

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

Report Period 1 July 2015–30 June 2020, and

Plan Period 1 July 2020–30 June 2025

Roy Churchwell



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Plan Period 1 July 2020–30 June 2025

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

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

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Purpose of this Report

This report provides a record of survey and inventory management activities for moose in Unit 1C for the 5 regulatory years 2015–2019 and plans for survey and inventory management activities in the following 5 regulatory years, 2020–2024. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY14 = 1 July 2014–30 June 2015). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game's (ADF&G, the department) Division of Wildlife Conservation (DWC) launched this 5-year report to more efficiently report on trends and to 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. RY15–RY19 Management Report

Management Area

Game Management Unit (GMU) 1C encompasses approximately 7,600 mi² 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, 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 landowners playing roles. Geographic features have divided moose in Unit 1C into 4 discrete populations (Taku River, Berners Bay, Chilkat Range, and Gustavus Forelands).

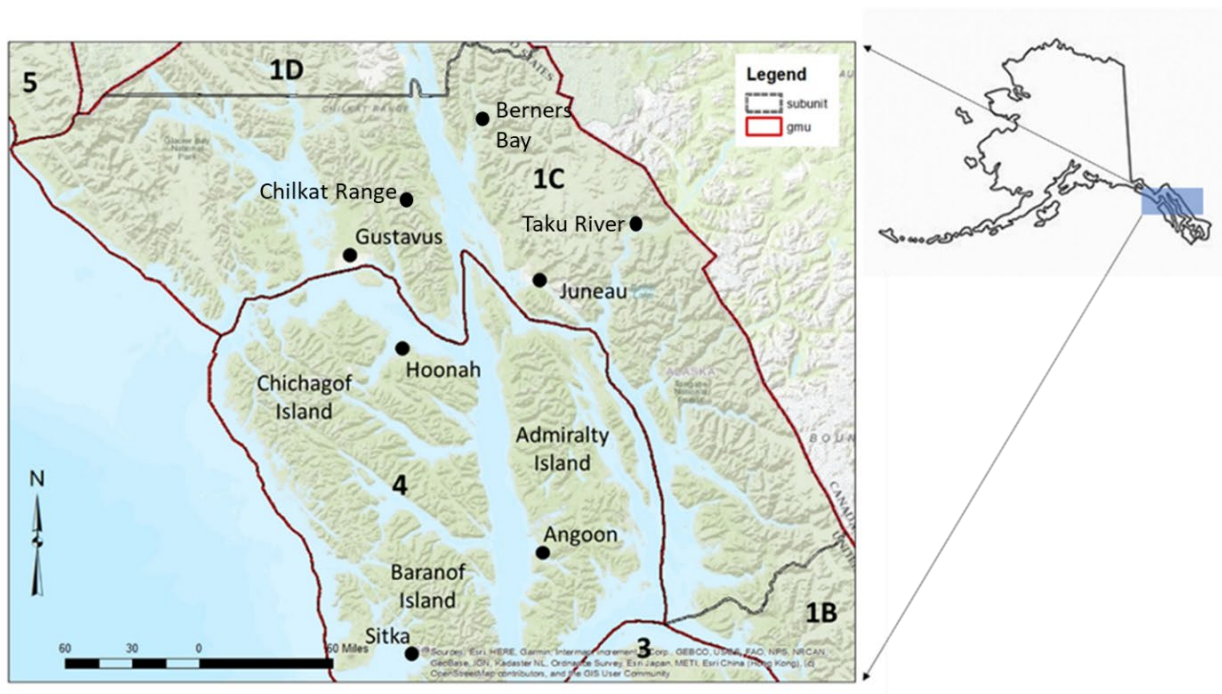


Figure 1. Map of Game Management Unit (GMU) 1C, Southeast Alaska.

TAKU RIVER

The Taku River is a transboundary river 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 1975. As in other areas of Southeast Alaska, moose habitat is generally associated with riparian sites supporting suitable forage. 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. 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 it is anticipated 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 the glacier advances far enough, it could dam the river and flood much of the current moose habitat.

BERNERS BAY

Berners Bay is located on the east side of Lynn Canal and includes the clear water Berners River drainage 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 the interior. Like elsewhere in Southeast Alaska, moose habitat is generally associated with early successional riparian habitat in disturbed areas associated with shifting river bars. In Berners Bay, much of the habitat is in 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 moose 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 lower quality habitat spruce or spruce-hemlock-dominated forest.

CHILKAT RANGE

The 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 drainages 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 thought 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.

GUSTAVUS FORELANDS

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 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

Taku River moose are indigenous 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 settlers in that country. Canadian biologists who occasionally conduct aerial surveys in the upper Taku report that moose from Alaska migrate into Canada during winter, possibly to avoid deeper snow near the coast and to access more forage. That could explain why fewer moose are observed 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. That population 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 moose calf transplants into the area in 1958 and 1960. In total, 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 between 5 and 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. This

included changing the harvest from bulls only to allowing both bulls and cows to balance the sex ratio and limit the population size to carrying capacity.

The use of a habitat capability model as well as moose browse surveys in the early 1980s helped inform the management objective that limits the post-hunt population to no more than 90 moose observed during aerial surveys. This was to assure that the herd did not exceed a level that the habitat could support. However, recently acquired body condition and productivity data for moose at larger population levels in Berners Bay indicates that moose are in good physical condition (K. White, DWC wildlife research biologist, Douglas, personal communication). Body condition is an indication of habitat quality, and in Berners Bay, good body condition suggests the habitat may be able to support a larger number of moose.

CHILKAT RANGE

Chilkat Range moose are relative newcomers to the Chilkat Range and 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 near Haines. In 1965 moose were sighted for the first time along the Endicott River and St. James Bay. 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 Point 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 the Chilkat Range, it is difficult to gather reliable aerial survey data, so our understanding of this moose population is limited to hunter harvest and reports.

