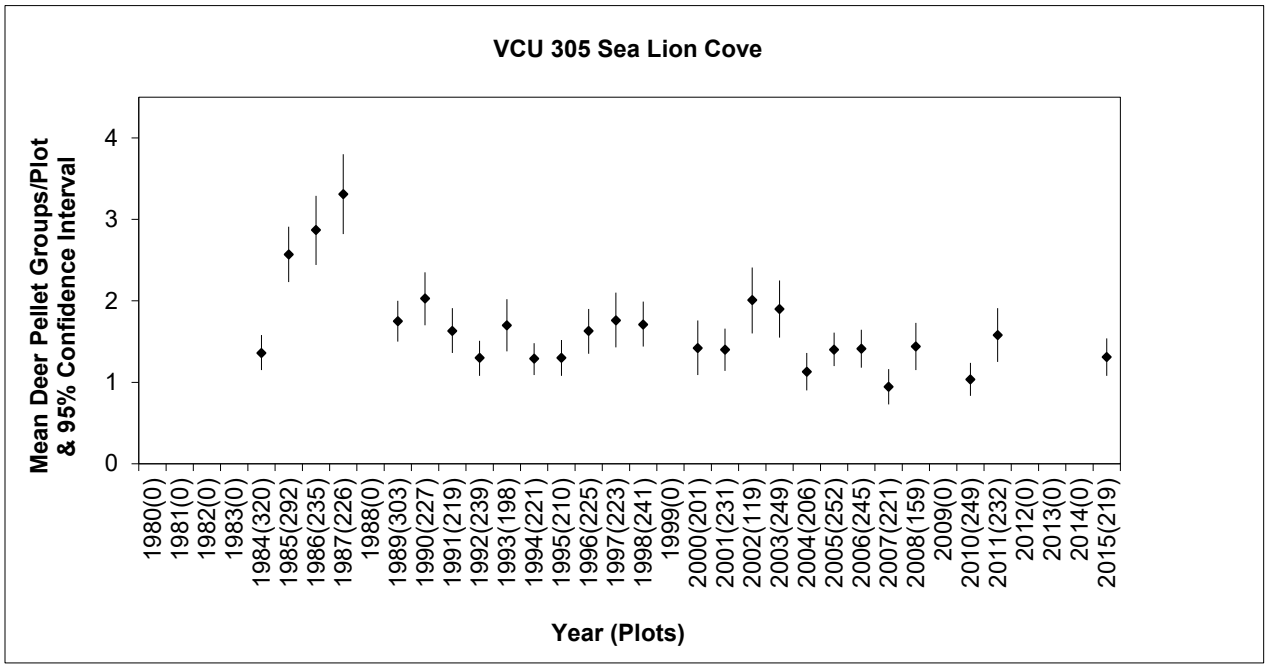

Figure 5. Historical Pellet Survey Results for Sea Lion Cove Value Comparison Unit (VCU) 305.

