Species Management Report and Plan ADF&G/DWC/SMR&P–2017–10

Moose Management Report and Plan, Game Management Unit 1C:

Report Period 1 July 2010–30 June 2015, and

Plan Period 1 July 2015–30 June 2020

Stephanie Sell

2017

Alaska Department of Fish and Game Division of Wildlife Conservation

Species Management Report and Plan ADF&G/DWC/SMR&P-2017-10

Moose Management Report and Plan, Game Management Unit 1C:

Report Period 1 July 2010–30 June 2015, and

Plan Period 1 July 2015–30 June 2020

PREPARED BY:

Stephanie Sell
Area Biologist

APPROVED BY:

Thomas Schumacher
Management Coordinator

Alaska Department of Fish and Game
Division of Wildlife Conservation
PO Box 115526
Juneau, AK 99811

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. This funding provided support for Federal Aid in Wildlife Restoration Moose Survey and Inventory Project 1.0.

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 Thomas Schumacher, Management Coordinator for the Division of Wildlife Conservation.

Species management reports and plans are available via the Alaska Department of Fish and Game's public website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, Alaska 99811-5526; phone: (907) 465-4190; email: dfg.dwc.publications@alaska.gov. The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services (www.arlis.org).

Please cite this document as follows:

Sell, S. 2017. Moose management report and plan, Game Management Unit 1C: Report period 1 July 2010–30 June 2015, and plan period 1 July 2015–30 June 2020. Alaska Department of Fish and Game, Species Management Report and Plan ADF&G/DWC/SMR&P-2017-10, Juneau.

Contents

List of Figures

List of Tables

List of Appendices

Purpose of this Report

This report provides a record of survey and inventory management activities for moose in Unit 1C for the previous 5 regulatory years (RY; RY10–RY14) and plans for survey and inventory management activities in the 5 years following the end of that period (RY15–RY19). A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010–30 June 2011). 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 moose management report of survey and inventory activities that was previously produced every 2 years.

I. RY10–RY14 Management Report

Management Area

Unit 1C encompasses approximately 7,600 mi^2 of mainland in northern Southeast Alaska from Cape Fanshaw to the latitude of Eldered Rock (Fig. 1). Maritime climates dominate a majority of the area with interior influences in river valleys. Unit 1C is comprised of glaciers and the Juneau Icefield, fjords, dense timber, tidelands, and estuaries. Land management in this area is complex, with a variety of state and federal agencies (Tongass National Forest and Park Service -Glacier Bay National Park) and private land owners playing roles. Geographic features have divided moose in Unit 1C into four discrete populations (Taku River, Berners Bay, Chilkat Range, and Gustavus Forelands).

Taku River: is a transboundary river system that originates in British Columbia and flows through the Coast Range into Stephens Passage southeast of Juneau. The Taku River is fed by several glacial outwash streams and is adjacent to the Taku Glacier, one of the few glaciers born in the Juneau Icefield that is advancing. No detailed analysis of the extent and composition of moose habitat in the Taku drainage exists; however, a general visual survey was made by river boat in June of 1975. A mix of cottonwood, alder, and willows of several different species was noted. Browse on the surveyed Canadian portion of the river was typified by more willow and was judged to be more extensive per unit area than on the Alaska portion of the river. The habitat capability for moose in the Taku River Valley is unknown. As in other areas of Southeast Alaska, moose habitat is generally associated with riparian sites supporting suitable forage. Because most glaciers in the Taku River Valley are retreating, habitat is typified by early to mid-post-glacial successional types, including deciduous shrub and tree species favored by moose. Over time we anticipate the vegetation will succeed to a climax spruce or spruce-hemlock forest that will support fewer moose. Isostatic rebound may also be at work, raising land in relation to the local water table, reducing wetlands in localized areas, and ultimately changing the vegetation to species that favor drier sites. Currently, the best habitat for moose is upstream from Taku Glacier. If it advances far enough, it could dam the river and flood much of the current moose habitat.

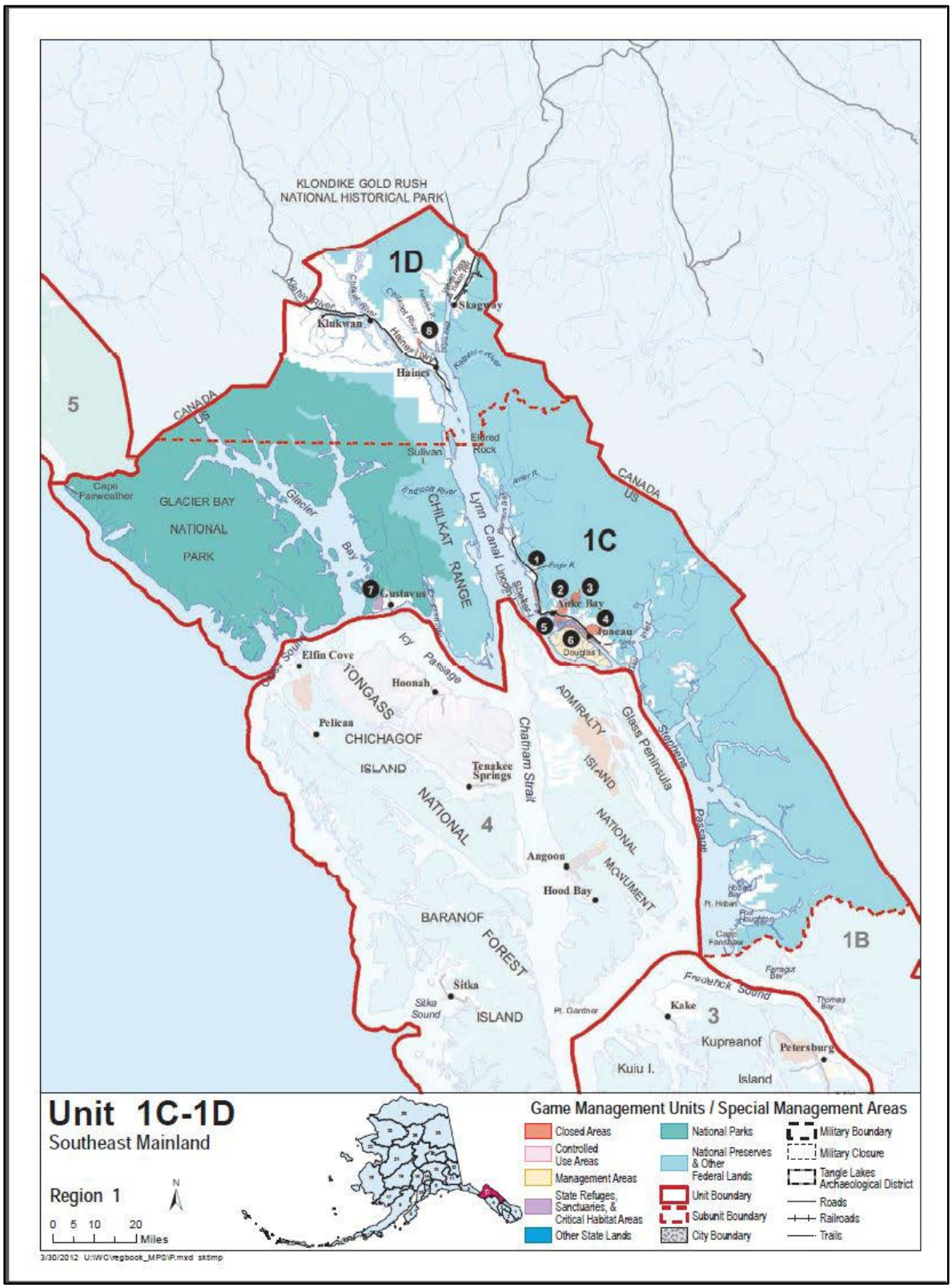


Figure 1. Overview of Unit 1C, Alaska boundary.

Berners Bay: is located on the east side of Lynn Canal and includes the clear water drainage of the Berners River and the glacial Lace, Antler, and Gilkey rivers. The mountains and icefields of the coast range isolate it from other drainage systems on the coast and in the interior. As elsewhere in Southeast Alaska, moose habitat is generally associated with early successional habitat in disturbed areas associated with shifting river bars and other riparian vegetation. In Berners Bay, much of the habitat is in a variety of early successional stages resulting from glacial retreat including deciduous shrublands, emergent herbaceous meadows, conifer forest and unvegetated riparian and upland habitats (White et al. 2006). Willow and black cottonwood are the most abundant preferred browse species in Berners Bay. Similar to other recently deglaciated areas like the Taku River Valley and Gustavus Forelands, upland vegetation in Berners Bay will likely succeed to spruce or spruce-hemlock-dominated forest of lower value to this isolated population.

Chilkat Range: is a mountainous and glaciated extension of the mainland in northern Southeast Alaska. It is bounded on the east by Lynn Canal and on the west by Glacier Bay. Its principal physiographic features are the Chilkat Mountains and the major drainage systems of St. James Bay and the Endicott River. Major stream drainages are the primary areas used by Chilkat Range moose. As in other areas of Southeast Alaska, moose rely on riparian habitats with suitable forage. Cottonwood and willow are the preferred forage species. No studies have been done on the condition or extent of moose habitat in the Chilkat Range. However, high quality moose range is believed to be limited. Some of the area which now supports increasing numbers of moose, particularly Adams Inlet, was glaciated until recently. In other areas the vegetation is in mid-successional stage, likely to give way to conifers, and thus of only transient value to moose. Moose range in St. James Bay, the Endicott River Valley, and other areas on the east side of the Chilkat Range may already be declining as the deciduous vegetation matures to a size less valuable for forage. The long-term habitat capability of this area for moose is unknown.

Gustavus Forelands is a glacial outwash plain bounded by Glacier Bay National Park and Icy Straits. Much of the habitat is in early successional, post-glacial vegetative types of undisturbed wet meadow systems and wetlands, willows, and cottonwood, succeeding into spruce-hemlock forests, and mudflat beaches. Extensive studies on habitat availability have been conducted as part of a long-term moose research project (White et al. 2006; Hood et al. 2007).

Summary of Status, Trend, Management Activities, and History of Moose in Unit 1C

Moose are relative newcomers to many parts of Southeast Alaska, with many of the populations becoming established in the early to mid-1900s. Some areas, such as the Gustavus Forelands, did not have moose present until the 1960s. It is likely that coastal mountains inhibited the movement of moose into these areas. Once moose discovered these unexploited areas, the presence of high quality habitat led to rapid expansions of new populations. Moose naturally colonized 3 of the 4 management areas in Unit 1C and were introduced to Berners Bay.

Taku River: Moose are indigenous although fairly recent inhabitants of the Taku River area. They almost certainly migrated from the interior of British Columbia downriver through the coast range. Moose were reported in the Taku River valley in Canada as early as the 1880s. It is

not known when they first appeared along the Alaska portion of the river; however, moose immigrated into the Stikine River area during the early twentieth century and presumably arrived in the Taku area around the same time. They were undoubtedly hunted for food by prospectors and other visitors and settlers in that country shortly after their appearance. Based on communications with Canadian biologists who occasionally conduct aerial surveys in the upper Taku, it appears likely that moose from Alaska migrate into Canada during winter, possibly to avoid deeper snow near the coast and to access more favorable forage. That could explain why we often see few moose on the Alaska side of the border during winter aerial surveys. Moose are also regularly seen in the Port Houghton area on the mainland south of the Taku River. Those moose probably moved across the Fanshaw Peninsula from the Farragut Bay/Thomas Bay population to the south. Since 1995, moose in this area of Unit 1C have been managed as part of the Unit 1B registration hunt.