GUSTAVUS FORELANDS

The first sightings of moose in the Gustavus area occurred in 1958. It is likely that moose migrated to this area via the Excursion River drainage. The population slowly grew over the next 30 years, and the first hunt occurred in 1988. During the 1990s the population experienced eruptive growth accounting 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 population growth. Biologists 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 the body condition of harvested female moose direct management of this population.

Management Direction

For management purposes, we have separated the moose in Unit 1C into 4 distinct populations, with 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; however, the 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 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 the creation of the Region I moose management plan in the late 1980s.

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 Uses

Unit 1C (Gustavus Forelands and Berners Bay) – In an annual memorandum 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 closed to ceremonial harvest.

Unit 1C (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.

Taku River drainage plan objectives:

- Annual hunter kill: 10 moose
- 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.

Berners Bay plan objectives:

- Post hunt numbers: 80–90 moose
- Annual hunter kill: 5 moose
- Post-hunt bull-to-cow ratio of 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.

Chilkat Range plan objectives:

- Annual hunter kill: 10 moose
- 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.

Gustavus Forelands plan objectives:

- Post hunt numbers: 250–350 moose
- Annual hunter kill: 15 moose
- Post-hunt bull-to-cow ratio of 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.

Data Needs

Population estimates, including minimum counts, age composition, and sex composition are used to inform management throughout most of Unit 1C. Because dense coniferous forests cover most of the Chilkat Range and the areas south of the Taku River, surveys focus on Berners Bay and the Gustavus Forelands. Minimum counts, age ratios, and sex ratios are compiled for each location. A subsample of collared animals is maintained in Berners Bay and the Gustavus Forelands. This allows ADF&G biologists to estimate populations with confidence intervals and to account for variation in survey conditions. Similarly, population models have been created to assist management in setting harvest goals.

Methods

When weather and pilot availability allowed, population abundance and composition surveys were conducted using fixed-winged aircraft (Piper PA-18 Super Cub or equivalent aircraft) following the onset of winter snowfall. The number of animals, age composition, and sex composition were recorded during surveys. Due to the inability to accurately distinguish between adult males and females following antler drop, after December 1 adults lacking antlers and in the absence of calves were defined as “unknown sex”.

ADF&G maintains a sample of radiocollared animals in Berners Bay and Gustavus Forelands. Collared animals allow biologists 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. During surveys, the number of radiocollared moose observed was enumerated. 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. Surveys are conducted less frequently on the Taku River and Chilkat Range because they do not adequately assess the population. This is due to

moose migrating out of the U.S. side of the Taku drainage in winter and heavy forests that blanket the Chilkat Range.

Results and Discussion

During RY15–RY19, we did not fly any aerial moose surveys in the Taku River or the Chilkat Range due to either poor conditions or there being higher priority areas to survey. We did survey Berners Bay and the Gustavus Forelands (Table 1). Composition surveys were not always possible due to antler loss during late-season surveys. In many years snow conditions do not allow surveys until December or January. Unfortunately, this is after antler drop has commenced and at a time when differentiating between male and female moose is no longer possible.

Berners Bay

Aerial surveys, including post-hunt surveys, were conducted in RY16 and RY18 for Berners Bay. A post-hunt survey in RY19 was aborted early in the survey due to poor flying and weather conditions. These conditions persisted in RY19 for the remainder of the year and did not allow for another survey opportunity.

Total moose counted during surveys has been over 100 animals (range = 106–115) in RY15–RY19, which is greater than the recommended 80–90 animals outlined in the objectives. Adult animals captured during this period have been in good body condition suggesting that a population greater than 90 animals post-hunt can be supported. In RY15–RY19 there were an average of 26 moose per hour observed, with 20 moose per hour observed in RY10–RY14. Moose counts in RY10–RY14 were lowest in the beginning of the period, demonstrating a recovery from the heavy snow winters of 2006–2009.

Gustavus Forelands

Aerial surveys were conducted every year during RY15–RY19. The largest count in RY17 was 194 moose, which is well below the post-hunt objective of 250–350 moose. Moose counts during RY15–RY19 ranged from 91 to 194 animals. Data from collared females in this population indicated that adult survival was low during RY15–RY19 which could have contributed to a decline in the population. Habitat succession has also progressed to the detriment of moose browse, which may slowly decrease the carrying capacity of this area for moose. There was an average of 32 moose per hour counted during RY15–RY19, which is about 10 moose per hour less than the RY10–RY14 average of 42 moose per hour.

Recommendations for Activity 1.1.

Continue with modification. The population estimate model currently used for Gustavus and Berners Bay requires population data and survival data for adults and calves, which is currently collected by DWC research staff. DWC regional coordinators and supervisor recommend transitioning the current Berners Bay and Gustavus moose projects from DWC research staff to DWC management staff and include maintaining 20–40 VHF radiocollared moose in each population. This would allow DWC management biologists to estimate sightability for mark-resight population estimates. DWC management staff might need to continue calf survival surveys periodically in the absence of research support after transferring these projects. It would

be helpful to expand these models to areas where surveys are not an option due to topography and as a result have limited demographic information.

DWC does not survey the Taku River regularly because good survey conditions are rare and other areas usually take priority. DWC management biologists should request survey and harvest information gathered by Canadian biologists (British Columbia provincial wildlife biologist) to gain insight into whether the current harvest in Alaska is sustainable.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor trends in hunter effort, moose abundance, and moose distribution including age and sex composition. Monitor number, age, and antler configurations of harvested moose.