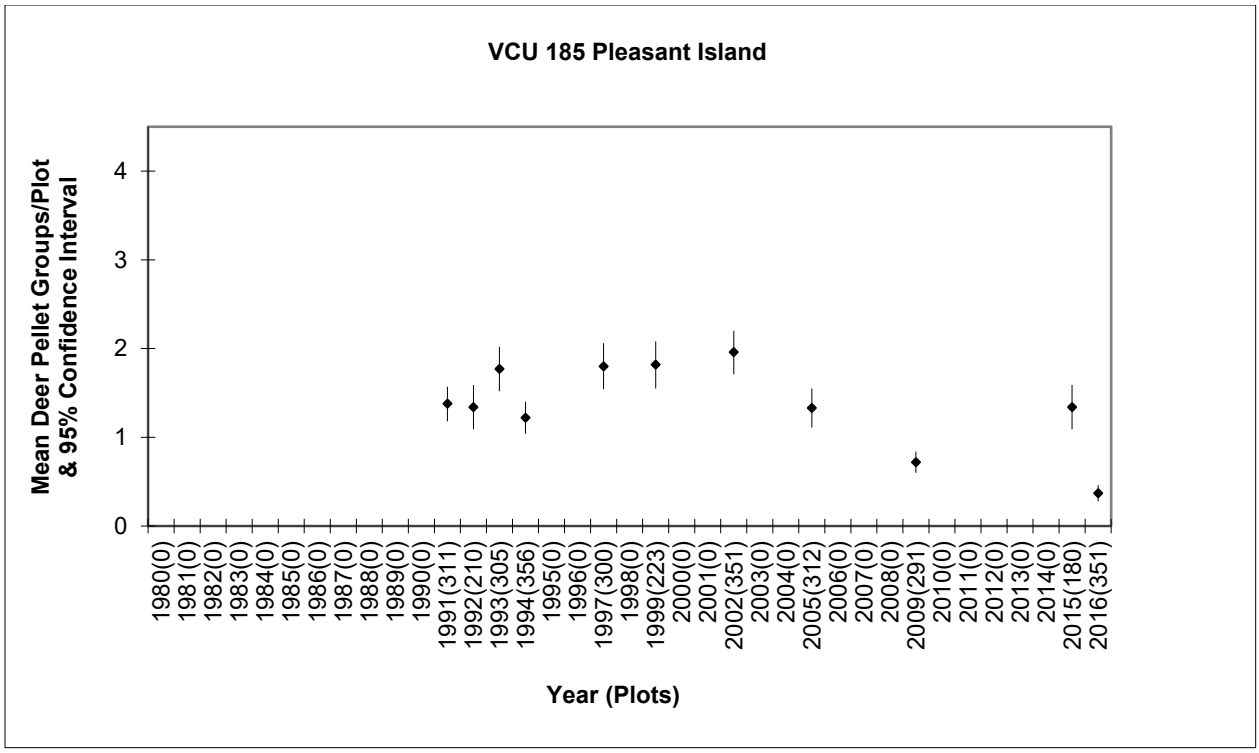

Figure 6. Historical Pellet Survey Results for Pleasant Island Value Comparison Unit (VCU) 185.

ACTIVITY 1.2. Body condition surveys.

Data Needs

During winter 1998 ADF&G developed methods to document the body condition of deer that were physiologically stressed due to severe winter conditions. Deer avoid deep snow by concentrating on beaches. Taking advantage of this we established specific boat routes to visually monitor the body condition of deer. These shoreline surveys give managers a way to quantifiably measure the effects of winter severity on deer. It allows us to note mortalities on the beach and go ashore to collect information on snow depth and condition of the habitat (levels of browsing). Body condition surveys provide a quantifiable index of winter severity for the deer population. Although other information collected during surveys is often anecdotal, it provides the manager with a sense of the state of the deer population and enhances credibility with the public.

Methods

Travelling 3–4 mph, deer are observed with high powered optics. The boat operator attempts to get as close as possible to deer without harassing them and forcing them to leave the beach. General counts are obtained as well as composition. Deer are classified according to the following scale:

0. Dead. Observation should be accompanied by necropsy report or notes.

1. Animal may be unwilling or unable to stand. Ribs visible through coat.

2. "Humped" appearance, may be "shaky" in hind limbs when walking. Animal may be somewhat lethargic. Often hesitant to leave beach. Hips noticeably angular at anterior pelvis. Hair often showing patches of disarray or missing patches of hair. Some posterior ribs may be visible.

3. Hair usually patchy. Some angled appearance of hips when viewed from the side. When viewed from rump, backbone visible.

4. Rounded hips, sleek coat. May have "breeding patches" of missing/scuffed hair. Very alert.

5. Fat. Classification usually reserved for late summer/early fall.

U. Unclassified. Used when any particular animal is too far away to be accurately classified or has departed the beach fringe before classifying. Still should be recorded.

Body condition ratings can also be applied to deer opportunistically during other survey and inventory activities such as ground based mortality surveys, traditional pellet transect surveys and incidental to travel for various management activities.

Results and Discussion

Shoreline body condition surveys were conducted during RY12 and RY13. Survey areas included north of Sitka, Peril Strait, west Admiralty Island, Tenakee Inlet, and Freshwater Bay. In those two years we classified 444 and 481 deer, respectively. Mean condition of deer seen during both of those surveys was 4.4, indicating that winters had been mild and that most deer came through winter in excellent condition (Mooney 2015).

Recommendations for Activity 1.2

Continue.

ACTIVITY 1.3. Winter beach mortality surveys.

Data Needs

Winter severity is believed to be the major limiting factor for deer in Southeast Alaska (Merriam 1968, 1970). Over-winter mortality and survival of deer is important for managers to assess.

Several methods have been used to attempt this, including fall aerial surveys in the alpine, winter and spring aerial and boat-based composition surveys on beaches, and beach mortality transect surveys. Of these methods, ADF&G wildlife biologists historically believed that the beach mortality transects were the method that provided the most consistent assessment of winter mortality.

Mortality transects for deer along beaches in Southeast Alaska were first conducted by Sigurd Olson in 1952 (Wallmo and Schoen 1979), who had estimated that 90% of winter-killed carcasses were found on or near the beach (Klein and Olson 1960). Mortality transects were established in fixed locations to enable biologists to make comparisons between years, and in many areas, surveys were conducted on transects for several decades, most commonly in Unit 4. Because Kirchhoff (1989) found them to be a relatively insensitive indicator of population trend, in recent years beach mortality transects have been conducted primarily to investigate mortality resulting from severe winters.

Methods

Beach mortality transects are conducted based following protocols:

Transects are usually a mile long and require two observers. One observer searches the area between the high-tide line and the beach fringe, and the other searches the area just inside the beach fringe. Observers stay in communication to assure the area is completely surveyed, to notify each other of mortalities encountered, and to avoid double counting in areas where carcasses are scattered.