Berners Bay: The Berners Bay moose population is the result of 2 transplants of moose calves into the area in 1958 and 1960. A total of 21 moose were released. The transplant was successful and a limited hunting season for bull moose was established in 1963. Since that time, the annual harvest has ranged 5–23 animals. Managing the Berners Bay moose herd has been challenging. The geography of the area allows for little to no immigration or emigration, resulting in a closed population with limited habitat. Because of this, ADF&G has used a variety of hunt strategies to manage this moose herd, changing the harvest from bulls only to bulls and cows, in an attempt to balance the herd's sex ratio and limit the population size to within the carrying capacity of the habitat. The use of a habitat capability model as well as moose browse surveys in the early 1980s helped set the management objective of keeping the post hunt population at no more than 90 moose observed during aerial surveys, to assure the herd does not exceed a level the habitat can support. However, recently acquired body condition and productivity data for moose in Berners Bay indicates moose are in good physical condition. Body condition is an indication of habitat quality, and in Berners Bay, good body condition suggests the habitat may be able to support a higher number of moose.

Chilkat Range: Moose are relative newcomers to the Chilkat Range. Moose were first documented in western Unit 1C in 1962 on the Bartlett River. In 1963 moose were observed in the Chilkat Mountain Range; these animals probably originated from the Chilkat Valley population near Haines. In 1965 moose were sighted for the first time along the Endicott River and St. James Bay areas. Moose probably followed the Endicott River to Adams Inlet shortly thereafter, because they were common in Adams Inlet by the 1970s. During the past few years, the southern end of the Chilkat Range near Homeshore and Pt. Couverden has seen a spike in harvest, likely a reflection of an increase in moose numbers along with the adoption of all-terrain vehicle (ATV) hunting practices on the logging road system in that area. Because of thick timber stands throughout this area, it is difficult to gather reliable aerial survey data, so our understanding of the Chilkat Range moose population is mostly limited to hunter reports and hunter harvest.

Gustavus Forelands: The first sightings of moose in the Gustavus area occurred in 1958. It is likely moose migrated to this area via the Excursion River drainage. The population slowly grew over the next 30 years, and the first hunt was opened in 1988. During the 1990s the population experienced eruptive growth and soon accounted for over half the moose harvested in Unit 1C.

As the moose population at Gustavus grew, ADF&G biologists had increasing concerns about habitat overutilization. Habitat studies were initiated by ADF&G in 1999 (White et al. 2006). In 2000, ADF&G submitted a proposal to the Board of Game (BOG) to initiate an antlerless moose hunt at Gustavus to curb the population growth. We conducted further studies, including additional habitat evaluation, and radiocollaring and monitoring of female moose (White et al. 2014). Data from these studies and examinations of harvested female moose are directing management of this population.

Management Direction

For management purposes, we have separated the moose in Unit 1C into 4 distinct populations, with separate management objectives for each.

EXISTING WILDLIFE MANAGEMENT PLANS

Region I developed a moose management plan in the late 1980s (ADF&G 1990) intended to guide management through RY94. With the exception of the Gustavus population, the 1990 plan included objectives and management strategies for moose populations throughout the region. That plan was never formally updated.

Although the overall goals of the original plan are important, the management objectives and harvest management strategies have changed since the plan was written based on public comment, staff recommendations, and Board of Game actions. These periodic changes in management planning have been reported in the division's previous species management reports. The plan portion of this report contains the current management plan for moose in Unit 1C.

GOALS

Regionwide moose management goals were established during creation of the Region I moose management plan in the late 1980s. The following goals are general and applicable to the entire region:

1. To maintain, protect, and enhance moose habitat and other components of the ecosystem.
2. To maintain viable populations of moose in their historic range throughout the region.
3. To manage moose on a sustained yield basis.
4. To manage moose in a manner consistent with the interests and desires of the public.
5. To manage primarily for meat, rather than trophy hunting of moose.
6. To manage for the greatest hunter participation possible consistent with maintaining viable populations, sustained yield, subsistence priority, and the interests and desires of the public.
7. To provide opportunities to view and photograph moose for the benefit of non-hunters (nonconsumptive users) of moose.
8. To develop and maintain a database useful for making informed management decisions.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Harvest

Unit 1(C) (Gustavus Forelands & Berners Bay) – In an annual memo to staff issued by the Division of Wildlife Conservation director, the Gustavus and Berners Bay cow moose populations have always been listed among the populations not open to ceremonial harvest (Appendix A).

Unit 1 (C) (remainder) – There is no customary and traditional use determination finding for moose in Unit 1C (remainder) listed in 5 AAC 99.025.

Intensive Management

None

MANAGEMENT OBJECTIVES

The following objectives, based on existing biological data, have been identified by staff with input from the public and are contained in the strategic plan for management of moose in Southeast Alaska (ADF&G 1990). The plan portion of this report contains the current management plan for moose in Unit 1C.

- *Taku drainage*: Annually compare hunter effort and success as well as age data from harvested moose to gain insight into the status of this moose population. Maintain an annual harvest of at least 10 bull moose. Gather aerial survey data on both the Alaska and the Canada portions of the Taku River, through ADF&G surveys and through correspondence with Canadian biologists.

Unit 1C:	Plan Objective
Annual hunter kill	10
Number of hunters	100
Hunter-days of effort	450
Hunter success	15%

- *Berners Bay:* Annually compare hunter effort and success as well as age data from harvested moose to gain insight into the status of this moose population.

Unit 1C:	Plan Objective
Post hunt numbers	80–90
Annual hunter kill	5
Post-hunt bull:cow ratio	25:100
Number of hunters	5
Hunter-days of effort	15

- *Chilkat Range:* Annually compare hunter effort and success as well as age data from harvested moose to gain insight into the status of this moose population.

Unit 1C:	Plan Objective
Annual hunter kill	10
Number of hunters	65
Hunter-days of effort	195
Hunter success	15%

- *Gustavus Forelands:* Continue to monitor this population using marked animals for insight into annual survival as well as to estimate sightability during aerial surveys. Maintain a bull:cow ratio of at least 25:100.

Unit 1C:	Plan Objective
Post hunt numbers	250–350
Annual hunter kill	15
Post-hunt bull:cow ratio	25:100
Number of hunters	100
Hunter-days of effort	500

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct annual post-hunt aerial surveys in areas that can be surveyed.

Data Needs

Estimates of population size, including minimum counts, and age and sex composition are used to inform management. Moose range throughout most of Unit 1C, but because dense coniferous forests covers most of the Chilkat Range and the areas south of Taku River, surveys focus on Berners Bay, the Taku River drainage, and the Gustavus Forelands. Minimum counts and age and sex ratios are compiled for each location; however, a subsample of collared animals in Berners Bay and the Gustavus Forelands allows us to estimate population sizes with confidence intervals and to account for variation in survey conditions. Similarly, population models have been created to assist management in setting harvestable goals.

Methods

When weather and pilot availability allows population abundance and composition surveys are conducted using fixed-winged aircraft (Piper PA-18 Super Cub or equivalent aircraft) following the onset of winter snowfall. During surveys the number and age/sex composition of all animals was recorded. Due to the inability to accurately distinguish between adult males and females following antler drop, after December 1 we use the rubric "unknown sex" for adults lacking antlers and in the absence of calves.

Taku River: When snow and weather conditions allow we monitor minimum abundance and age/sex composition. Our goal is to survey this population once each year. However, efforts to survey can be confounded by lack of snow cover early in the winter and the apparent tendency of

at least some moose to move upriver into Canada later in the winter. The Taku area is not surveyed on a consistent basis.

Berners Bay and Gustavus Forelands: Our goal is to survey these populations once per year when conditions permit. We maintain a sample of radiocollared animals in both populations. Collared animals allow us to estimate sightability (i.e., the probability of seeing moose on a given survey) and population size including a measure of precision using a modified mark-resight technique. Population estimation models developed for both areas are updated annually using vital statistics collected by research staff. During surveys, the number of radiocollared moose observed was enumerated and these data, combined with knowledge about the number of collared and uncollared animals in the study area, were used to estimate sightability and population abundance using modified Lincoln-Peterson mark-resight techniques. In addition, we also collect habitat, behavioral, and environmental data associated with each radiocollared animal seen or not seen (but later radio-located) during surveys. In Gustavus, historical anecdotal information coupled with minimum counts from aerial surveys with radiocollared moose allow the department to visually depict moose population trajectory in the area during 1966- 2014 (Appendix B).

Chilkat Range: Due to the dense coniferous forest cover across the Chilkat Range moose in this area cannot be seen from the air; therefore, managers rely solely on harvest data, age data, and anecdotal hunter reports.

Results and Discussion

During this report period we did not fly any aerial moose surveys in the Taku River or the Chilkat Range, primarily because conditions did not allow or other areas were a higher priority, but we did survey Berners Bay and the Gustavus Forelands (Table 1). Composition surveys were not always possible due to various factors, including weather, snow cover, and antler loss. In many years snow conditions do not allow surveys until December or January, after antler drop has commenced and when differentiating between male and female moose is no longer possible.

Taku River: We have very little information regarding the number of moose in the Taku River drainage. The last survey conducted by the department in the Taku River was in the winter of RY00, when 37 moose were counted. In response to a proposed mine development on the Canadian portion of the Taku River, a consulting group conducted an aerial moose survey in March 2007 along a proposed barge transportation route 25 river miles from the U.S.–Canadian Border to the mouth of the Taku River at Taku Inlet. It found a total of 21 moose including 4 bulls, 9 cows, and 8 calves (A. MacLeod, Redfern Resources, unpublished data). Although that number seems low, it is comparable to historical surveys of the Alaska portion of the Taku River. Correspondence with Canadian biologists suggests that a significant but unknown proportion of Taku River moose migrate up the Taku River drainage during early winter and overwinter in Canada.

Berners Bay: The number of moose seen during aerial surveys RY10–RY14 ranged 73–105 total moose (Table 1). The survey totals for RY10, RY11, and RY13 were below our management objective of 80–90 moose counted post hunt; however, in RY12 and RY14 numbers met or exceeded the objective. Bull:cow ratios RY10–RY13 exceeded our management objective, likely because the season was closed in RY06 and no bulls had been harvested until RY14 when a

limited any-bull hunt was opened. Careful monitoring of the herd should be continued to ensure declines in reproduction and survival are detected in time to make effective management decisions. Historically, lower calf production and survival linked to severe winters (White et al. 2012) are contributing factors to declines in the Berners Bay moose population.

Table 1. Unit 1C, Alaska aerial moose survey data, regulatory years[a] 2010–2014.

Year	Bulls	Cows	Calves	Unknown	Total Moose	Count time (hrs)	Bulls per100 Cows	Calves per100 Cows	Calves % in herd	Moose Per hour
Berners Bay 2010–2014										
2010	18	45	10	0	73	4.3	40	22	14	17
2011	22	41	10	0	73	NA	54	24	14	NA
2012	23	53	9	0	85	4.2	43	17	11	20
2012	21	67	14	0	102	4.0	31	21	14	26
2013	18	47	8	0	73	4.7	38	17	11	16
2014	22	52	24	7[b]	105	4.7	42	46	23	22
Chilkat Range 2010–2014										
2010–2014	No Survey									
Taku River 2010–2014										
2010–2014	No Survey									
Gustavus Forelands 2010–2015										
2010	14	22	22	107[b]	165	3.0	11	17	13	55
2011	16	94	26	0	136	3.9	17	28	19	35
2012	33	201	40	0	274	5.0	16	20	15	55
2013	25	46	40	75[b]	186	4.1	21	33	22	44
2014	--[c]	24	12	55[b]	91	4.0	--[c]	50	13	23

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.
[b] Moose of unknown sex are presumed to be female for bull:cow and calf:cow calculations.
[c] Survey was conducted post antler drop; therefore, males and females cannot be definitively determined.

Chilkat Range: We have no direct data on the status of the Chilkat Range moose population as no surveys have been conducted for many years due to limited snow cover and dense forest canopy.

Gustavus Forelands: Aerial surveys during RY10–RY14 found 91–274 total moose (Table 1). In addition to counting all moose seen, we attempt to gather demographic data. The three-fold difference in the numbers of moose seen during the report period more likely reflect annual differences in survey conditions than changes in the number of moose. In some years poor survey conditions prior to antler-drop inhibited our ability to collect demographic data. The bull:cow ratio continues to be below the management objective of 25 bulls:100 cows; however, calf:cow ratios appear to be healthy. Due to the timing of late season surveys it is likely that the number of bull moose is biased as low because surveys are typically conducted post antler drop.