Data Needs

Monitoring the harvest and analyzing harvest data are essential to determining whether harvest objectives have been met and harvest is 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, which include the following: DM041–Berners Bay; RM046–remainder of Unit 1C; RM049–Gustavus Forelands; or RM038–Port Houghton to Cape Fanshaw (Fig. 2). Each permit requires the hunter’s demographic information, including their hunting license number. Permits also include a punch ticket that hunters must validate upon successful harvest of a moose. Each permit 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 front portion of the lower jaw to ADF&G so teeth can be pulled for aging. Teeth are sent to Matson Laboratory, LLC (Manhattan, MT) for aging. Successful RM049 and RM038 hunters must present moose antlers to ADF&G to verify compliance with antler restrictions and collect information on antler configuration. For all other hunt areas within Unit 1C, hunters are asked to voluntarily send antler photos to the department, which allows the area manager to correlate antler configuration with age. Such information has been used in the past to provide insight regarding recruitment which has helped in refining antler regulations.

Table 1. Minimum count and composition aerial moose survey data, regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hours)	Bulls/ 100 cows	Calves/ 100 cows	Calves % in herd	Moose/ hour
<i>Berners Bay</i>											
	2010	18	45	10	0	73	4.3	40	22	14	17
	2011	22	41	10	0	73	—	54	24	14	—
	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 ^a	105	4.7	42	46	23	22
	2015 ^b										
	2016	18	31	27	39 ^a	115	3.8	26	39	23	30
	2017										
	2018	2 ^c	26	13	65 ^a	106	4.8	— ^c	14	12	22
	2019										
<i>Chilkat Range</i>											
	2010–2014 ^b	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^b	—	—	—	—	—	—	—	—	—	—
<i>Taku River</i>											
	2010–2014 ^b	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^b	—	—	—	—	—	—	—	—	—	—
<i>Gustavus Forelands</i>											
	2010	14	22	22	107 ^a	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 ^a	186	4.1	21	33	22	44
	2014	— ^c	24	12	55 ^a	91	4.0	— ^c	50	13	23
	2015	15	65	15	2	97	3.3	20	22	15	29
	2016	19	36	22	59 ^a	136	4.0	20	23	16	34

-continued-

Table 1. Page 2 of 2.

Area	Regulatory year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hours)	Bulls/ 100 cows	Calves/ 100 cows	Calves % in herd	Moose/ hour
<i>Gustavus Forelands</i>											
	2017	— ^c	45	22	127 ^a	194	5.4	— ^c	13	11	36
	2018	19	76	17	0	112	3.5	25	22	15	32
	2019	1 ^c	10	13	67 ^a	91	3.2	— ^c	16	14	28

^a Moose of unknown sex are presumed to be female for bull-to-cow and calf-to-cow calculations.

^b No survey was conducted.

^c Survey was conducted post antler drop; therefore, males and females cannot be definitively determined.

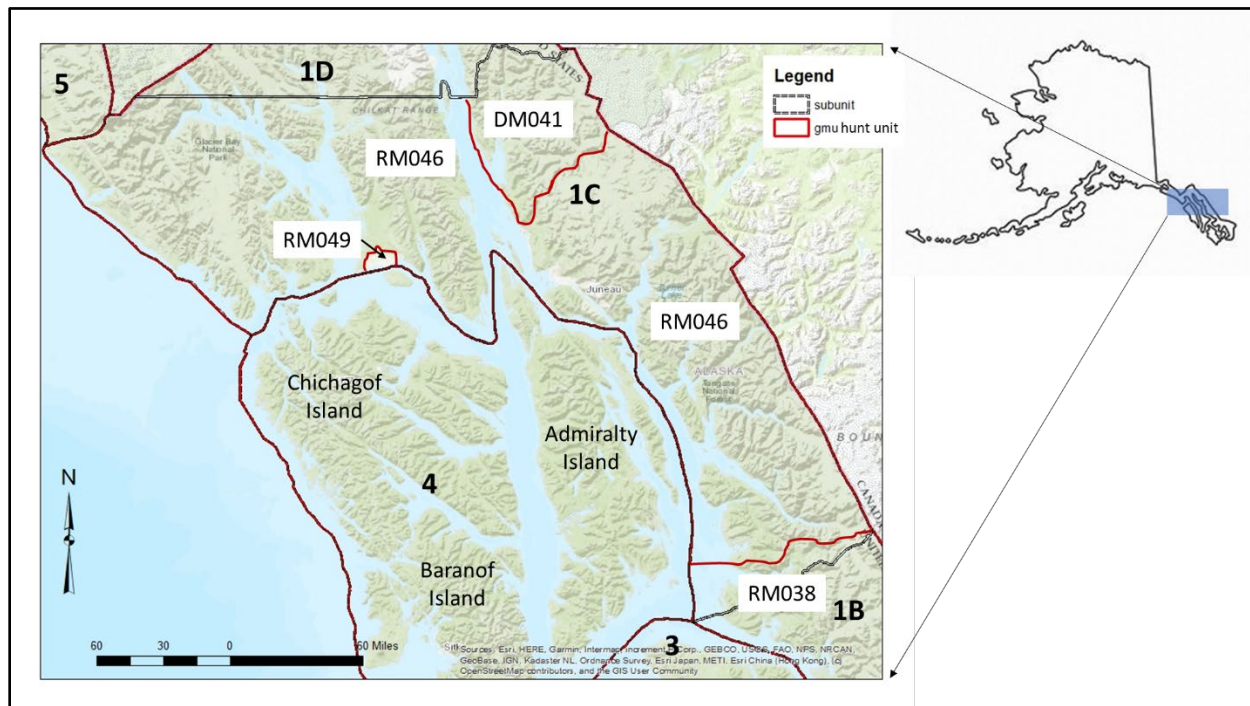


Figure 2. Map of GMU 1C moose registration hunt areas (RM038, DM041, RM046, and RM049), Southeast Alaska.