Observers record the number of bones present, the condition of the marrow in long bones (red or pink indicates malnutrition), the age-class of the animal (adult or fawn) as determined by the size of the bones and/or the teeth in the jaw (cementum age/Servinghaus (1949) technique), and the sex of the animal (skull/pelvis). The proportion of adult males, adult females, and fawn mortalities gives an indication of winter severity. Usually fawns die first, followed by adult males, and then adult females. Winters with a higher proportion of adult doe mortalities are considered more severe. Any information that cannot be determined is marked as unknown.

Mortalities that occurred prior to winter are noted but not counted in the over-winter mortality. Old kills will be hollow and dry with bones that are clean or bleached and will smell diminished. Hunter-killed deer are also noted in comments, but not counted in the over-winter mortality. Hunter-killed deer can be identified by some or all of the following characteristics: leg bones missing, evidence of sawing or cutting bones, skull cap or skull missing, found at camp site, rope or cord near carcass, bone marrow firm and white, and/or bullet holes). White solid bone marrow indicates the animal was healthy and could have died due to hunter harvest, predation, falls, drowning, or other causes.

Results and Discussion

During this reporting period, beach mortality transects were completed in both spring 2012 and spring 2013 and tallied 0.1 mortalities/mi in both years. Prior to that, surveys were completed in 2008 and 2009 and tallied 0.15 and 0.88 mortalities per mile, respectively. For comparison,

following the record-setting snows of winter 2006–2007 spring mortality surveys found 3.8 mortalities/mile (Mooney 2015).

Recommendations for Activity 1.3

Continue.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Quantify and analyze harvest data.

Data Needs

With a positive customary and traditional finding and a corresponding ANS established, as well as intensive management objectives, harvest must be assessed to evaluate the achievement of these goals. Harvest data also helps managers determine if management objectives are being met such as deer per hunter, hunter effort, and sex ratio of harvest.

Methods

Harvest data are summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY12 = 1 July 2012–30 June 2013). Prior to RY11 we estimated deer harvest from responses to questionnaires mailed to a random sample of 33% deer hunters who were issued harvest tickets. Since RY11, hunter effort and harvest data has been collected through mandatory harvest reports. The average state-wide reporting rate is about 70% but varies by community with lower reporting rates in many rural communities. These data are stored on ADF&G's internal Wildlife Information Network (WinfoNet).

Results and Discussion

Season and Bag Limit

The state season for resident and nonresident hunters is 1 August–31 December. The resident and nonresident bag limit is 4 deer. Female deer can be taken beginning September 15. On Chichagof Island east of Port Frederick and north of Tenakee Inlet the bag limit is 3 deer.

On federal lands in Unit 4, federally qualified hunters may hunt through 31 January and have a bag limit of 6 deer, with take of does allowed beginning 15 September.

Hunter Harvest

Harvest levels generally reflect current population levels. For example, harvest dropped from 7,903 deer in RY06 to 1,932 in RY07 due to record snowfalls in the winter of 2006–07. This resulted in mortality estimates of up to 80% in parts of the unit (Mooney 2015). The number of hunters also dropped significantly from 2006 to 2007 (35% from 3,454 to 2,185 hunters) because hunters were aware of the high die-offs the previous winter and chose not to hunt, thinking that populations were too low to be worth the effort and expense. Harvests can also fluctuate based on cold snaps and/or snowfall events that although not necessarily limiting, make deer more vulnerable to hunters. Harvests during this reporting period (Table 2) were variable but generally indicate a population that has fully recovered from the severe winters of 2006–2008. Shoreline

habitat in some watersheds show evidence of heavy browsing that indicates that deer herds have likely reached carrying capacity.

The 5-year average (RY11–RY15) harvest of deer by area indicates that Chichagof Island (1,940 deer) yields the highest harvest of deer followed by Baranof Island (1,689 deer) and Admiralty (1,548 deer; Table 2).

Bucks comprised more than 70% of the harvest during each year of this reporting period. Despite ADF&G promoting the take of female deer due to concerns of overutilization of winter habitat, hunters continued to harvest 73% to 79% bucks unit-wide (Table 2). Juneau residents hunting on Admiralty Island took the highest proportion of does.

It is important to note again that in 2011 ADF&G's method for estimating hunter effort and harvest changed from a mail-out survey to mandatory harvest reporting. Although reporting is mandatory for anyone who acquired harvest tickets, the Board of Game never adopted an enforcement mechanism. Consequently, there is no penalty for not reporting. During the report period the state-wide reporting rate for deer hunters ranged from about 60% to 70%. However, reporting rates in smaller rural communities were often much lower, sometimes less than 30%. To account for effort and harvest by hunters who did not report, data from hunters who did report are expanded. Because hunters who live in the same community likely have the most similar hunting habits, data are proportionally expanded by community of residence. In small communities with low reporting rates, expanded data may be based on the reports of only a handful of hunters, which results in a good deal of uncertainty about the expanded data.