Maintaining a sample of radiocollared moose has allowed managers to estimate moose abundance based on sightability determined during the survey. By knowing the number of collared moose in an area and the number of collared moose actually seen on surveys we used a ratio to estimate population numbers at the time of the survey. Demographic information and vital statistics collected by research staff inputted into a model account for variability among

annual aerial survey findings. Population estimates indicate that the moose population in Gustavus is relatively stable or slightly increasing.

Recommendations for Activity 1.1. Continue with modification. We recommend transitioning the current Berners Bay and Gustavus moose research projects to management projects where we maintain 20-40 animals with VHF radio collars in each population primarily to estimate sightability for mark-resight population estimates. The population estimate model currently used for Gustavus and Berners Bay requires survival data for adults and calves, which has been collected by research staff. Management staff will potentially need to continue calf survival surveys periodically in the absence of research support after this transfer. Ideally, it would be helpful to see these models expanded to areas where we do not have the ability to conduct surveys because of topography and only have some demographic information.

We have not regularly surveyed the Taku River because good survey conditions are rare and other areas usually take priority. We should investigate survey and harvest information gathered by Canadian biologists to learn if it provides any insight into whether the current harvest in Alaska is sustainable.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor trends in hunter effort and abundance and distribution of moose including age and sex composition through hunter reports on required registration permits. Data needs and methods are the same for Activity 2.2.

ACTIVITY 2.2. Monitor number, age, and antler configurations of harvested moose by examining antlers (opportunistically or required depending on the hunt) and collecting lower jaws for aging from successful hunters.

Data Needs

Monitoring the harvest and analyzing harvest data are essential to determining whether our harvest objectives have been met and that harvests are sustainable.

Methods

Hunters in Unit 1C are required to obtain a registration permit for the hunt they are planning to participate in before entering the field (DM041-Berners Bay (Fig. 2); RM046-remainder of Unit 1C (Fig. 3); RM049-Gustavus Forelands (Fig. 4); or RM038-Port Houghton to Cape Fanshaw (Fig. 5). Each permit requires the hunter's demographic information including their hunting license number, and includes a punch ticket that hunters must get validated upon successful harvest of a moose. Each permit also contains a mail-in hunt report card. Submission of a hunt report is mandatory for all permittees regardless of whether they hunt or not. Hunt reports provide the department with information on the number of participants in the hunt, number of days hunted, date and location of hunt and harvest, method of transport to the field, and any use of commercial services.

All successful moose hunters are required to inform ADF&G of their harvest within 5 days of the kill and bring the lower front portion of the jaw to ADF&G so teeth can be pulled for aging at

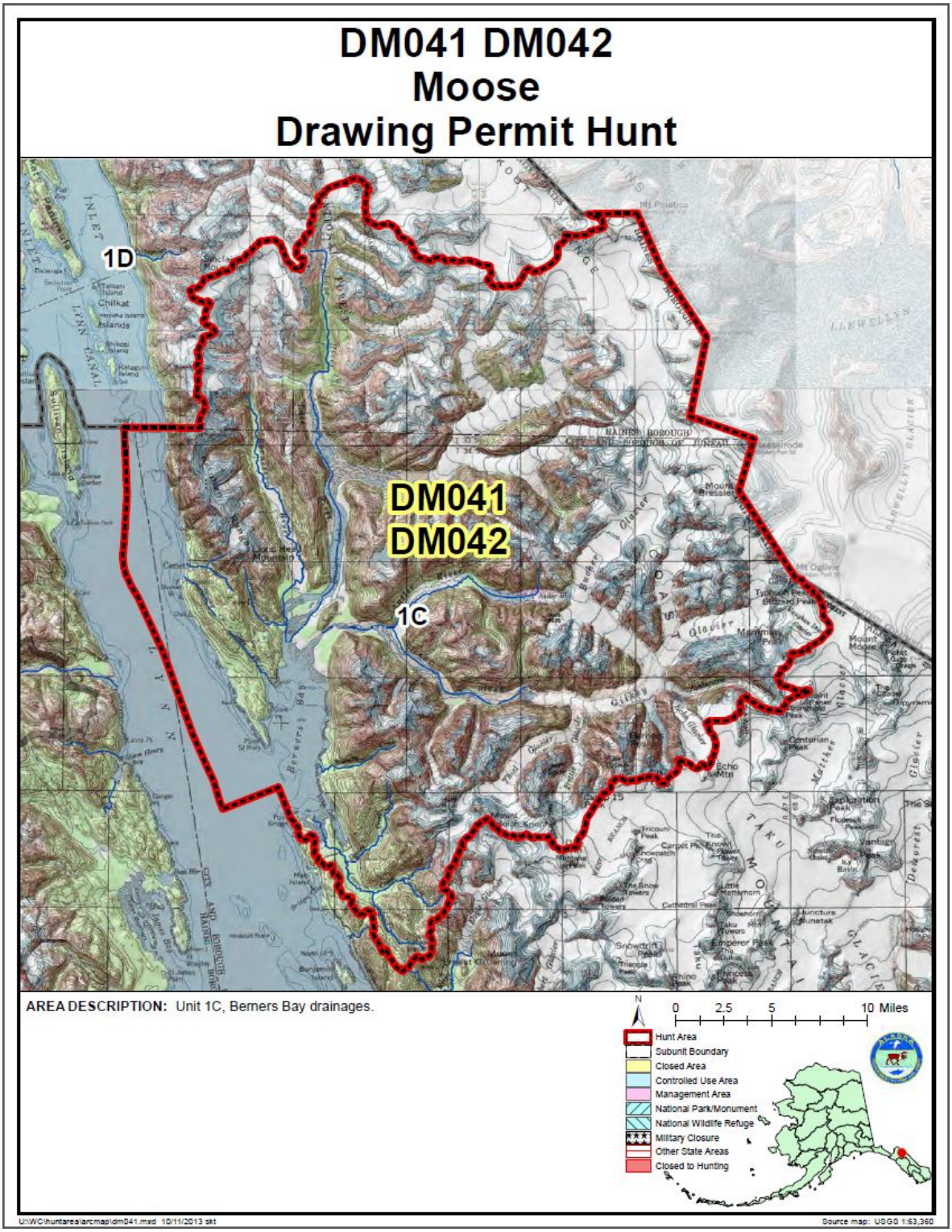


Figure 2. Bull (DM041) and cow (DM042) drawing permit hunt boundary, Unit 1C, Alaska, regulatory years[a] 2010–2014.

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.

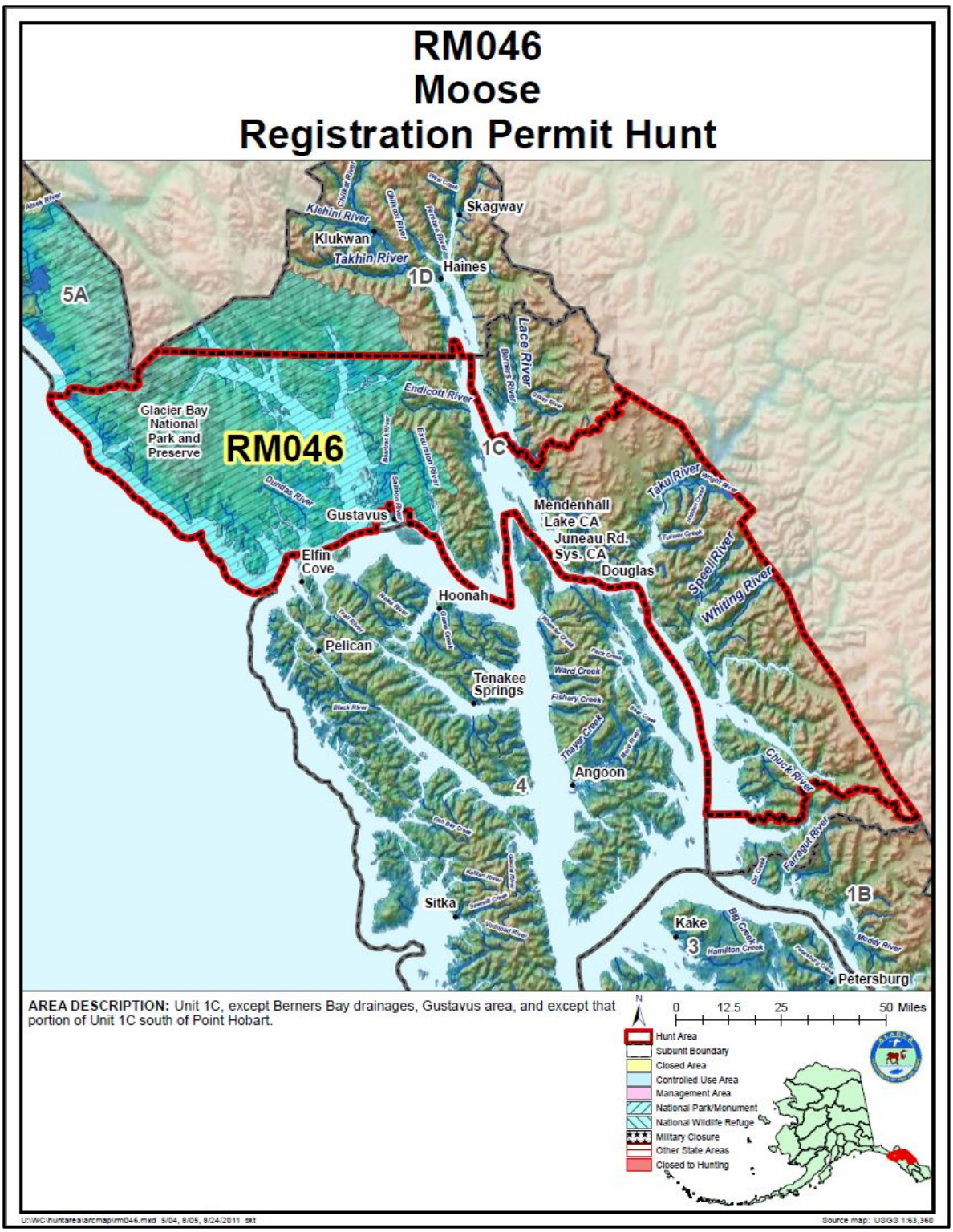


Figure 3. Any bull registration permit hunt RM046 boundary, Unit 1C, Alaska, regulatory years[a] 2010–2014.

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.