Season and Bag Limit

Area	Season and bag limits	Resident and nonresident hunter
Unit 1C (DM041), Berners Bay Drainages	1 moose by drawing permit only; up to 30 permits may be issued	15 Sep–15 Oct (General hunt only)
Unit 1C (RM038), that portion south of Point Hobart, including all Port Houghton drainages	1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on 1 side or 2 or more brow tines on both sides by registration permit only	15 Sep–15 Oct (General hunt only)
Unit 1C (RM049), 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 or 1 antlerless moose by drawing permit only; up to 100 permits may be issued	15 Sep–15 Oct (General hunt only) 15 Nov–30 Nov (General hunt only)
Remainder of Unit 1C (RM046)	1 bull by registration permit only	15 Sep–15 Oct (General hunt only)

Results and Discussion

Harvest by Hunters

TAKU RIVER

The annual harvest of moose increased substantially during this reporting period (Table 2). There was an average of 29 moose harvested in RY15–RY19 compared to 15 moose harvested RY10–RY14. The number of hunters also increased but hunter percent success increased as well. This indicates that higher hunter success was due to a moose population increase that hunters were able to take advantage of. The average age of harvested animals has decreased slightly (Table 3). This signifies that the moose population is younger with an average age of 2.3 years during RY10–RY14 compared to 2.1 years in RY15–RY19. From RY10 to RY19, 60% of harvested moose were yearling bulls. The large number of young bulls in the harvest points to good recruitment in the population. All plan objectives for this hunt were exceeded during RY15–RY19.

BERNERS BAY

Annual harvest averaged 5 moose (range = 4–7 moose) during this reporting period, RY15–RY19. During much of the previous reporting period the hunt was closed (RY10–RY13) while the population recovered from the hard winters of 2006–2009. In RY14 a draw for the harvest of 5 moose was held and 4 moose were harvested. There were no antlerless hunts held during RY10–RY19. The hunt plan objectives were met during this reporting period.

CHILKAT RANGE

The average annual harvest of 9 moose during this reporting period (RY15–RY19) is lower than the previous reporting period that averaged 13 moose (RY10–RY14; Table 2). This decline could be due to a decrease in hunting pressure from 70 to 92 hunters in RY15–RY19 and RY10–RY14, respectively. This is also supported by similar values for percent harvest success among the 2 periods 13.4% and 14.2%, respectively. There was no indication of change in the age of harvested moose from this population with an average age of 3 for this reporting period and 4 for the previous period (Table 3). The annual hunter kill and hunter success were lower than the plan objectives for this area with on objective harvest of 10 animals and 15% percent hunt success.

GUSTAVUS FORELANDS

Guideline harvest goals for each year are based on information collected over the previous year. The average annual harvest for RY15–RY19 was 10 moose, which is the same as the 10 moose average from the last report period (RY10–RY14; Table 2). This hunt has been below the plan objective harvest of 15 moose since RY10. At this point, the population cannot sustain a higher bull harvest. Nearly all of the bulls with spike-fork, 3 brow-tine, and greater than 50-inch antlers are harvested from this population each year, based on post-hunt bull counts. There would need to be a larger moose population for an increase in harvest to be warranted. This population is also below the population objective; thus, the goal should be to increase this population if there is an opportunity. Staff continued to provide a community training event for RM049 moose hunters in Gustavus at which time antler architecture was discussed. Between 1 and 5 bulls that did not meet legal antler requirements were brought in to ADF&G each year (RY15–RY19), which emphasizes the need to continue public education efforts prior to the moose hunt. There was a slight increase in the age of harvested bull moose on the Gustavus Forelands with a change from 2.9 years in the previous reporting period to 3.7 years in the current reporting period (Table 3). There were no antlerless hunts held during RY10–RY19.

Table 2. Moose harvest, number of hunters, and percent success for regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	No. males	No. females	No. unknown	Total harvest	No. hunters	Percent success
<i>Berners Bay</i>							
	2010–2013 ^a	–	–	–	–	–	–
	2014	4	0	0	4	5	80
	2015	4	0	0	4	5	80
	2016	4	0	0	4	5	80
	2017	7	0	0	7	7	100
	2018	6	0	0	6	7	86
	2019	5	0	0	5	5	100
<i>Berners Bay (Antlerless Harvest)^a</i>							
	2010–2014 ^a	–	–	–	–	–	–
	2015–2019 ^a	–	–	–	–	–	–
<i>Chilkat Range</i>							
	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
	2015	11	0	0	11	67	15
	2016	12	0	0	12	69	17
	2017	9	0	0	9	87	10
	2018	8	0	0	8	65	12
	2019	8	0	0	8	62	13
<i>Gustavus Forelands</i>							
	2010	12	1 ^b	0	13 ^b	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
	2015	13	0	0	13	85	15
	2016	10	0	0	10	86	12
	2017	9	0	0	9	80	11
	2018	7	0	0	7	73	10
	2019	9 ^b	0	0	9 ^b	62	13
<i>Gustavus Forelands (Antlerless Harvest)^a</i>							
	2010–2014 ^a	–	–	–	–	–	–
	2015–2019 ^a	–	–	–	–	–	–

-continued-

Table 2. Page 2 of 2.