Hunter Residency and Success

Deer hunters enjoyed high success rates during this reporting period, ranging between 63% (RY 14) and 79% (RY11) with an average of 70% (Table 3). Weather during deer hunting season can significantly affect hunter numbers and effort. The high success rates of RY11 are likely attributable to early snowfalls, which concentrated deer on beaches and made for relatively easy hunting conditions. In all years, success rates of local hunters exceeded nonlocal hunters and success rates of nonlocal hunters exceeded nonresident hunters. Nonlocal hunters make up the largest segment of Unit 4 hunters (~53%) due to the high number of Juneau hunters who hunt nearby Admiralty Island. Nonresident hunters make up just a small fraction (~5%) of the Unit 4 hunters. Unit 4 likely attracts fewer nonresident hunters because it is not known for producing trophy caliber bucks compared to places such as Kodiak and Prince of Wales Island.

Table 2. Unit 4 Alaska deer harvest, RY11–RY15.

Area	Regulatory year	Estimated legal harvest[a] M	(%)	F	(%)	Total	Estimated illegal/ unrecovered harvest[a]	Total
Unit 4 Total								
	RY11	5,165	(75)	1,743	(25)	6,909	1,727	8,636
	RY12	3,811	(79)	1,041	(21)	4,853	1,213	6,066
	RY13	3,948	(73)	1,462	(27)	5,409	1,352	6,761
	RY14	3,549	(76)	1,145	(24)	4,694	1,174	5,868
	RY15	4,830	(74)	1,675	(26)	6,505	1,626	8,131
Admiralty Island								
	RY11	1,208	(69)	543	(31)	1,751	438	2,189
	RY12	1,124	(75)	383	(25)	1,507	377	1,884
	RY13	1,010	(69)	459	(31)	1,469	367	1,836
	RY14	929	(76)	300	(24)	1,229	307	1,536
	RY15	1,327	(74)	455	(26)	1,782	496	2,278
Baranof Island								
	RY11	1,743	(71)	718	(29)	2,460	615	3,075
	RY12	959	(75)	315	(25)	1,274	319	1,593
	RY13	1,068	(74)	377	(26)	1,445	361	1,806
	RY14	1,018	(75)	346	(25)	1,364	341	1,705
	RY15	1,366	(72)	535	(28)	1,901	475	2,376
Chichagof Island								
	RY11	1,862	(86)	301	(14)	2,162	541	2,703
	RY12	1,369	(85)	237	(15)	1,605	401	2,006
	RY13	1,461	(76)	466	(24)	1,927	482	2,409
	RY14	1,353	(79)	356	(21)	1,709	427	2,136
	RY15	1,776	(77)	520	(23)	2,297	574	2,871

[a] Estimated to be 25% of reported total.

Table 3. Unit 4 Alaska deer hunter residency and success RY11–RY15.

Regulatory year	Successful Local resident[a]	Nonlocal resident	Non resident	Total	(%)	Unsuccessful Local resident	Nonlocal resident	Non resident	Total	(%)	Total hunters
RY11	1,171	1,208	106	2,485	(79)	194	423	55	672	(21)	3,157
RY12	944	1,026	79	2,049	(66)	350	619	85	1,054	(34)	3,103
RY13	959	1,200	111	2,270	(70)	327	566	85	978	(30)	3,248
RY14	943	1,104	101	2,148	(63)	432	767	88	1,287	(37)	3,435
RY15	1,269	1,347	130	2,746	(74)	347	571	69	987	(26)	3,733

[a] Resident of Unit 4.

Harvest Chronology

Most Unit 4 hunters target their effort and harvest toward the latter part of the season. About half the total harvest takes place during November and about three quarters during November and December (Table 4). Most hunters prefer the November–December time period because the rut occurs during November, making bucks more vulnerable to harvest. Other factors influencing when people hunt likely include the lower probability of encountering brown bears in November and December and that snowfall can concentrate deer at lower elevations. Although all Unit 4 residents are federally qualified subsistence users, less than 4% of the annual harvest occurs during the extended January portion of the federal subsistence season.

Table 4. Unit 4 Alaska deer harvest chronology percent by month RY11–RY15.

Regulatory	Harvest period						
year	Aug	Sep	Oct	Nov	Dec	Jan	*n*
RY11	5	5	9	56	19	6	6824
RY12	4	5	10	41	36	5	4821
RY13	4	5	10	43	34	3	5384
RY14	7	8	16	49	17	4	4672
RY15	6	9	16	46	21	2	6479

Transport Methods

Unit 4 has very little road accessible hunting areas with the exception of the NE Chichagof Controlled Use Area, so it is no surprise that nearly 80% of the annual Unit 4 harvest is by boat-based hunters (Table 5). Other modes of transportation include airplane, ATVs, highway vehicles and by foot, but rarely is one of these transport modes associated with more than 10% of the annual harvest.

Table 5. Unit 4 Alaska deer harvest percent by transport method, RY11–RY15.