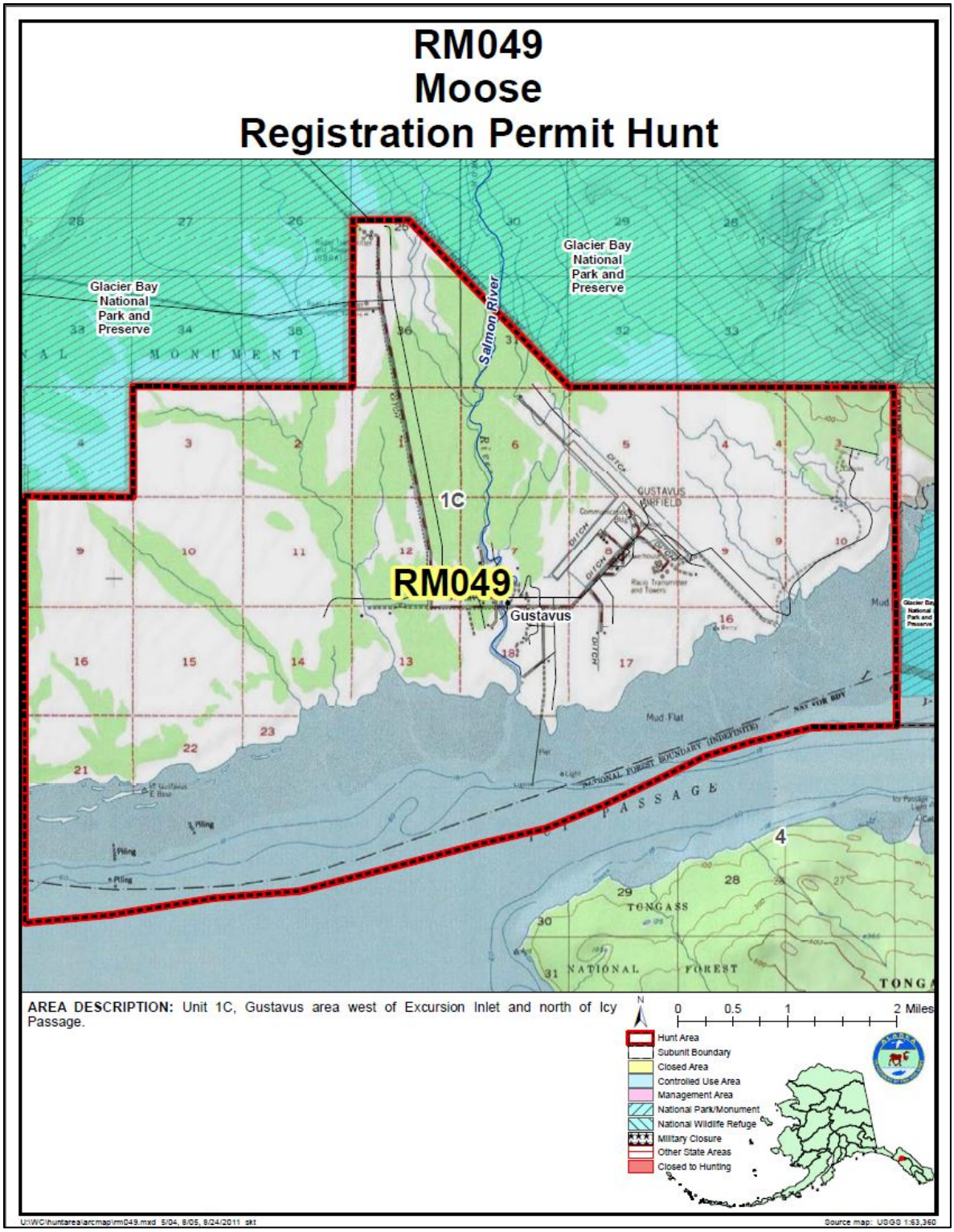


Figure 4. Antler restricted hunt boundary for RM049, Unit 1C, Alaska, regulatory years[a] 2010–2014.

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.

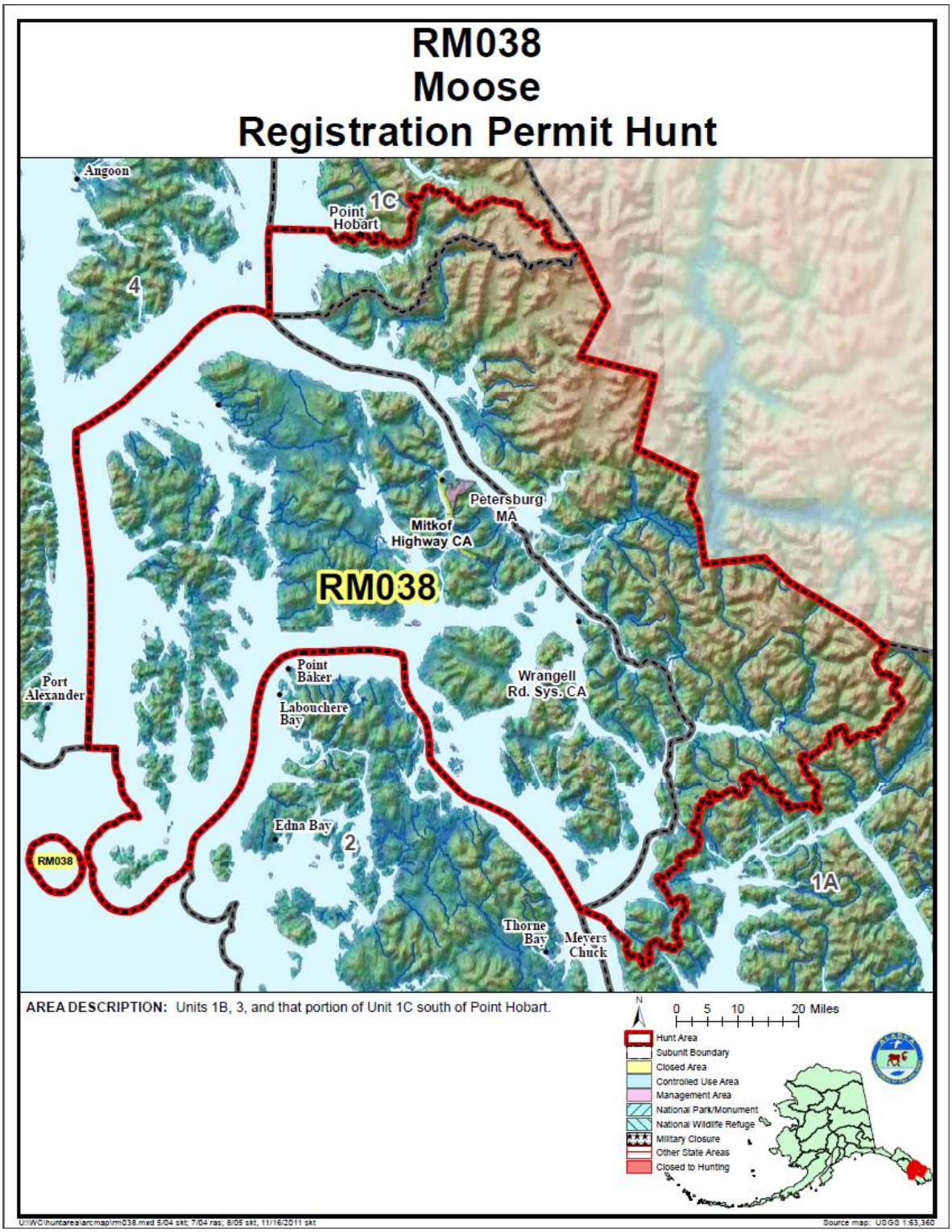


Figure 5. Antler restricted hunt boundary RM038, Unit 1C, Alaska, regulatory years[a] 2010–2014.

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.

Matson Laboratory, LLC (Manhattan, MT). Successful RM049 (Gustavus) and RM038 (Port Houghton to Cape Fanshaw) hunters must present moose antlers to ADF&G to verify compliance with antler restrictions, and collect information on antler architecture. For all other hunt areas within Unit 1C hunters are asked to voluntarily send antler photos to the department, which allows manager to correlate antler architecture with age. Such information has been used in the past to provide insight regarding recruitment that has helped in refining antler regulations.

Season and Bag Limit

Season and bag limits	Resident and nonresident hunter
Unit 1(C), Berners Bay Drainages:	15 Sep–15 Oct (General hunt only)
1 moose by drawing permit only; up to 30 permits may be issued	
Unit 1(C), that portion south of Point Hobart, including all Port Houghton drainages:	15 Sep–15 Oct (General hunt only)
1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on one side or 2 or more brow tines on both sides by registration permit only	
Unit 1(C), that portion west of Excursion Inlet and north of Icy Passage:	
1 moose per regulatory year, only as follows:	
1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on one side by registration permit only	15 Sep–15 Oct (General hunt only)
or	
1 antlerless moose by drawing permit only; up to 100 permits may be issued	15 Nov–30 Nov (General hunt only)
Remainder of Unit 1(C)	
1 bull by registration permit only	15 Sep–15 Oct (General hunt only)

Results and Discussion

Harvest by Hunters-Trappers

Taku River: The annual harvest of moose during this report period averaged 15 moose (Table 2) and was within our management objective. Harvest records of hunter effort, take, and anecdotal information from hunters indicate that the number of moose in the Taku River drainage appears to be stable. By aging teeth from lower jaws we gain some insight into the age structure of harvested bulls. The mean age of moose harvested during this report period was 2 years (Table 3). More than half of the 53 bulls harvested from RY10 through RY14 were yearlings, possibly indicating good recruitment. Few older bulls were taken during the report period; only 13 of the 53 (24%) bulls taken were older than 3.5 years.

Berners Bay: No moose were harvested in Berners Bay during RY10–RY13 because the season was closed to allow recovery from mortality during deep snowfall years in 2006–2009. Improved bull:cow ratios allowed for a limited any bull harvest (DM041) to open during RY14. Five permits were issued and 4 bull moose were harvested Table 2. Because our first open moose season started near the end of this report period we have only one year of age data. The mean age of harvested moose for RY2014 was 3.75 years with a range of 2–5 years (Table 3).

Chilkat Range: The mean annual harvest during this report period was 13 moose, similar to previous report periods (Table 2). The mean age of harvested moose during this report period was 3.6 years, which is also similar to prior reporting periods. However, during this report period 17 of 65 (26%) bull moose taken were yearlings, suggesting there may be a slight increase in recruitment within the population (Table 3). The Chilkat Range has little access for hunters throughout most of the area, and few large open areas where hunters can find moose. Moose in these areas have the potential to advance to older age classes because hunters cannot easily locate them. We will continue to monitor age at harvest to learn if the higher number of young moose in the harvest is an anomaly or a trend.

Gustavus: Guideline harvest goals for each year are based on information collected over the previous year. Hunters harvested between 8 and 13 bulls annually during this report period (Table 2). Anytime a new hunt strategy is introduced it is important to provide training opportunities for hunters, and to expect, in the case of a selective harvest strategy hunt, some harvest of bulls that do not meet legal antler requirements. Staff continued to provide a community training event for RM049 moose hunters in Gustavus at which time antler architecture was discussed. One to 4 bulls not meeting legal antler requirements were taken in each year, which emphasizes the need to continue with public education prior to the moose hunt. No antlerless moose permits have been offered since RY08.

The 5-year mean bull moose age at harvest was 2.6 years (Table 3). The age of harvest began to decline in the early 2000s when a larger number of bull moose were taken. The proportion of yearling bulls taken during the report period is about the same as in the recent past, but a few older bulls taken in a year with a low overall harvest can skew the age structure. Overall, it appears there are older bulls (9 bulls were 5.5–9.5 years of age) available for harvest, which is a product of the antler-restricted hunt strategy that protects some bulls from harvest based on antler

configuration. Gustavus is an area where the antler restriction fits well with protecting breeding aged bulls.

Table 2. Unit 1C, Alaska moose harvest, number of hunters, and percent success for regulatory years[a] 2010–2014.

Year	No. males	No. females	No. unknown	Total kill	No. hunters	% Success[b]
			Berners Bay			
2010–2013			HUNT CLOSED			
2014	4	0	0	4	5	80
			Chilkat Range			
2010	11	0	0	11	108	10
2011	20	0	0	20	103	19
2012	11	0	0	11	86	13
2013	10	0	0	10	89	11
2014	13	0	0	13	73	18
			Gustavus Forelands			
2010	12	1[c]	0	13[c]	96	13
2011	8	0	0	8	108	7
2012	8	0	0	8	104	8
2013	13	0	0	13	83	16
2014	11	0	0	11	99	11
			Gustavus Forelands (Antlerless Harvest)			
2010–2014			HUNT CLOSED			
			Taku River			
2010	12	0	0	12	84	14
2011	16	0	0	16	98	16
2012	14	0	0	14	90	16
2013	20	0	0	20	88	23
2014	12	0	0	12	74	16

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.
[b] Includes illegal bull moose harvest in Gustavus Forelands.
[c] Illegal take.

Table 3. Unit 1C moose age at harvest regulatory years[a] 1999–2014.