Area	Regulatory year	No. males	No. females	No. unknown	Total harvest	No. hunters	Percent success
<i>Taku River</i>							
	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
	2015	26	0	0	26	99	26
	2016	22	0	0	22	110	20
	2017	30	0	0	30	123	24
	2018	30	0	0	30	133	23
	2019	39	0	0	39	138	28

^a Hunt closed.^b One illegal take.**Table 3. Moose age at harvest, regulatory years 2010–2019, GMU 1C, Southeast Alaska.**

Area	Regulatory year	Age class								Total harvest	Percent aged	Mean age
		1.5	2.5	3.5	4.5	5.5	6.5	7–9	10+			
<i>Berners Bay</i>												
	2010–2013 ^a	—	—	—	—	—	—	—	—	—	—	—
	2014	0	1	0	2	1	0	0	0	4	100	4.3
	2015	3	0	0	1	0	0	0	0	4	100	2.3
	2016	0	1	1	0	1	0	1	0	4	100	4.8
	2017	1	2	1	1	0	2	0	0	7	100	3.9
	2018	0	2	2	1	0	0	1	0	6	100	4.0
	2019	1	2	2	0	0	0	0	0	5	100	2.7
<i>Berners Bay (Antlerless Harvest)</i>												
	2010–2014 ^a	—	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^a	—	—	—	—	—	—	—	—	—	—	—
<i>Chilkat Range</i>												
	2010	2	1	1	1	0	3	1	1	11	91	5.3
	2011	6	6	0	3	2	0	2	1	20	100	3.8
	2012	1	1	5	2	1	0	0	0	11	91	3.6
	2013	3	1	3	0	1	1	1	0	10	100	3.2
	2014	5	1	1	1	3	0	0	2	13	100	3.8
	2015	3	3	1	1	2	1	0	0	11	100	3.4
	2016	4	3	0	0	1	0	1	0	11	82	2.9

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Table 3. Page 2 of 2.

Area	Regulatory year	Age class								Total harvest	Percent aged	Mean age
		1.5	2.5	3.5	4.5	5.5	6.5	7–9	10+			
<i>Chilkat Range</i>												
	2017	3	2	2	0	1	0	0	1	9	100	3.6
	2018	1	1	2	2	2	0	0	0	8	100	3.9
	2019	3	2	1	1	1	0	0	0	8	100	2.9
<i>Gustavus Forelands</i>												
	2010	7	1	1	1	1	1	1	0	13	100	3.2
	2011	4	0	0	2	1	0	1	0	8	100	3.5
	2012	5	2	0	0	0	1	0	0	8	100	2.4
	2013	7	1	2	2	0	0	1	0	13	100	2.4
	2014	6	0	2	1	0	0	2	0	11	100	2.9
	2015	5	1	1	3	0	2	0	1	13	100	3.9
	2016	2	2	2	0	3	1	0	0	10	100	3.8
	2017	3	0	2	0	1	1	1	0	9	89	3.9
	2018	1	2	1	1	1	0	0	0	7	86	3.3
	2019	2	4	0	1	0	0	1	0	8	100	3.4
<i>Gustavus Forelands (Antlerless Harvest)</i>												
	2010–2014 ^a	–	–	–	–	–	–	–	–	–	–	–
	2015–2019 ^a	–	–	–	–	–	–	–	–	–	–	–
<i>Taku River</i>												
	2010	10	1	0	0	1	0	0	0	12	100	1.9
	2011	10	1	1	0	0	3	0	0	16	94	2.7
	2012	7	4	2	0	0	0	0	1	14	100	2.7
	2013	15	1	2	1	0	1	0	0	20	100	1.7
	2014	2	5	3	1	0	0	1	0	12	100	2.7
	2015	20	3	0	1	0	0	0	0	26	92	1.8
	2016	15	4	2	0	1	0	0	0	22	100	2.0
	2017	17	8	4	0	0	0	0	0	30	97	2.1
	2018	14	11	5	0	0	0	0	0	30	100	2.2
	2019	20	9	7	0	1	0	0	0	39	95	2.2

^a Hunt closed.

Permit Hunts

Unit 1C moose hunts are managed under both drawing and registration permits. Drawing permits are used to manage both bull (DM041) and antlerless moose (DM042) hunts in Berners Bay. There are 3 drawing permits used to manage the antlerless hunt in the Gustavus area: DM043, DM044, and DM045. There is a single registration permit (RM049) to manage the bull moose hunt. The remaining areas of Unit 1C, including the Chilkat Peninsula and Taku River, are managed under an any bull registration permit (RM046).

An annual mean of 308 RM046 permits were issued during RY15–RY19 in Unit 1C. RM046 permits are issued for all of Unit 1C not covered by RM049, DM041, and RM038, and the resulting reporting data indicate that of those that hunted, 37% hunted the Chilkat Range and 63% hunted the Taku River area (Table 4).

For the Gustavus area, an annual mean of 113 permits (RM049) were issued from RY15–RY19 (Table 4). This is a decrease from the previous reporting period (RY10–RY14) where the annual average number of permits issued was 142. This is likely due to the selective harvest strategy which was put in place in 2009 and restructured the hunt for a spike-fork, 50-inch, or 3-brow-tine bull harvest that decreased hunter success and encouraged local participation due to the amount of time necessary to be successful. Overall, 68% of permittees hunted during RY15–RY19.

Hunter Residency and Success

Most moose harvested in Unit 1C continue to be taken by residents of Unit 1C (Table 5). During RY15–RY19, residents of Unit 1C were responsible for 86% of the total harvest, other Alaska residents harvested 12%, and nonresidents harvested 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 between hunt locations, and management objectives set for hunter success were met only in Berners Bay and the Taku River area (Table 4).

Table 4. Hunter effort and success for moose, regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	Permits issued ^a	Successful hunters			Unsuccessful hunters			Total hunters		
			No. hunters	Total days	Average days	No. hunters	Total days	Average days	No. hunters	Total days	Average days
<i>Berners Bay</i>											
	2010–2013 ^b	—	—	—	—	—	—	—	—	—	—
	2014	5	4	20	5.0	1	6	6.0	5	26	5.2
	2015	5	4	11	2.8	1	0	0.0	5	11	2.2
	2016	5	4	5	1.3	1	4	4.0	5	9	1.8
	2017	7	7	24	3.4	0	0	0.0	7	24	3.4
	2018	7	6	11	1.8	1	5	5.0	7	16	2.3
	2019	5	5	14	2.8	0	0	0.0	5	14	2.8
<i>Berners Bay (Antlerless Hunt)</i>											
	2010–2014 ^b	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^b	—	—	—	—	—	—	—	—	—	—
<i>Chilkat Range</i>											
	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
	2015	274	11	50	4.5	56	361	6.4	67	411	6.1
	2016	300	12	30	2.5	57	252	4.4	69	282	4.1
	2017	338	9	42	4.7	78	386	4.9	87	428	4.9
	2018	310	8	17	2.1	57	278	4.9	65	295	4.5
	2019	316	8	26	3.3	54	208	3.9	62	234	3.8
<i>Gustavus Forelands</i>											
	2010	142	13	45	3.5	83	452	0.2	96	497	5.2
	2011	153	8	80	10.0	100	762	7.6	108	842	7.8

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Table 4. Page 2 of 2.