	Percent of harvest						
Regulatory year	Airplane	Boat	ATV	Highway vehicle	Foot	Unknown/ other	*n*
RY11	6	84	2	3	3	3	6,909
RY12	9	77	2	8	2	2	4,853
RY13	6	82	2	7	2	<1	5,409
RY14	10	72	3	12	3	<1	4,694
RY15	9	76	3	9	3	<1	6,505

Hunter Effort

Two of our three management objectives relate directly to hunter effort, deer per hunter and hunter days per deer. Deer per hunter ranged from 1.3 in RY14 to 2.2 in RY11 and averaged 1.7 for the reporting period (Table 6). We met or exceeded this objective during four out of five years. Days per deer ranged from 2.0 (RY11) to 2.9 (RY14) and averaged 2.4 days per deer, meeting the management objective of one deer for every 4 days of hunting effort.

Table 6. Unit 4 Alaska deer hunter effort, RY11–RY15.

Regulatory year	Total hunters	Successful hunters	Total hunt days	Successful hunter days	Deer/ hunter	Deer/successful hunter	Days/hunter	Days/deer
RY11	3,178	2,505	14,020	11,654	2.2	2.8	4.1	2.0
RY12	3,136	2,065	12,214	8,500	1.5	2.3	3.9	2.5
RY13	3,331	2,333	13,094	9,929	1.6	2.3	3.9	2.4
RY14	3,442	2,150	13,815	9,522	1.3	2.2	4.0	2.9
RY15	3,742	2,753	15,183	12,053	1.7	2.4	4.1	2.3

Other Mortality

Although big game may be hunted from boats throughout much of the state, that practice is illegal in Southeast Alaska (Units 1–5) without a Disabled Hunter Permit. Deer commonly forage on beaches and are often undisturbed by boats. Therefore, some hunters ignore the regulation and take their chances at being cited. Shooting from a boat can result in high crippling rates and loss of deer. Every year the Alaska Wildlife Troopers cite people for shooting from their boat, but law enforcement is insufficient to fully discourage the practice. Rates of deer mortality resulting from wounding loss, unreported or illegal take, predation by brown bears, and diseases and parasites are difficult to estimate, but we have assigned a rate of 25% of the reported harvest for these other sources of mortality (Whitman 2003). These other sources of mortality are thought to have little influence on the population compared to severe winters.

Game Board Actions and Emergency Orders

Following the record-setting deep snow winter of 2006–07 and high deer mortality, in 2007 the harvest of does was closed by emergency order for the Northeast Chichagof Controlled Use Area. The Federal Subsistence Board also closed this are to taking does. This restriction to help the deer population recover remained in effect through the RY12 hunting season. By RY13, measures of deer abundance suggested that deer numbers were sufficient to again allow harvest of does in this area (Mooney 2015).

Recommendations for Activity 2.1.

Continue

3. Habitat Assessment-Enhancement

Since the 1960s land in Unit 4 including those managed by the U.S. Forest Service and Alaska Native corporations on northern Baranof, northern Chichagof, and portions of Admiralty Island have been subject to commercial clear-cut timber harvest. Clear-cutting can initially result in an abundance of forage. However, 25–35 years after timber harvest occurred, the regenerating trees shade out forage species. For decades to follow the result is harvested stands that retain little value for deer. Most clear-cuts in Unit 4 have reached the stem-exclusion stage where understory species have been shaded out, and the ability of those lands to support deer has declined. Networks of logging roads have also been built in support of the timber industry which greatly increased hunter access to the interior of islands, particularly when connected to a community.

Deer densities in some portions of Unit 4 are expected to decline in the long term due to habitat alteration caused by commercial logging. Kirchhoff (1994) pointed out that following clear-cut logging browse availability initially increases but then declines for a prolonged period as forest regeneration progresses. He also noted that snow accumulation in clear-cut areas during severe winters precludes use by deer, resulting in potential starvation mortality. Farmer and Kirchhoff (1998) reiterated that differences in habitat use and mortality may be attributed to forage abundance and availability (Wallmo and Schoen 1980, Farmer et al. 2006), nutritional quality (Hanley et al. 1989), snow (Kirchhoff and Schoen 1987), and predation risk (Kirchhoff 1994). Second-growth thinning may be able to delay the decline in browse availability that takes place during succession changes, but no mechanisms exist to restore old growth forest structure on deer winter range other than natural regeneration, which may take several hundred years.

No habitat assessment or enhancement activities were conducted by ADF&G in Unit 4 during this reporting period.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

All records related to deer pellet group transects, harvest tickets, and hunter reports are archived on network servers in the Douglas, Region I office. Original data sheets are filed in the Douglas area office.

Records related to alpine surveys, mortality transects, and body condition surveys are saved to the regional shared drive (network/dfg.alaska.local/DWC/Douglas/Region1shared-DWC/Offices/Sitka). Original data sheets are filed in the local Sitka area office.