	Age Class																Total	%	Mean
Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	kill	aged	age
Berners Bay																			
Males																			
1999	0	3	1	3	1	0	1	0	0	1	0	0	0	0	0	0	10	100	3.8
2000	0	0	2	2	3	0	0	0	0	0	0	1	0	0	0	0	8	100	4.6
2001	0	2	2	1	0	2	1	0	0	0	0	0	0	0	0	0	8	100	3.6
2002	0	2	1	0	1	0	1	0	0	0	0	0	0	0	0	0	5	100	3.3
2003	0	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	8	100	2.1
2004	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	6	100	3.2
2005	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5	80	2.5
2006	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	5	80	4.0
2007–2013	HUNT CLOSED																		
2014	0	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	4	100	4.3
Females																			
1999	0	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	5	100	2.3
2000	0	0	1	1	3	0	1	0	0	0	1	0	0	0	0	0	7	100	5.2
2001	0	1	2	0	0	0	1	0	0	0	1	0	0	1	0	0	6	100	6.2
2002	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4	100	2.3
2003–2005	HUNT CLOSED																		
2006	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	100	2.5
2007–2014	HUNT CLOSED																		
Chilkat Range																			
2003	0	6	7	2	0	1	2	0	0	1	0	0	0	2	0	0	22	95	4.2
2004	0	5	3	3	1	0	3	0	1	0	0	0	0	0	0	0	18	89	3.6
2005	0	2	5	2	2	0	0	2	0	2	0	1	0	0	0	0	17	94	4.8
2006	0	8	7	8	3	0	0	0	0	0	0	0	1	1	0	0	28	100	3.5
2007	0	2	2	1	5	1	0	0	0	0	0	0	0	0	0	0	12	92	3.6
2008	0	2	4	4	4	2	0	1	0	0	0	0	0	0	0	0	18	94	3.7

	Age Class																Total	%	Mean
Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	kill	aged	age
2009	1	1	2	3	2	3	2	3	0	0	0	0	0	0	0	0	18	94	4.6
2010	0	2	1	1	1	0	3	1	0	0	0	0	1	0	0	0	11	91	5.3
2011	0	6	6	0	3	2	0	1	1	0	1	0	0	0	0	0	20	100	3.8
2012	0	1	1	5	2	1	0	0	0	0	0	0	0	0	0	0	11	91	3.6
2013	0	3	1	3	0	1	1	1	0	0	0	0	0	0	0	0	10	100	3.2
2014	0	5	1	1	1	3	0	0	0	0	1	1	0	0	0	0	13	100	3.8
Gustavus Forelands																			
2003	3	27	14	4	2	0	0	0	0	0	0	0	0	0	0	0	51	98	2.0
2004	0	23	10	7	0	1	1	0	0	0	0	0	0	0	0	0	43	98	2.3
2005	0	10	23	8	2	3	0	0	0	0	0	0	0	0	0	0	47	98	2.7
2006	0	7	12	6	6	2	1	0	0	0	1	0	0	0	0	0	37	95	3.3
2007	0	2	4	8	5	4	3	1	1	0	0	0	0	0	0	0	29	97	4.3
2008	0	5	3	1	3	1	1	1	0	0	0	0	0	0	0	0	15	100	3.4
2009	0	4	0	1	1	1	1	3	1	0	1	0	0	0	0	0	13	100	5.2
2010	0	7	1	1	1	1	1	0	1	0	0	0	0	0	0	0	13	100	3.2
2011	0	4	0	0	2	1	0	1	0	0	0	0	0	0	0	0	8	100	3.5
2012	0	5	2	0	0	0	1	0	0	0	0	0	0	0	0	0	8	100	2.4
2013	0	7	1	2	2	0	0	0	0	1	0	0	0	0	0	0	13	100	2.4
2014	0	6	0	2	1	0	0	1	0	1	0	0	0	0	0	0	11	100	2.9
Gustavus Forelands (Antlerless Harvest)																			
2002	0	1	1	2	1	3	1	0	0	0	0	0	0	0	0	1	10	100	5.4
2003	2	2	6	9	1	2	1	0	1	0	0	0	0	0	1	1	32	88	4.3
2004	2	14	2	8	5	4	4	1	6	1	2	2	0	0	1	0	53	98	4.8
2005	3	3	11	4	3	9	5	5	10	3	6	0	1	1	1	0	69	94	6.1
2006	0	1	3	2	1	0	2	0	0	0	0	1	0	0	0	0	12	83	4.5
2007	HUNT CLOSED																		
2008	0	0	2	3	0	1	0	3	0	0	1	0	0	0	0	0	10	100	5.4
2009–2014	HUNT CLOSED																		

Year	Age Class 0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% aged	Mean age
									Taku River										
2003	0	3	3	1	2	1	0	0	0	0	0	0	0	0	0	0	11	91	3.0
2004	0	7	3	3	0	0	1	0	0	0	0	0	0	0	0	0	15	93	2.5
2005	0	5	4	0	0	1	0	0	1	1	0	0	0	0	0	0	14	86	3.4
2006	0	10	5	1	0	0	0	0	0	0	0	0	0	0	0	0	16	100	1.9
2007	0	8	5	1	0	0	0	1	0	0	0	0	0	0	0	0	16	94	2.4
2008	0	6	6	3	1	1	0	0	0	0	0	0	0	0	0	0	17	100	2.6
2009	0	8	7	1	1	0	0	0	0	0	0	0	0	0	0	0	18	94	2.2
2010	0	10	1	0	0	1	0	0	0	0	0	0	0	0	0	0	12	100	1.9
2011	0	10	1	1	0	0	3	0	0	0	0	0	0	0	0	0	16	94	2.7
2012	0	7	4	2	0	0	0	0	0	0	1	0	0	0	0	0	14	100	2.7
2013	0	15	1	2	1	0	1	0	0	0	0	0	0	0	0	0	20	100	1.7
2014	0	2	5	3	1	0	0	1	0	0	0	0	0	0	0	0	12	100	2.7

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.

Permit Hunts

In Unit 1C, moose hunts are managed under 2 types of permits; drawing and registration. Drawing permits are used to manage both bull (DM041) and antlerless moose (DM042) hunts in Berners Bay. At Gustavus we use 3 drawing permits (DM043, DM044, and DM045) to manage the antlerless hunt, and a single registration permit (RM049) to manage the bull moose hunt. The remaining areas of Unit 1C at Chilkat Peninsula and Taku River are managed under an any bull registration permit (RM046).

Under the Unit 1C bull moose registration permit (RM046) an annual mean of 315 permits were issued during the report period. Although we cannot determine the destination the permittees will hunt within Unit 1C when they acquire their permit (for RM046), the resulting reporting data (Table 4) indicate that of those actually hunting 50% hunted the Chilkat Range and 50% hunted the Taku River.

For RM049 (Gustavus) an annual mean of 142 permits were issued RY10–RY14 (Table 4). The number of hunters decreased significantly from previous reporting periods, which is likely due to the implementation of the selective harvest strategy. As in most hunts, not all of the permittees actually participated in a hunt. Overall, 69% of the permittees hunted during the report period.

Hunter Residency and Success

Most moose harvested in Unit 1C continue to be taken by residents of the Unit 1C (Table 5). During the report period, residents of Unit 1C took 83% of the harvested moose, other Alaska residents took 15%, and nonresidents took 2%. The low rates of participation and success by nonlocal Alaska residents and nonresidents is likely related to the difficulty of accessing moose hunting opportunity in Unit 1 and the abundance of opportunity elsewhere in the state. When offered, antlerless moose hunts also primarily draw prospective hunters from the Southeast Alaska region. Hunter success varied based on hunt location, and the management objectives were met only in Berners Bay and the Taku River (Table 3).

Harvest Chronology

Similar to previous reporting periods, the bull moose harvest was heavily weighted toward the early part of the season (mid to late September). This is partly because nearly all hunters participate on opening day, and hunt less as the season goes on. The pace of the hunts on the Chilkat Range and the Taku River are much slower than at Gustavus, but even those areas experience the majority of their respective harvests within the first 2 weeks of the season.

The chronology of the antlerless harvest differs substantially from the bull harvest in that the antlerless season at Gustavus is 1 December–10 December. Even then, most of the animals are killed during the first 2 or 3 days of the hunt.

Transport Methods

The type of transport used by successful hunters varies, reflecting difficulties in the logistics of access (Table 6).

Table 4. Unit 1C, Alaska moose hunter effort and success, regulatory years[a] 2003–2014.

		Successful hunters			Unsuccessful hunters			Total Hunters		
Year	Permits Issued[b]	No. hunters	Total days	Avg days	No. hunters	Total days	Avg days	No. hunters	Total days	Avg days
					Berners Bay-DM041 and DM042					
2003	9	8	24	3.0	0	0	0	8	24	3.0
2004	8	6	9	1.5	2	9	4.5	8	18	2.3
2005	8	5	21	4.2	3	27	9.0	8	48	6.0
2006	8	7	16	2.3	1	15	15.0	8	31	3.9
2007–2013					HUNT CLOSED					
2014	5	4	20	5.0	1	6	6.0	5	26	5.2
					Chilkat Range – RM046					
2003	516	22	61	2.8	75	244	3.3	97	305	3.1
2004	474	18	49	2.7	80	282	3.5	98	331	3.4
2005	313	17	53	3.1	98	364	3.7	115	417	3.6
2006	337	28	89	3.2	93	355	3.8	121	444	3.7
2007	358	13	41	3.2	103	452	4.4	116	493	4.3
2008	363	18	81	4.5	103	366	3.6	121	447	3.7
2009	335	18	71	3.9	98	404	4.1	116	475	4.1
2010	330	11	35	3.2	97	446	4.6	108	481	4.5
2011	327	20	67	3.4	83	412	5.0	103	479	4.7
2012	321	11	83	7.5	75	370	4.9	86	453	5.3
2013	306	10	42	4.2	79	472	6.0	89	514	5.8
2014	292	13	58	4.5	60	324	5.4	73	382	5.2
					Gustavus Forelands- RM049					
2003	---	52	107	2.1	127	437	3.4	179	544	3.0
2004	---	45	68	1.5	119	292	2.5	164	360	2.2
2005	212	47	47	1.0	103	104	1.0	150	151	1.0
2006	197	37	61	1.6	122	472	3.9	159	533	3.4
2007	214	29	83	2.9	134	445	3.3	163	528	3.2
2008	159	15	15	1.0	109	109	1.0	134	124	1.0
2009	147	13	95	7.3	94	764	8.1	107	859	8.0

2010	142	13	45	3.5	83	452	5.4	96	497	5.2
2011	153	8	80	10.0	100	762	7.6	108	842	7.8
2012	147	8	66	8.3	96	638	6.6	104	704	6.8
2013	127	13	74	5.7	70	308	4.4	83	382	4.6
2014	143	11	39	3.5	88	649	7.3	99	688	6.9
					Gustavus Forelands (Antlerless Harvest)—DM043, DM044, DM045					
2004	60	53	95	1.8	4	18	4.5	57	113	2.0
2005	90	69	163	2.4	11	36	3.3	80	199	2.5
2006	23	12	19	1.6	6	9	1.5	18	28	1.6
2007					HUNT CLOSED					
2008	15	10	15	1.5	1	5	5.0	11	20	1.8
2009-2014					HUNT CLOSED					
					Taku River –RM046					
2003	---	11	28	2.5	73	283	3.9	84	311	3.7
2004	---	15	33	2.2	58	221	3.8	73	254	3.5
2005	---	14	62	4.4	71	294	4.1	85	356	4.2
2006	---	16	50	3.1	66	281	4.3	82	331	4.0
2007	---	16	38	2.4	71	285	4.0	87	323	3.7
2008	---	17	53	3.1	66	277	4.2	83	330	4.0
2009	---	18	42	2.3	65	246	3.8	83	288	3.5
2010	---	12	22	1.8	72	419	5.8	84	441	5.3
2011	---	16	42	2.6	82	389	4.7	98	431	4.4
2012	---	14	59	4.2	76	417	5.5	90	476	5.2
2013	---	20	62	3.1	68	318	4.7	88	380	4.3
2014	---	12	49	4.1	62	354	5.7	74	403	5.4

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.
[b] Number of registration permits shown for the Chilkat Range is the total number of permits issued for all of Unit 1C excluding Berners Bay; only permittees who hunted may be categorized to specific hunt areas.

Table 5. Unit 1C, Alaska annual moose harvest by community of residence, regulatory years[a] 2003–2014.