Area	Regulatory year	Permits issued ^a	Successful hunters			Unsuccessful hunters			Total hunters		
			No. hunters	Total days	Average days	No. hunters	Total days	Average days	No. hunters	Total days	Average days
<i>Gustavus Forelands</i>											
	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
	2015	130	13	121	9.3	72	494	6.9	85	615	7.2
	2016	114	10	36	3.6	76	554	7.3	86	590	6.9
	2017	122	9	25	2.8	71	692	9.7	80	717	9.0
	2018	106	7	28	4.0	66	562	8.5	73	590	8.1
	2019	95	8	54	6.8	54	384	7.1	62	438	7.1
<i>Gustavus Forelands (Antlerless Harvest)</i>											
	2010–2014 ^b	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^b	—	—	—	—	—	—	—	—	—	—
<i>Taku River</i>											
	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
	2015	—	26	85	2.9	70	281	4.0	96	366	3.7
	2016	—	22	85	3.4	85	374	4.4	107	459	4.2
	2017	—	30	99	3.0	90	365	4.1	120	464	3.8
	2018	—	30	98	3.2	102	420	4.1	132	518	3.9
	2019	—	39	140	3.3	95	428	4.5	134	568	4.1

^a 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.

^b Hunt closed.

Table 5. Annual moose harvest by community of residence, regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	Total harvest	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Nonresident
<i>Berners Bay</i>										
	2010–2013 ^a	—	—	—	—	—	—	—	—	—
	2014	4	0	4	0	0	0	0	0	0
	2015	4	0	4	0	0	0	0	0	0
	2016	4	0	4	0	0	0	0	0	0
	2017	7	0	5	0	0	0	0	1	1
	2018	6	0	4	0	0	0	0	1	1
	2019	5	0	4	0	0	0	0	1	0
<i>Berners Bay (Antlerless Harvest)</i>										
	2010–2014 ^a	—	—	—	—	—	—	—	—	—
	2015–2019 ^a	—	—	—	—	—	—	—	—	—
<i>Chilkat Range</i>										
	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
	2015	11	0	10	1	0	0	0	0	0
	2016	11	0	9	1	0	0	0	1	0
	2017	9	0	8	1	0	0	0	0	0
	2018	8	0	7	1	0	0	0	0	0
	2019	8	0	6	1	0	0	0	0	1

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Table 5. Page 2 of 2.

Area	Regulatory year	Total harvest	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Nonresident
<i>Gustavus Forelands</i>										
	2010	13	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
	2015	13	10	3	0	0	0	0	0	0
	2016	10	7	2	0	0	0	0	0	1
	2017	9	6	1	0	0	0	0	1	1
	2018	7	4	3	0	0	0	0	0	0
	2019	8	8	0	0	0	0	0	0	0
<i>Gustavus Forelands (Antlerless Harvest)</i>										
	2010–2014 ^a	—	—	—	—	—	—	—	—	—
	2015–2019 ^a	—	—	—	—	—	—	—	—	—
<i>Taku River</i>										
	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
	2015	26	0	23	2	0	1	0	0	0
	2016	22	0	18	1	0	0	0	3	0
	2017	30	1	25	3	0	1	0	0	0
	2018	30	0	29	0	0	0	0	1	0
	2019	39	0	32	3	0	0	0	4	0

^a Hunt closed.

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 in the Chilkat Range and the Taku River areas are much slower than in the Gustavus area; however, the majority of their respective harvests are still within the first 2 weeks of the season start.

Transport Methods

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

TAKU RIVER

In the Taku River area boats were the most widely used mode of transportation among successful hunters, with the remainder using either airplanes or off-road vehicles (ORV). 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.

BERNERS BAY

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

CHILKAT RANGE

Hunters on the Chilkat Peninsula used boats, ORVs, airplanes, and highway vehicles for transportation to hunting areas. Generally, hunters use airplanes to access the Chilkat Range in the upper Endicott River area. Most hunters that use boats access the area at St. James Bay, Howard Bay, or Point Couverden/Swanson Harbor. Off-road vehicle use in the Couverden area is gaining popularity due to the combination of an increase in moose numbers and growing awareness of local logging roads which provide access for ORVs.

GUSTAVUS FORELANDS

In general, successful hunters in Gustavus either drive to their hunt areas using a highway vehicle or hunt on or near property that they own. ATV access for hunting moose at Gustavus is restricted to “constructed road surfaces” only; thus, there is limited use of ATVs.