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

Under Intensive Management law (AS 16.05.255) our mandated population objective is 125,000 deer and annual harvest objective is 7,800 deer. Because we have no estimate of population size, that objective is, at best, an educated guess at the number of deer required to support human needs. Obtaining a population estimate has not been identified as a priority because of the survey challenges associated with finding and counting forest dwelling animals. However, based on all the information available to us at this time we believe the Unit 4 population is high, near carrying capacity, and sufficient to meet human needs.

During this reporting period harvest only approached the harvest objective of 7,800 deer once when an estimated 6,921 deer were harvested in RY11. The current harvest objective appears unrealistically high, being met only once in the last 30 years (ADF&G WinfoNet). Other management objectives have been consistently met during this reporting period.

Our survey methods (traditional pellet surveys, mortality transects, and body condition surveys) along with harvest reporting seem adequate to monitor and manage deer at a gross level. We are optimistic that aerial alpine surveys can be an effective tool, and we encourage further research to better understand how the number of deer seen during alpine surveys relates to abundance and trend of the larger population.

Although hunting may have localized effects on deer abundance adjacent to roads and certain beaches, the relatively low human population, lack of extensive road systems, and light predation result in low mortality. As a result, the Unit 4 population is primarily regulated by habitat

capability and winter severity. Currently deer populations throughout Unit 4 are at high densities and may exceed severe winter carrying capacity in some watersheds.

II. Project Review and RY16–RY20 Plan

Review of Management Direction

MANAGEMENT DIRECTION

GOALS

- Manage for high sustainable harvest opportunity that to the extent possible prevents deer from damaging winter range, commonly defined as productive old-growth forest below 800 feet elevation with some southerly aspect.
- Following winters with high mortality, reduce harvest, particularly of does, to rebuild the population while maintaining reasonable harvest opportunity.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game has made a positive subsistence finding for deer in Unit 4 with an amount necessary for subsistence of 5,200–6,000 deer annually.

Intensive Management

At this time we do not recommend any changes to the current management direction. However, we do recommend re-evaluating and updating the IM population and harvest objectives in 5AAC 92.108 to figures that reflect reasonable population size based on habitat capability and harvest levels achieved within the last decade.

REVIEW OF OBJECTIVES

The current objectives to maintain a population capable of sustaining a mean reported harvest of at least 1.5 deer per hunter, a minimum reported success rate of 1 deer killed per 4 days hunting effort, and at least 60% bucks in the harvest are reasonable and regularly achieved. However, we believe the population and harvest objectives should be reviewed and revised.

REVISED MANAGEMENT OBJECTIVES

Unit 4:	Plan Objective
Population objective	None
Annual harvest objective	10-year running average
Average deer per hunter	1.5 deer
Hunter effort per deer	4 days/deer harvested
Sex composition of harvest	60% bucks

During a June 2017 deer summit of Region 1 and 2 deer biologists and managers, staff from across the state expressed frustration at Intensive Management population and harvest objectives. The current Unit 4 population objective of 125,000 deer represents a density of 21.5 deer/mi^2 throughout the entire land area of the unit (~5,820 km^2). In reality, a considerable portion of Unit 4 is not suitable deer habitat, especially during winter. Consequently, meeting the current population objective would require carrying a very high and probably unsustainable density of deer in suitable habitat. Further, ADF&G has few options for influencing deer abundance. Brown bears, the only predator inhabiting most of Unit 4, are thought to have little effect on deer abundance, and there is considerable uncertainty about the value of thinning or other habitat enhancement techniques for improving stem-exclusion second-growth forest as habitat for deer. Population objectives for deer in Southeast Alaska are also unverifiable because managers have no way of estimating abundance relative to objectives. Until a reliable and feasible method for estimating deer abundance is developed, we recommend eliminating the population objective.

Estimated total deer harvest has only met the current annual harvest objective of 7,800 deer once in the past 30 years, and that objective appears unrealistically high. Harvest is related to deer abundance and hunter effort. Through RY10 deer harvest was estimated using surveys mailed to 35% of deer hunters. Since RY11 total harvest estimates have been based on mandatory harvest reports. Statewide about 70% of hunters turn in harvest reports, so harvest by hunters who did not report is estimated by proportional expansion of data from hunters who did report. The accuracy of this estimated harvest is unknown. It is also possible that with the addition of illegal or unreported take and wounding loss that total deer mortality resulting from hunting exceeds the current harvest objective (Table 2). We currently add 25% to estimated reported take to account for illegal take and wounding loss but have no way of quantitatively estimating mortality resulting from those causes.

Beyond encouraging hunters to take full bag limits, managers have few options for increasing harvest to meet the current objective. Therefore, we recommend developing a new harvest objective based on a 10-year running average of estimated harvest. Using that method during the RY11–RY15 reporting period would have resulted in harvest objectives ranging from 5,078 to 5,540 deer and those objectives being exceeded twice, nearly met once, and unmet twice. Average annual harvest during the report period was 5,693 deer. Using a running average, rather than a static number, would also automatically adjust the annual objective for effects of severe winters and declining habitat value in managed forest stands.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor abundance of deer in selected watersheds using annual deer pellet group transects.