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non-resident
				Berners Bay					
2003	8	0	7	0	0	0	0	1	0
2004	6	0	6	0	0	0	0	0	0
2005	5	0	5	0	0	0	0	0	0
2006	7	0	7	0	0	0	0	0	0
2007–2013				HUNT CLOSED					
2014	4	0	4	0	0	0	0	0	0
				Chilkat Range					
2003	22	0	15	0	0	0	0	7	0
2004	18	1	13	0	0	0	0	3	1
2005	17	1	12	1	0	0	0	3	0
2006	28	2	16	4	0	0	0	5	1
2007	13	1	6	3	0	0	0	3	0
2008	18	2	11	3	0	0	0	2	0
2009	18	1	12	4	0	0	1	0	0
2010	11	0	8	1	0	0	0	2	0
2011	20	0	12	3	0	0	0	4	1
2012	11	0	6	4	0	0	0	1	0
2013	10	2	4	4	0	0	0	0	0
2014	13	1	9	3	0	0	0	0	0
				Gustavus Forelands					
2003	52[b]	25	20	4	0	0	1	2	0
2004	45[c]	18	20	4	0	0	0	2	1
2005	47	20	21	3	0	0	0	3	0
2006	37	15	18	1	0	0	1	1	1
2007	29	18	10	0	0	0	0	0	1
2008	15	8	6	1	0	0	0	0	0
2009	13	10	2	0	0	0	1	0	0
2010	13[b]	12	1	0	0	0	0	0	0
2011	8	6	1	0	0	0	0	0	1
2012	8	5	2	1	0	0	0	0	0
2013	13	9	3	0	0	0	0	1	0
2014	11	7	3	0	0	0	0	0	1
				Gustavus Forelands (Cow Harvest)					
2003	32	5	23	1	0	1	1	1	0
2004	53	6	39	3	0	2	1	2	0
2005	69	10	41	4	0	1	3	9	1
2006	12	0	9	1	0	0	0	1	1
2007				HUNT CLOSED					
2008	10	0	9	1	0	0	0	0	0
2009–2014				HUNT CLOSED					

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non-resident
				Taku River					
2003	11	0	10	1	0	0	0	0	0
2004	15	0	13	1	0	0	1	0	0
2005	14	0	11	2	0	0	0	1	0
2006	16	0	16	0	0	0	0	0	0
2007	16	0	13	2	0	0	0	1	0
2008	17	0	13	1	0	0	0	3	0
2009	18	0	13	2	0	0	0	2	1
2010	12	0	11	0	0	0	0	1	0
2011	16	0	14	1	0	0	0	1	0
2012	14	0	14	0	0	0	0	0	0
2013	20	0	18	2	0	0	0	0	0
2014	12	0	11	1	0	0	0	0	0

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.
[b] One of these moose was an illegal kill.
[c] Two of these moose were illegal kills.

Table 6. Unit 1C, Alaska successful moose hunters transport methods, regulatory years[a] 2003–2014.

	Airplane		Boat		3- or 4- wheeler		Hwy vehicle		Foot	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
					Berners Bay					
2003	0	---	8	(100)	0	---	0	---	0	---
2004	0	---	6	(100)	0	---	0	---	0	---
2005	0	---	5	(100)	0	---	0	---	0	---
2006	0	---	7	(100)	0	---	0	---	0	---
2007-2013					HUNT CLOSED					
2014	0	---	4	(100)	0	---	0	---	0	---
					Chilkat Range					
2003	6	(27)	10	(45)	6	(27)	0	---	0	---
2004	7	(39)	7	(39)	3	(17)	0	---	1	(5)
2005	5	(31)	7	(44)	3	(19)	0	---	1	(6)
2006	10	(35)	12	(43)	3	(11)	3	(11)	0	---
2007	2	(15)	5	(39)	6	(46)	0	---	0	---
2008	4	(22)	8	(44)	5	(28)	1	(6)	0	---
2009	5	(28)	5	(28)	7	(39)	1	(5)	0	---
2010	2	(18)	5	(46)	4	(36)	0	---	0	---
2011	5	(25)	6	(30)	7	(35)	1	(5)	1	(5)
2012	1	(9)	5	(46)	4	(36)	1	(9)	0	---
2013	2	(20)	3	(30)	5	(50)	0	---	0	---
2014	4	(31)	5	(38)	2	(15)	2	(15)	0	---

Year	Airplane Total	(%)	Boat Total	(%)	3- or 4- wheeler Total	(%)	Hwy vehicle Total	(%)	Foot Total	(%)
					Gustavus Forelands					
2003	3	(6)	7	(13)	3	(6)	29	(57)	9	(18)
2004	1	(2)	6	(14)	4	(9)	30	(68)	3	(7)
2005	4	(9)	9	(20)	0	---	24	(51)	9	(20)
2006	1	(3)	4	(11)	2	(5)	27	(73)	3	(8)
2007	2	(7)	5	(17)	0	---	18	(62)	4	(14)
2008	0	---	1	(7)	1	(7)	12	(80)	1	(7)
2009	0	---	1	(8)	0	---	9	(69)	3	(23)
2010	0	---	1	(8)	0	---	12	(92)	0	---
2011	0	---	1	(12)	0	---	7	(88)	0	---
2012	0	---	2	(25)	0	---	6	(75)	0	---
2013	0	---	1	(8)	0	---	9	(69)	3	(23)
2014[a]	0	---	0	---	0	---	10	(91)	0	---
					Gustavus Forelands (Cow Harvest)					
2003	5	(16)	3	(9)	2	(6)	22	(69)	0	---
2004	2	(4)	2	(4)	2	(4)	47	(88)	0	---
2005	1	(1)	4	(6)	2	(3)	56	(81)	6	(9)
2006	0	---	2	(17)	1	(8)	8	(67)	1	(8)
2007					HUNT CLOSED					
2008	0	---	0	---	1	(10)	9	(90)	0	---
2009–2014					HUNT CLOSED					
					Taku River					
2003	0	---	11	(100)	0	---	0	---	0	---
2004	0	---	15	(100)	0	---	0	---	0	---
2005	1	(7)	13	(93)	0	---	0	---	0	---
2006	1	(6)	15	(94)	0	---	0	---	0	---
2007	0	---	16	(100)	0	---	0	---	0	---
2008	1	(6)	16	(94)	0	---	0	---	0	---
2009	0	---	18	(100)	0	---	0	---	0	---
2010	0	---	12	(100)	0	---	0	---	0	---
2011	0	---	15	(94)	1	(6)	0	---	0	---
2012	0	---	13	(93)	1	(7)	0	---	0	---
2013	0	---	20	(100)	0	---	0	---	0	---
2014	0	---	12	(100)	0	---	0	---	0	---

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.
[b] One hunter used a horse for transportation.

Taku: Of the successful Taku River moose hunters, boat access in the area was the most widely used mode of transportation, with the remainder using ORVs. Most hunters used boats equipped with jet units to access the upper reaches of the river, then based out of private cabins near the Canadian border. Occasionally, an airplane has been used to access the area.

Berners Bay: Historically, all successful Berners Bay hunters have used boats for access (Table 6), and airboats are almost exclusively the boat of choice. Few, if any, hunters have their own airboats; rather, they make arrangements with one of several local air boaters who then take them into Berners for their hunt.

Chilkat Range: Hunters on the Chilkat Peninsula used boats, ORVs, airplanes, and highway vehicles for transportation to hunting areas. Generally, most airplane access to this area is in the upper Endicott River, and most boat access takes place at St. James Bay, Howard Bay, and Point Couverden/Swanson Harbor. Off-road-vehicle (ORV) use in the Couverden area is gaining in popularity due to the increase in moose numbers and the recent discovery that ORV hunting is effective on the logging roads throughout that area.

Gustavus Forelands: In general successful hunters in Gustavus primarily use highway vehicles or are locals accessing hunting areas on or near their property. It is almost certain that the people who listed airplane as their mode of access actually flew into Gustavus on a commercial airline, then drove to a residence where they hunted with a vehicle or on foot. ATV access for hunting moose at Gustavus is restricted to "constructed road surfaces" only, thus, the limited use of that access type.

Commercial Services

Commercial services were used by 3% of Unit 1C moose hunters during the report period (Table 7). Local residents were more likely to use commercial services, usually for transport to the field.

Other Mortality

During this report period survival estimates for radiocollared female moose in Berners Bay continued to improve, averaging about 90% for the report period with a high of 96% in 2012 (White et al. 2012). Calf moose survival for Berners Bay also improved during the report period. Except for 2013 when it was only 13%, annual calf survival was near or over 30% each year. We believe severe winter weather with deep snow is the leading cause of adult moose mortality in Berners Bay. The combination of relatively low calf survival, occasional adult mortality events, and limited habitat appears to limit resilience and growth of this herd, prolonging the need for hunting closures. Brown and black bears and wolves inhabit the Berners Bay area, but the role predation plays in regulating this population is unknown.

Alaska Board of Game Actions and Emergency Orders

There were no Board of Game actions taken for moose in Unit 1C during the 2010 or 2013 Alaska meetings. The Gustavus moose hunt was closed early by emergency order during RY10 and RY13. Early closures were issued because the harvest quota had been met.

Table 7. Unit 1C moose hunters commercial services use, regulatory years[a] 2003–2014.

	Unit residents		Other AK residents		Nonresidents		Total use			Non-guided	Other
Year	No	Yes	No	Yes	No	Yes	No	Yes	Transport	services	services
Berners Bay											
2001	13	0	2	0	0	0	15	0	0	0	0
2002	13	0	1	0	0	0	14	0	0	0	0
2003	7	0	1	0	0	0	8	0	0	0	0
2004	8	0	0	0	0	0	8	0	0	0	0
2005	8	0	0	0	0	0	8	0	0	0	0
2006	8	0	0	0	0	0	8	0	0	0	0
2007–2013	HUNT CLOSED										
2014	5	0	0	0	0	0	5	0	0	0	0
Chilkat Range											
2003	74	0	19	1	3	0	96	1	1	0	0
2004	75	4	12	2	4	1	91	7	7	0	0
2005	77	2	30	1	3	0	110	3	3	0	0
2006	83	7	25	0	6	0	114	7	7	0	0
2007	82	8	22	2	1	1	105	11	11	0	0
2008	83	1	34	0	3	0	120	1	1	0	0
2009	73	3	38	0	0	2	111	5	5	0	0
2010	75	6	21	2	4	0	100	8	7	0	1
2011	76	6	16	2	3	0	95	8	7	1	0
2012	62	6	16	1	1	0	79	7	7	0	0
2013	60	5	22	1	0	0	83	6	6	0	0
2014	52	9	9	2	1	0	62	11	8	2	1
Gustavus Forelands											
2003	152	2	21	0	2	0	175	2	2	0	0
2004	134	4	17	0	7	1	158	5	4	0	1
2005	132	2	13	1	1	0	146	3	2	1	0
2006	138	4	14	2	1	0	153	6	3	0	3
2007	147	2	9	1	4	0	160	3	1	1	1
2008	116	0	6	1	1	0	123	1	1	0	0
2009	102	0	4	1	1	0	107	1	1	0	0
2010	89	1	4	0	2	0	95	1	1	0	0
2011	93	4	8	0	3	0	104	4	1	0	3
2012	97	3	4	0	0	0	101	3	1	0	2
2013	73	4	4	0	0	0	77	4	1	0	3
2014	87	2	6	0	3	0	96	2	0	1	1
Gustavus Forelands (Cow Harvest)											
2003	25	3	4	0	0	0	29	3	2	0	1
2004	44	5	6	2	0	0	50	7	4	0	3
2005	54	5	17	3	1	0	72	8	4	0	4
2006	14	0	3	0	1	0	18	0	0	0	0
2007	HUNT CLOSED										

Year	Unit residents		Other AK residents		Nonresidents		Total use		Transport	Non-guided services	Other services
	No	Yes	No	Yes	No	Yes	No	Yes			
2008	6	2	3	0	0	0	9	2	1	1	0
2009–2014	HUNT CLOSED										
					Taku River						
2003	76	0	6	0	1	0	83	0	0	0	0
2004	64	1	6	0	0	0	70	1	0	1	0
2005	76	0	9	0	0	0	85	0	0	0	0
2006	77	0	5	0	0	0	82	0	0	0	0
2007	78	2	6	0	1	0	85	2	2	0	0
2008	75	2	5	1	0	0	80	3	2	1	0
2009	77	0	5	0	1	0	83	0	0	0	0
2010	80	2	2	0	0	0	82	2	2	0	0
2011	88	0	10	0	0	0	98	0	0	0	0
2012	82	0	8	0	0	0	90	0	0	0	0
2013	76	2	9	0	1	0	86	2	1	1	0
2014	64	1	9	0	0	0	73	1	1	0	0

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010=1 July 2010–30 June 2011.