Table 6. Transport methods used by successful moose hunters, regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	Airplane		Boat		3- or 4- wheeler		Highway vehicle		Foot	
		Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
<i>Berners Bay</i>											
	2010–2013 ^a	—	—	—	—	—	—	—	—	—	—
	2014	0	—	4	100	0	—	0	—	0	—
	2015	0	—	4	100	0	—	0	—	0	—
	2016	0	—	4	100	0	—	0	—	0	—
	2017	0	—	7	100	0	—	0	—	0	—
	2018	0	—	6	100	0	—	0	—	0	—
	2019	0	—	5	100	0	—	0	—	0	—
<i>Berners Bay (Antlerless Hunt)</i>											
	2010–2014 ^a	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^a	—	—	—	—	—	—	—	—	—	—
<i>Chilkat Range</i>											
	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	—
	2015	4	36	4	36	3	28	0	—	0	—
	2016	3	27	6	55	0	—	2	18	0	—
	2017	4	45	3	33	2	22	0	—	0	—
	2018	2	25	4	50	2	25	0	—	0	—
	2019	3	38	2	25	2	25	1	12	0	—
<i>Gustavus Forelands</i>											
	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 ^b	0	—	0	—	0	—	10	91	0	—
	2015	0	—	0	—	0	—	11	85	2	15
	2016	1	10	1	10	0	—	8	80	0	—
	2017	0	—	0	—	0	—	8	89	1	11
	2018	0	—	1	14	0	—	4	57	2	29
	2019	0	—	0	—	0	—	5	63	3	37

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Table 6. Page 2 of 2.

Area	Regulatory year	Airplane		Boat		3- or 4- wheeler		Highway vehicle		Foot	
		Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
<i>Gustavus Forelands (Antlerless Hunt)^a</i>											
	2010–2014 ^a	–	–	–	–	–	–	–	–	–	–
	2015–2019 ^a	–	–	–	–	–	–	–	–	–	–
<i>Taku River</i>											
	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	–
	2015	2	8	23	88	1	4	0	–	0	–
	2016	1	5	21	95	0	–	0	–	0	–
	2017	1	3	29	97	0	–	0	–	0	–
	2018	1	3	29	97	0	–	0	–	0	–
	2019	0	–	39	100	0	–	0	–	0	–

^a Hunt closed.

^b One additional hunter used a horse for transportation.

Commercial Services

Commercial services were used by 5% of hunters that reside in Unit 1C during RY15–RY19 (Table 7). Unit 1C residents were more likely to use commercial services, usually for transport to the field.

Other Mortality

During RY15–RY19 annual survival estimates for radiocollared female moose in Berners Bay were consistent from year to year (0.91 ± 0.05) until RY19 when survival was at 0.67 ± 0.07 , the lowest it had been since monitoring started in 2006. This was probably due to deep snow in the spring that allowed for heavy predation on the herd. Also, many of the radiocollared cows in this population are old in age.

During RY15–RY19, survival estimates were also low for the moose population in the Gustavus area, 0.88 ± 0.05 in RY16, 0.78 ± 0.06 in RY18, and 0.80 ± 0.06 in RY19. Like the Berners Bay area, an aging population of collared animals could be contributing. Based on reports from local residents and hunters, there are also indications of increased predation pressure with large numbers of wolves and brown bears in the Gustavus area.

Table 7. Commercial services used by moose hunters, regulatory years 2010–2019, GMU 1C, Southeast Alaska.

Area	Regulatory year	Unit residents		Other Alaska residents		Nonresidents		Total use		Transport	Nonguided services	Other services
		No	Yes	No	Yes	No	Yes	No	Yes			
<i>Berners Bay</i>												
	2010–2013 ^a	—	—	—	—	—	—	—	—	—	—	—
	2014	5	0	0	0	0	0	5	0	0	0	0
	2015	5	0	0	0	0	0	5	0	0	0	0
	2016	5	0	0	0	0	0	5	0	0	0	0
	2017	5	0	1	0	1	0	7	0	0	0	0
	2018	5	0	1	0	1	0	7	0	0	0	0
	2019	4	0	1	0	0	0	5	0	0	0	0
<i>Berners Bay (Antlerless Hunt)^a</i>												
	2010–2014 ^a	—	—	—	—	—	—	—	—	—	—	—
	2015–2019 ^a	—	—	—	—	—	—	—	—	—	—	—
<i>Chilkat Range</i>												
	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
	2015	42	12	10	2	1	0	53	14	14	0	0
	2016	50	7	10	2	0	0	60	9	7	0	2
	2017	61	12	12	1	1	0	74	13	12	1	0
	2018	43	4	17	1	0	0	60	5	5	0	0
	2019	47	7	5	0	3	0	55	7	6	1	0

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Table 7. Page 2 of 2.

Area	Regulatory year	Unit residents		Other Alaska residents		Nonresidents		Total use		Transport	Nonguided services	Other services
		No	Yes	No	Yes	No	Yes	No	Yes			
<i>Gustavus Forelands</i>												
	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
	2015	77	2	5	0	1	0	83	2	1	1	0
	2016	83	0	2	0	1	0	86	0	0	0	0
	2017	70	1	6	0	3	0	79	1	1	0	0
	2018	69	0	4	0	0	0	73	0	0	0	0
	2019	57	3	1	1	0	0	58	4	1	2	1
<i>Gustavus Forelands (Antlerless Hunt)^a</i>												
	2010–2014 ^a	–	–	–	–	–	–	–	–	–	–	–
	2015–2019 ^a	–	–	–	–	–	–	–	–	–	–	–
<i>Taku River</i>												
	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	10	0	0	0	98	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
	2015	88	3	8	0	0	0	96	3	3	0	0
	2016	94	1	14	0	1	0	109	1	1	0	0
	2017	106	2	14	0	1	0	121	2	2	0	0
	2018	118	3	12	0	0	0	130	3	3	0	0
	2019	112	3	20	0	2	0	134	3	3	0	0

^a Hunt closed.

Alaska Board of Game Actions and Emergency Orders

There were no Board of Game actions for moose in Unit 1C during the 2019 Southeast Alaska meeting. The Gustavus moose hunt was closed early by emergency order in RY15 and RY19. Early closures were issued because the harvest quota had been met. In RY19 the closure was issued because of harvest of too many moose with illegal antler configurations.

Recommendations for Activity 2.1.