Data Needs

No change.

Methods

No change. We recommend continuing this activity. In the future, if another option for a live-aboard vessel were made available, ADF&G could intensify sampling efforts by reaching more remote watersheds. As funds allow the department will use chartered float planes to reach remote locations.

ACTIVITY 1.2. Monitor late-winter and early spring body condition of deer through boat-based surveys along selected segments of beach.

Data Needs

No change.

Methods

No change. We recommend continuing this activity.

ACTIVITY 1.3. Monitor over-winter mortality by searching for and counting deer carcasses within and outside the beach fringe along selected segments of beach.

Data Needs

No change.

Methods

No change. We recommend continuing this activity, particularly following winters with deep and persistent snow.

ACTIVITY 1.4. Proposed new activity. Monitor abundance of deer in selected alpine areas using alpine aerial surveys.

Data Needs

Beginning in 2013, ADF&G staff and volunteers from the Petersburg office began conducting experimental aerial alpine deer surveys in five areas in central Southeast Alaska including south Admiralty Island. The purpose of that project was to gather preliminary data on whether aerial alpine deer surveys were feasible and could provide an index of deer abundance to help assess

the effectiveness of predator control as part of an Intensive Management (IM) program to increase abundance of deer in Unit 3.

Although the surveys were initiated in response to IM needs in Unit 3, the method may be an effective deer monitoring tool in any area with sufficient alpine deer habitat. Although research is required to verify whether the number of deer seen in the alpine corresponds to trends in the larger population, this method appears to provide an index of deer abundance that is timelier than and complimentary to existing techniques. Compared to other game management units in Region I, Unit 4 supports high densities of deer and has abundant alpine deer habitat making it well suited to help evaluate this technique.

Methods

After two seasons of experimentation, Petersburg staff selected standard survey methods. Surveys should be flown in a Piper Super Cub or similar aircraft during clear days in mid-summer, beginning 2 hours before sunset and ending at sunset. The pilot and observer count as many deer as possible while covering established alpine survey routes. Deer composition should be classified to large buck, small buck, doe, and fawn, although when abundance is high it is difficult to classify deer. The goal each summer is to fly at least 4 replicate surveys in each area to account for variability. Deer per survey hour was selected as the standard metric.

Results and Discussion

Alpine surveys of southern Admiralty Island indicated high abundance relative to other survey areas with an increasing population from 2014–2016 (Figs. 7 and 8) (Lowell and Valkenburg 2017). The alpine survey technique appears to be a useful tool for gauging deer abundance immediately prior to hunting season. However, research is needed to learn more about what alpine surveys tell us about the larger deer population. Pending funding, staff availability and aircraft/pilot availability (likely the most limiting factor) managers in Unit 4 will be looking into establishing survey routes on Baranof, Chichagof and Admiralty Islands and begin gathering baseline data in 2017.

Recommendations for Activity 1.4

Begin and expand as warranted.