Recommendations for Activity 2.1

- Continue to monitor total harvest for comparison with management objectives.

Recommendations for Activity 2.2

- Continue to monitor antler structure and age data to inform management decisions.

3. Habitat Assessment-Enhancement

The current survey and inventory (S&I) project reported on in this report does not include monitoring browse, but we do recognize the importance of monitoring range quality and browsing intensity for closed populations like Berners Bay and for areas with seasonal concentrations of moose like Gustavus. Moose range in both of those areas has been evaluated, and browsing intensity in Gustavus has been monitored since 1999 as part of a research project (White et al. 2006, Hood et al. 2007). We will evaluate whether it would be better to add this activity to the S&I project or leave it as an element of the research project.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Recording:

- Annual Memo: Wildlife Excluded from Ceremonial Harvest (Appendix A).
- Gustavus moose population trajectory, 1966–2014 (Appendix B).

- Moose survey form (Appendix C).
- Berners Bay and Gustavus collared moose monitoring forms (Appendix D and Appendix E).
- Antler Forms (Appendix F).

Archiving

- Harvest data are stored on an internal database housed on a server (http://winfonet.alaska.gov/index.cfm). Field data sheets for surveys are stored in file folders in filing cabinets in the Douglas area office (Room 104).
- All other electronic data and files, such as survey memos and reports, are located on the computer and regional server (H:\Aerial surveys\Moose) in the Douglas area office area biologist cubicle. Field data sheets, paper files, hard copies, etc. are located in the file cabinet located in the Douglas area office beside the area biologist's cubicle.
- Permit overlay hard copies are retained in the Douglas area office warehouse, and electronically in WinfoNet.
- Antler photos are located on the area biologist's laptop computer and regional server (S:\Region1Shared-DWC\Offices\Douglas\Stephanie Sell\MooseAntler).

Conclusions and Management Recommendations

Taku: Without the snow conditions needed to conduct regular aerial surveys in the Taku River, it is difficult to determine the status of this moose population. However, in the absence of survey data, the age of harvested animals, the annual harvest, and the catch per unit effort by hunters all suggest that this population of moose is stable. We will attempt to survey the area on a more consistent basis and try to acquire survey data for the upper Taku River by working with Canadian biologists.

Berners Bay: The bull:cow ratios exceeded the management objective of 25:100 during the report period. However, the population objective of 80–90 moose was met in only 2 of 5 years. We believe survey conditions and timing play significant roles in the findings. For example, we anticipated a severe winter in RY11 would result in a population decline, but the number of moose found during the RY12 survey was as high as it has been since 1999. This suggests more research into sightability of this population is needed. Management and research staff will continue to monitor this population using a sample of 20–40 radiocollared cow moose with the goals of learning more about factors influencing sightability and documenting adult female survival, productivity, and fecundity.

Chilkat Range: The Chilkat Range moose numbers and composition are not attainable through aerial surveys. Therefore we must use hunter harvest and effort data to gauge how this population is doing. Because of the thickly forested areas in the Chilkat Mountains and the

inaccessible nature of most of this area, we believe the present strategy, allowing harvest of any bull, should be sustainable.

Gustavus Forelands: The management objective of 25 bulls:100 cows was not met during the report period. We believe the bull-to-cow ratio remains low due to relatively low adult survival and low calf survival and recruitment. The ongoing moose research project monitors body condition, pregnancy, and twinning rates. Although there is variability among years, estimated survival and pregnancy rates of adult female moose appear to have improved. However, low calf survival resulted in little population growth. Even with the positive indications listed above, increased predation and declining recruitment are reasons to continue closely monitoring this population.

The selective harvest strategy with a harvest cap first implemented in 2009 has changed the Gustavus hunt from a derby-style hunt to one where hunters are able to enjoy hunting for longer periods because they must locate a bull with a legal antler configuration. We believe this change has also enhanced public safety. Although hunters would prefer a higher harvest cap, the current hunt has been well received.

We believe that continuing the current registration permit system should help meet population objectives throughout Unit 1C by allowing the Division of Wildlife Conservation to monitor harvest and hunter effort. The collection of teeth for aging moose harvested throughout Unit 1C should be continued and a survey of browsing intensity in other key wintering areas to gage moose abundance relative to carrying capacity should be initiated. Research conducted at Gustavus and Berners Bay should serve as a template for investigations of other 1C moose populations.

II. Project Review and RY15–RY19 Plan

Review of Management Direction

MANAGEMENT DIRECTION

There are no changes in management direction for moose in Unit 1C.

CODIFIED OBJECTIVES

Amount Reasonably Necessary for Subsistence Uses (ANS)

Unit 1(C) (Gustavus Forelands) – In a memo issued annually by the Department, the Gustavus moose population has always been listed among the populations not open to subsistence harvest Appendix A).

Unit 1 (C) (remainder) – There is no Customary and Traditional Use Determination finding for moose in Unit 1C (remainder) listed in 5 AAC 99.025.

Intensive Management

None

MANAGEMENT OBJECTIVES

- *Taku drainage*: Annually compare hunter effort and success as well as age data from harvested moose to gain insight into the status of this moose population. Maintain an annual harvest of at least 10 bull moose. Gather aerial survey data on both the Alaska and the Canada portion of the Taku River, through ADF&G surveys and through correspondence with Canadian biologists.

Unit 1C:	Plan Objective
Annual hunter kill	10
Number of hunters	80
Hunter-days of effort	400
Hunter success	15%

- *Berners Bay:*

Unit 1C:	Plan Objective
Post hunt numbers	80–90
Annual hunter kill	5
Post-hunt bull:cow ratio	25:100
Number of hunters	5
Hunter-days of effort	15

- *Chilkat Range:* Annually compare hunter effort and success as well as age data from harvested moose to gain insight into the status of this moose population.

Unit 1C:	Plan Objective
Annual hunter kill	10
Number of hunters	80
Hunter-days of effort	400
Hunter success	15%

- *Gustavus Forelands:* Continue to monitor this population using marked animals for insight into annual survival as well as using marked animals to estimate sightability during aerial surveys. Maintain a bull: cow ratio of at least 25:100.

Unit 1C:	Plan Objective
Post hunt numbers	250–350
Annual hunter kill	10
Post-hunt bull:cow ratio	25:100
Number of hunters	80
Hunter-days of effort	600

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1 Continue to conduct annual aerial surveys post-hunt in areas that can be surveyed.

Data Needs

No changes. We currently conduct surveys annually when conditions allow.

Methods

Collaborate with Canadian biologists in the Upper Taku River drainages to better understand moose movement across the border.

For Gustavus and Berners Bay populations, transition collaring and aerial surveys from research project to S&I project with Area Management Biologist as the Principle Investigator. Maintain 20–40 radiocollared cow moose for sightability estimates and to monitor survival and calf production. Continue to estimate the post-hunt populations using both mark-resight estimates and models and parameters developed by the Gustavus and Berners Bay research projects.

ACTIVITY 1.2 Monitor abundance of moose including age and sex composition through hunter reports on required registration permits.

Describe Data Needs

No change. We continue to collect age and sex composition data through hunter reports annually.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor trends in hunter effort and abundance and distribution of moose including age and sex composition through hunter reports on required registration permits. Data needs and methods are the same for Activity 2.2.

ACTIVITY 2.2. Monitor number, age, and antler configurations of harvested moose by examining antlers (opportunistically or required depending on hunt) and collecting lower jaws for aging from successful hunters.

Data Needs

No change. We continue to collect harvest data annually.

Methods

No change from the current reporting period

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

Recording:

- Annual Memo: Wildlife Excluded from Ceremonial Harvest (Appendix A).
- Gustavus moose population trajectory, 1966–2014 (Appendix B).
- Moose survey form (Appendix C).
- Berners Bay and Gustavus collared moose monitoring form (Appendix D and E).
- Antler Forms (Appendix F).

Archiving:

- Harvest data are stored on an internal database house on the server (http://winfonet.alaska.gov/index.cfm). Field data sheets for surveys are stored in file folders in filing cabinets in the Douglas Area Office (Room 104).
- All other electronic data and files such as survey memos and reports are located on the computer and regional server (H:\Aerial surveys\Moose) in the Douglas area office Area Biologist cubicle. Field data sheets, paper files, hard copies, etc. are located in the file cabinet located in the Douglas Area Office beside the Area Biologist's cubicle.
- Permit Overlays- hardcopies are retained in the Douglas Area Office warehouse, and electronically in WinfoNet.
- Antler photos are located on the area biologist's laptop and desktop computers and on the regional server at (S:\Region1Shared-DWC\Offices\Douglas\Stephanie Sell\MooseAntler).

Agreements

None.

References Cited

Alaska Department of Fish and Game (ADF&G). 1990. Strategic plan for management of moose in Region I, Southeast Alaska 1990– 94, Division of Wildlife Conservation, Douglas, Alaska.

Hood, E., A. Miller, and K. White. 2007. Effects of moose foraging on soil nutrient dynamics in the Gustavus forelands, Alaska. Pages 20–24 [*In*] J. F. Piatt and S. M. Gende, editors. Proceedings of the Fourth Glacier Bay Science Symposium, 26-28 October 2004. U.S. Geological Survey, Scientific Investigations Report 2007–5047.

White, K. S., N. Barten, and J. Crouse. 2006. Ecology of moose on the Gustavus forelands: Population irruption, nutritional limitation, and conservation implications. Pages 25–28 [*In*] J. F. Piatt and S. M. Gende, editors. Proceedings of the Fourth Glacier Bay Science Symposium, 26-28 October 2004. U.S. Geological Survey, Scientific Investigations Report 2007–5047.

White, K. S., N. L. Barten, S. Crouse, and J. Crouse. 2014. Benefits of migration in relation to nutritional condition and predation risk in a partially migratory moose population. Ecology 95(1):225–237.

White, K. S., D. P. Gregovich, N. L. Barten, and R. Scott. 2012. Moose population ecology and habitat use along the Juneau Access road corridor, Alaska. Alaska Department of Fish and Game, Final Wildlife Research Report ADF&G/DWC/WRR-2012-03, Juneau.

♦ ♦ ♦

Appendix A. Annual memo on wildlife excluded from ceremonial harvest.