Continue to monitor total harvest for comparison with management objectives. Continue to monitor antler structure and age data to inform management decisions.

3. Habitat Assessment-Enhancement

The current management strategy 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 has been evaluated in both Berners Bay and Gustavus by the DWC moose research biologist in Douglas. Browsing intensity and range quality have been monitored in Gustavus since 1999 (White et al. 2006, Hood et al. 2007). DWC management will evaluate whether it would be beneficial to add this activity as part of area management duties or leave it as an element of moose research in the region.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- Harvest data are stored in ADF&G's Wildlife Information Network (WinfoNet; <http://winfonet.alaska.gov/index.cfm>).
- All other electronic data and files such as survey memoranda and reports are stored either on the area biologist's computer hard drive or the regional server (S:\Region1 Shared-DWC\S&I-Survey Memorandum). Field data sheets, paper files, hard copies, etc. are in the file cabinet located in the Douglas area office beside the area biologist's cubicle.
- Antler photos are located on the area biologist's computer hard drive.

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

TAKU RIVER

Without the snow and weather conditions needed to conduct regular aerial surveys in the Taku River, it is difficult to determine the status of this moose population; however, the age of harvested animals, the annual harvest, and the catch per unit effort by hunters all suggest that this population of moose is increasing. We will attempt to acquire survey data for the upper Taku River by working with Canadian biologists.

BERNERS BAY

Bull-to-cow ratios exceeded the management objective of 25:100 in RY16. However, for every year that there was a survey, the population objective of 80–90 moose was met. Both survey conditions and timing significantly influence the outcome of surveys, which is an indication that more research on population distribution is needed. There are indications that moose move into higher elevations with heavy trees as the winter progresses. DWC management and research staff will continue to monitor this population using a sample of 20–40 radiocollared cow moose. Monitoring these animals will enable biologists to learn more about factors influencing sightability and document adult female survival, productivity, and fecundity.

CHILKAT RANGE

Chilkat Range moose population abundance and composition estimates are not attainable through aerial surveys. Instead, hunter harvest and effort data are used to gauge the status of this population. Because of the thickly forested areas in the Chilkat Mountains, and the inaccessible nature of most of this area, the present strategy which allows the harvest of any bull should be sustainable.

GUSTAVUS FORELANDS

During RY15–RY19, the management objective of 25 bulls:100 cows was only met in RY18. ADF&G biologists believe that the bull-to-cow ratio remains low due to relatively low adult survival, calf survival, and recruitment. DWC moose research monitoring body condition, pregnancy, and twinning rates is ongoing. Although there is variability among years, the estimated survival and pregnancy rates for adult female moose were low during RY15–RY19. In addition, low calf survival resulted in little population growth. ADF&G biologists will continue to closely monitor this population due to increased predation and declining recruitment.

The selective harvest strategy with a harvest cap was first implemented in 2009. This changed the Gustavus hunt from a derby-style hunt to one where hunters are able to enjoy hunting for longer periods of time because they must locate a bull with a legal antler configuration. ADF&G staff 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 in Unit 1C should be continued. A survey of browsing intensity in other key wintering areas to gauge 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 Unit 1C moose populations.

II. Project Review and RY20–RY24 Plan

Review of Management Direction

MANAGEMENT DIRECTION

There are no changes in management direction for moose in Unit 1C. DWC area management staff will likely assume responsibility for Gustavus and Berners Bay moose population research activities that are currently conducted by DWC research staff. This involves continuing to radiocollar moose in these 2 populations, monitor their survival, and provide population counts.

GOALS

Regionwide moose management goals were established during creation of the Region I moose management plan in the late 1980s:

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 nonhunters (nonconsumptive users) of moose.
8. To develop and maintain a database useful for making informed management decisions.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

Unit 1C (Gustavus Forelands and Berners Bay) – The Gustavus and Berners Bay cow moose populations have always been listed among the populations that are closed to ceremonial harvest.

This has been reaffirmed each year in an annual memorandum to staff issued by the Division of Wildlife Conservation director.

Unit 1C (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 the 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.

Taku River drainage plan objectives:

- Annual hunter kill: 10 moose
- 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.

Berners Bay plan objectives:

- Post hunt numbers: 80–90 moose
- Annual hunter kill: 5 moose
- Post-hunt bull-to-cow ratio of 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.

Chilkat Range plan objectives:

- Annual hunter kill: 10 moose
- 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.

Gustavus Forelands plan objectives:

- Post hunt numbers: 250–350 moose
- Annual hunter kill: 15 moose
- Post-hunt bull-to-cow ratio of 25:100
- Number of hunters: 100
- Hunter-days of effort: 500

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct annual post-hunt aerial surveys.

Data Needs

No changes from RY15–RY19.

Methods

Fish and Game biologist will continue to follow the previous methods used to conduct moose surveys. Biologists would also like to collaborate with Canadian biologists in the Upper Taku River drainages to better understand moose movement across the border.

Transition the work of maintaining and monitoring radio collars and conducting aerial surveys for Berners Bay and Gustavus from DWC research staff to DWC area management staff. 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.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor trends in hunter effort, moose abundance, and moose distribution including age and sex composition. Monitor number, age, and antler configurations of harvested moose.

Data Needs

No change from RY15–RY19. We will continue to collect harvest data annually.

Methods

No change from the RY15–RY19 reporting period.

3. Habitat Assessment-Enhancement

The current management strategy 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 has been evaluated in both Berners Bay and Gustavus by the DWC moose research biologist in Douglas. Browsing intensity and range quality have been monitored in Gustavus since 1999 (White et al. 2006, Hood et al. 2007). DWC management will evaluate whether it would be beneficial to add this activity as part of area management duties or leave it as an element of moose research in the region.

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- Antler photos are located on the area biologist's laptop computer.

Agreements

None.

Permitting

None.

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