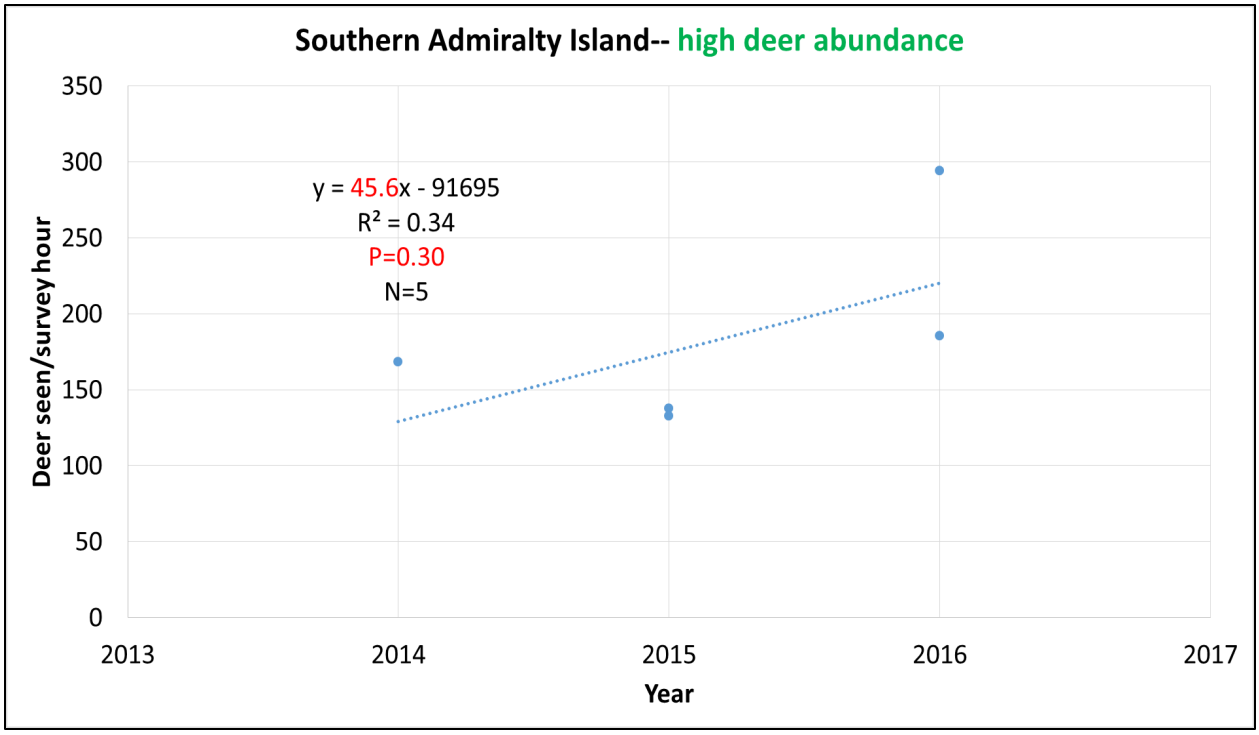

Figure 7. Numbers of deer seen during five aerial alpine surveys on southern Admiralty Island, Southeast Alaska, 2014–2016 (Lowell and Valkenburg 2017).

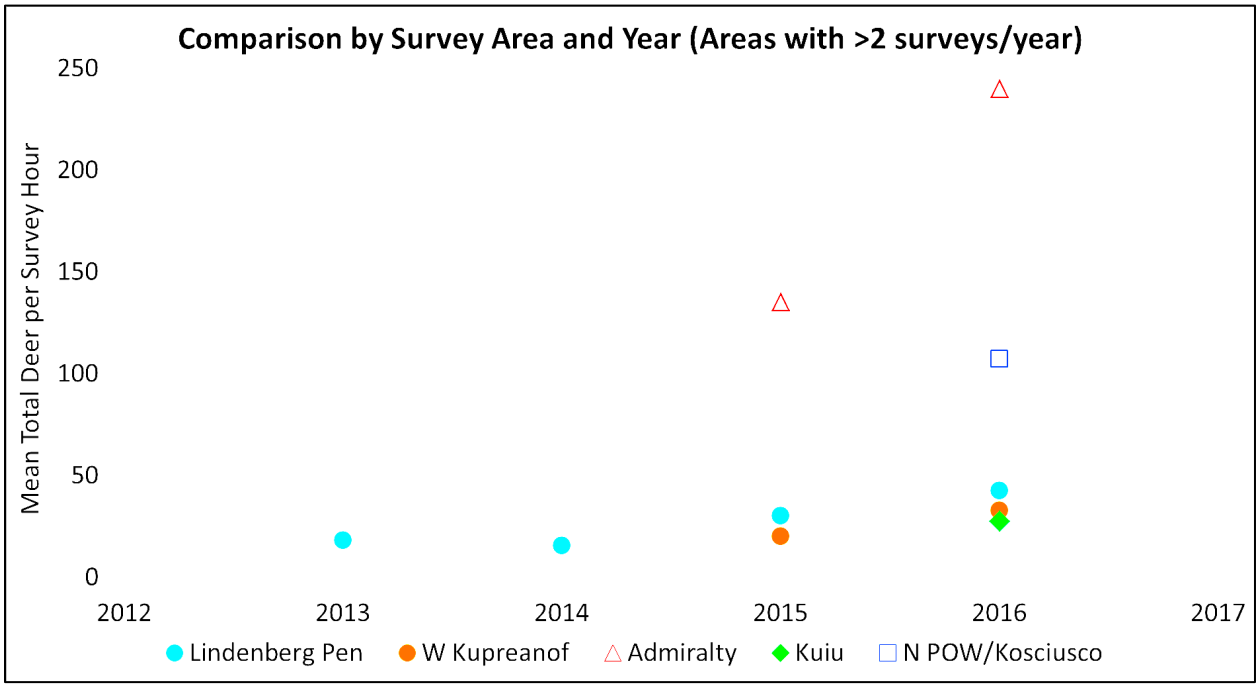

Figure 8. Numbers of deer seen during aerial alpine surveys on several islands in Southeast Alaska, 2013–2016 (Lowell and Valkenburg 2017).

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Quantify and analyze harvest and hunter effort data.

Data Needs

No change.

Methods

No change. We recommend continuing this activity.

3. Habitat Assessment-Enhancement

The department does not have any plans for any habitat assessment or enhancement.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

All records related to deer pellet group transects, harvest tickets, and hunter reports are archived on network servers in the Douglas, Region I office.

Records related to alpine surveys, mortality transects, and body condition surveys are saved to the regional shared drive (Network/dfg.alaska.local/DWC/Douglas/Region1shared-DWC/Offices/Sitka. Original data sheets are filed in the local Sitka area office.

Harvest data are stored on ADF&G's WinfoNet site.

Agreements

Deer pellet transects are conducted as a cooperative project between USFS and ADF&G.

Permitting

None.

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