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Fish and Game

Division of Wildlife Conservation
Headquarters

1800 Glenn Hwy, Suite 4
Palmer, AK 99645
Main: 907.861.2100
Fax: 907.861.2121

DATE: April 8, 2014

To: Division of Wildlife Conservation Staff

FROM: Bruce Dale, Deputy Director,
Division of Wildlife Conservation
Department of Fish and Game

SUBJECT: Wildlife Excluded from Ceremonial Harvest

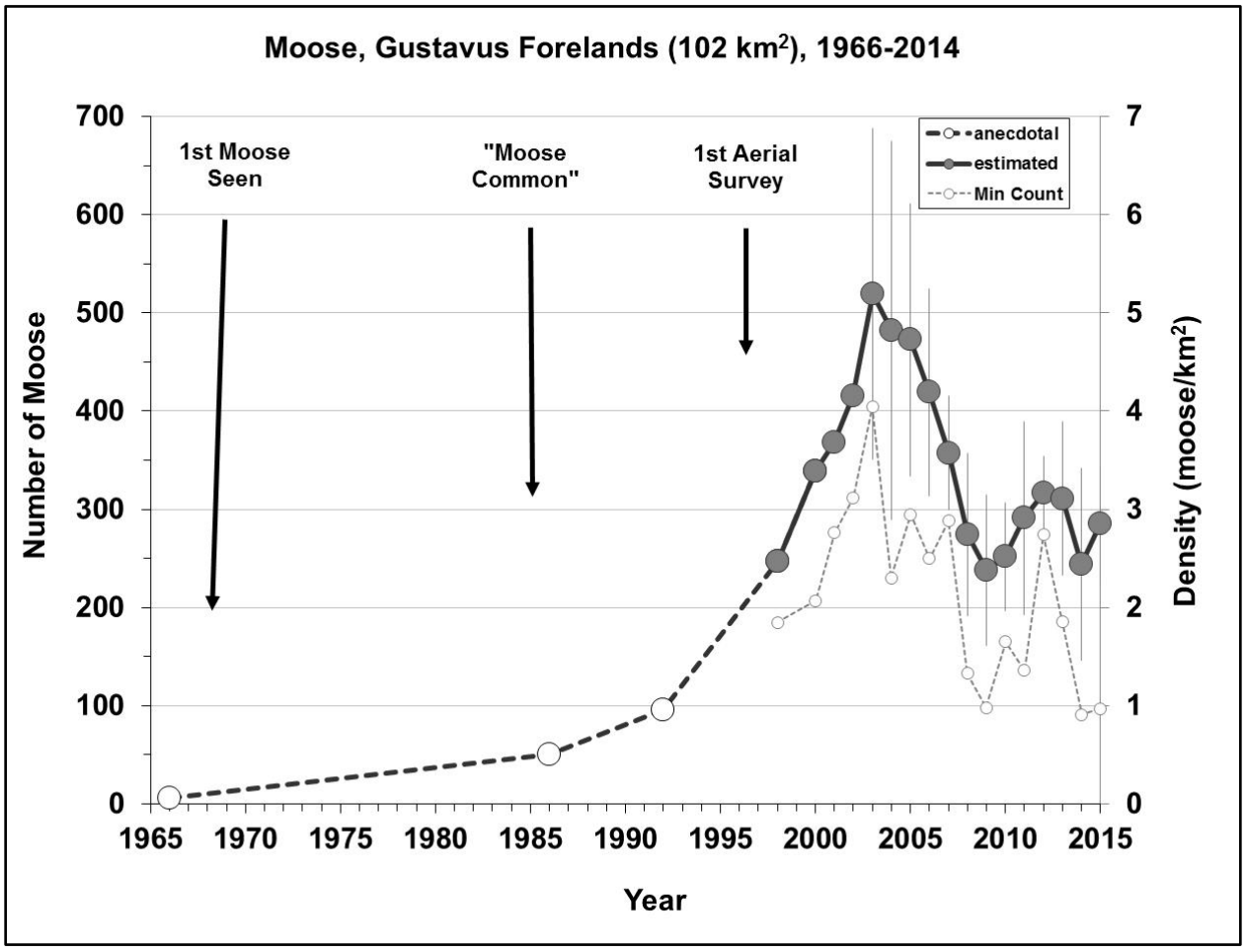
Under regulation 5 AAC 92.019 the department is required to compile and maintain a list of areas that are not eligible for ceremonial harvest of wildlife because harvest would be inconsistent with sustained yield principles. The department considers all areas that have an open hunting season for game eligible for ceremonial harvest. In addition, ceremonial harvest may be allowed for game populations that do not currently have a hunting season, but current population size and growth patterns indicate that a limited ceremonial harvest is sustainable. Ceremonial harvesters are encouraged to contact wildlife management staff for more specific information on harvest opportunities and procedures.

The following list of big game species by area do not meet the above criteria and are not available for ceremonial harvest at this time. Bison and elk are not eligible because the Board of Game has not determined that those species have customary and traditional use.

Species	Geographic Location
Bison	Statewide
Elk	Statewide
Moose	Unit 1A, for cow moose
Moose	Unit 1C, Berner's Bay – for cow moose; Gustavus – for cow moose
Moose	Unit 9, for cow moose
Muskoxen	Unit 18, excluding Nunivak and Nelson Island
Muskoxen	Unit 26A, that portion east of 154° W Longitude
Muskoxen	Units 26B and 26C

This list remains in effect until updated.

Appendix B. Gustavus moose population trajectory, 1966–2014.



Appendix C. Moose survey form.

Moose Survey Form (v. 11/29/12)

Page__________of__________

Area:	Date:	Observers/Pilot:	Aircraft Type:	Start Time:
Sky Conditions: Clear Ptly Cloudy Overcast/Flat		Wind Speed:	Temp:	Stop Time:
Snow Depth (in.):	Fresh Snow (in.)/Age (days):	% of Area Covered by Snow:	Snow on Trees?	Total Survey Time:
Comments:				

WPT/ Group	Bulls			Cows			Unk Sex	# Adults Checked for Collars	Collared Moose Data									Comments
	L	M	S	C0	C1	C2			Moose ID	Seen During Survey (Yes, No)	Activity (Bedded, Standing)	Light (Sun, Shade, Flat)	% Canopy Cover (10m radius)	Spruce <10m	Habitat (Mdw, Low Shb, Tall Shb, Conf, Mxd. Fst.)	% Snow (Complete Veg Visible Ground Visible)	Photo #	
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		
										Y N	B S	Su Sh Fl		Y N	M LS TS C MF	C V G		

Appendix D. Berners Bay collared moose monitoring form.

Berners Moose Telemetry Data Sheet (as of 6/16/16):

Date: Weather: Obs:

ID	Name	Freq	Collar	WPT	Beats/ Min	Calf Status	Comments	Calf Status
Berners/Forelands								
BM-20	Sockeye	149.500	92				U Berners	C1
BM-57	Chipotle	149.561	10				U Berners	C2
BM-54	Oasis	149.621	17				Hump	C0/Y1
BM-01	Micro	149.660	4				Hump	C0
BM-80	Sundance	149.690	62				L Berners	C1
BM-56	Bowl	149.750	6				Forelands	C2
BM-59	Shiya	150.151	29				U Berners (freq close to BM41 in Gilkey)	C1/Y1
BM-60	Talini	150.420	25				U State Lk	C1
BM-74	Catkin	150.688	36				U Berners	C1
BM-85	Astrila	150.800	56				U Berners	C0
Antler/Gilkey								
BM-78	Saturn	149.581	18				Antler	C1
BM-41	Woody	150.150	52				Antler (freq close to BM59 in Bersers)	C0/Y1
BM-58	Hootlin	150.159	32				L Gilkey	0
BM-77	Neptune	150.190	63				Antler	C0
BM-40	Slush	150.280	33				Antler	C0
BM-39	Bugs	150.321	55				U Antler	C2
BM-73	Mad Dog	150.550					Male; U Gilkey - no visual collar	--
BM-03	Tiny	150.780	45				Ant/Gilkey	C0
BM-79	Nano	150.939	81				BM03's 2013 calf; U Gilkey	C2
Lace								
BM-83	Trickster	149.521	16				U Lace	C1
BM-44	Lucky	149.531	20				U Lace - visual collar ripped	C1
BM-52	Zulu	149.611					U Lace-no visual collar	C0/Y1
BM-63	Clara	150.130	48				E Fork	C1
BM-65	Crick	150.291	53				E Fork	C0
BM-75	Hooter	150.389	39				Upper E Fork	C0
BM-86	Kayi	150.440	51				U Lace	C0
BM-82	Waterfall	150.560	78				E Fork	C1
BM-37	Bambi	150.599	37				U Lace	C2
BM-84	Williwaw	150.720	79				U Lace	C0
BM-17	Meadow	150.840					U Lace - no visual collar (white)	C1
Katzehin								
BM-67	Flats	150.211	57				Katz Flats	
BM-66	Katz	150.342	59				U Katzehin	

= no calf = calf = Male

VHF Pulse Mode: Live: 40-50/BPM, Dead: 65/BPM

Appendix E. Gustavus collared moose monitoring form.

Gustavus Moose (6/6/16)

Date: Weather:

ID	Name	Freq	Collar	WPT	BPM	Calf?	Comments	Calf Status
GM68	Barb	149.511	98					2
GM93	Myrica	149.651	35					1
GM89	Glenda	149.671	40					0
GM53	Bow	149.680 150.530	44				VHFcam-Bush	2
GM83	After	149.710	30					0
GM100	Swan	149.731 150.680	68				VHFcam-Brinno	1
GM84	Rosebud	150.000	2					2
GM62	Next	150.089	72					0
GM77	Nugget	150.099	34					0
GM09	Dopey	150.140	27					2
GM104	Breeze	150.167	23				GM103's 2015 calf	0
GM91	Dewlap	150.180	21				GM88's 2014 calf	1
GM73	Wonder	150.199	50					1
GM45	Thicket	150.220	64					0
GM88	Barble	150.230 150.880	65				GPScam-Brinno	2
GM17	Tower	150.240	73				Mortality, Excursion Ridge; 58.5026, 135.58639	
GM50	Horsetail	150.251	54					0
GM36	Tic	150.312	47					0
GM85	Carpet	150.331	77					1
GM82	Goldy	150.360	42					0
GM57	Gift	150.372	61				need tooth	1
GM69	Dolly	150.409	7				need tooth	2*
GM101	Acute	150.460 150.760	13				VHFcam-Bush	2*
GM96	Joker	150.470	76				GM81's 2015 calf	0
GM103	Sunshine	150.490	24					2
GM95	Buckbean	150.569 151.934	69				GPScam-Brinno	0
GM92	Bark	150.580	67				need tooth	2
GM81	Queen	150.589 151.660	43				GPScam-Brinno	0
GM55	Fester	150.629	11					1
GM97	Soapberry	150.660 151.740	14				GPScam-Brinno	0
GM90	Paydirt	150.670 150.640	70				GM80's 2014 calf VHFcam-Bush	1
GM98	Belle	150.700	3				GM88's 2015 calf	0
GM70	Nina	150.710	26					1
GM47	Stevie	150.728	22				not transmitting?	--
GM102	Sablefish	150.750	15				GM69's 2015 calf	0
GM78	Stickleback	150.789	49					0
GM51	Bunny	150.810 151.940	80				GPScam-Brinno	1
GM94	Salix	150.818	58				need tooth	0
GM63	Popcicle	150.899	12					2
GM64	Nelly	150.910	8					0
GM80	Sluicebox	150.920 150.770	1				VHFcam-Bush	1
GM76	Rain	150.949 150.970	41				VHFcam-Brinno	0
GM86	Gelato	150.959	82					0
GM65	Ringo	150.989	5					2
GW02	Black Wolf	151.490						--

= Calf = No Calf = Yearling

Live: 40/50 BPM, Dead: 30/60/100 BPM [Wolf: Live: 30/40 BPM, Dead: 50 BPM]

Appendix F. Moose antler measurement form.

RM049-···2015

MOOSE·ANTLER·MEASUREMENTS·(in·inches)

Permit·#··RM049-_____

Hunter's·Name:→ _____ →Date·of·Kill:→ _____

Kill·Location:→_____

Jaw: → Y·/·N → → → → → → → Legal: → Y·/·N

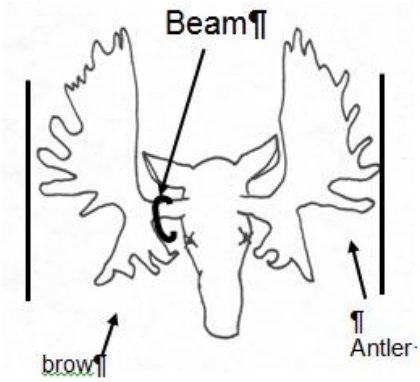
Total·Width:→_____

Antler·Points·(excl.·brow):→R·_____ → → L·_____

Brow·Points:→ → → → R·_____ → → L·_____

Beam·circumference:→ → R·_____ → → L·_____

Comments:→



Hunter·Signature:_____

Sealer·Signature:_____


ALASKA
DEPARTMENT OF FISH AND GAME