Moose
Management Report
of Survey-Inventory Activities
1 July 2001–30 June 2003

Cathy Brown, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2004

Photo by Randy Rogers, ADF&G

Please note that population and harvest data in this report are estimates and may be refined at a later date.

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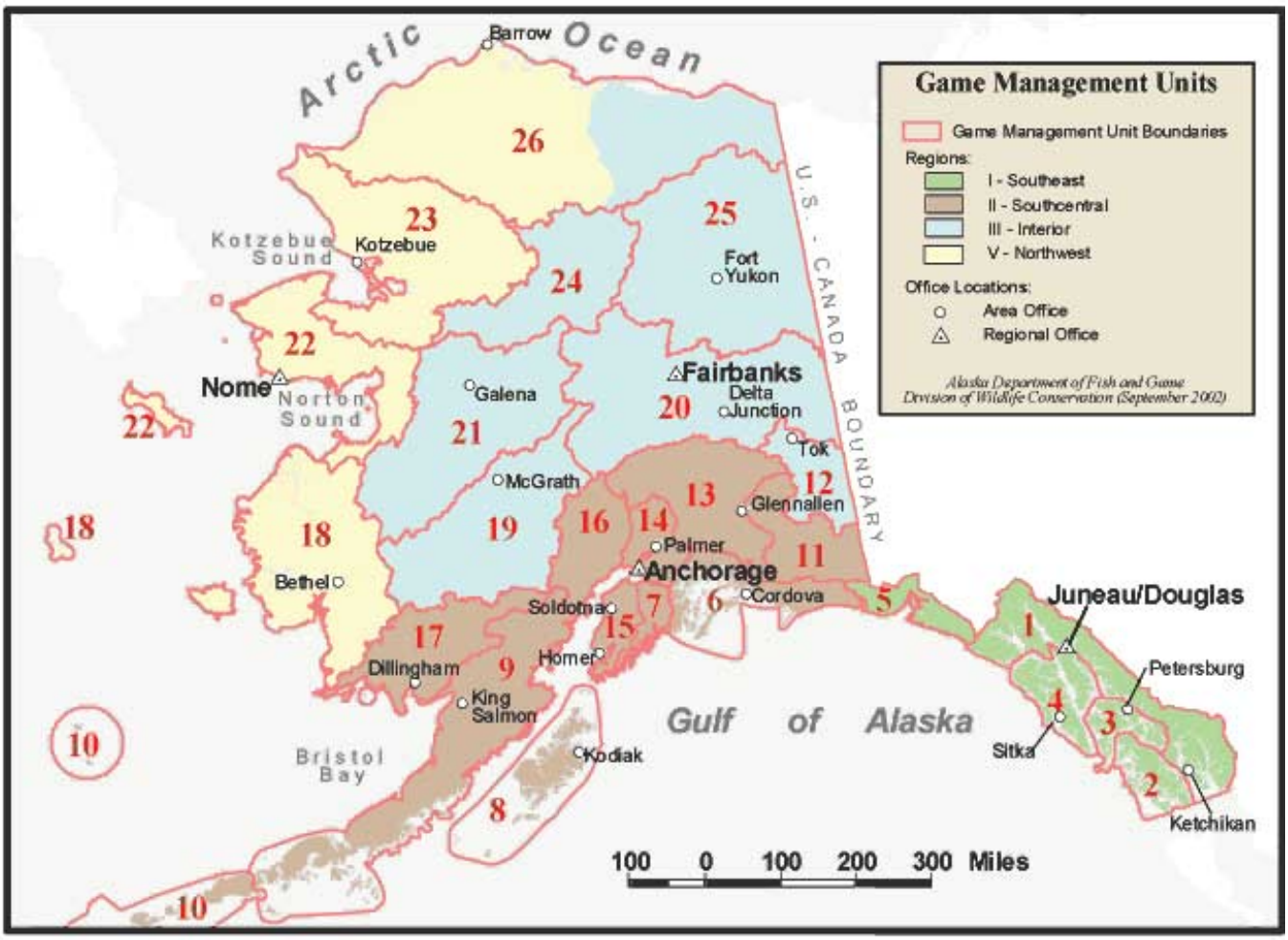
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(907) 465-4190 PO BOX 25526
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MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 1A (5300 mi^2) and 2 (3600 mi^2)
GEOGRAPHIC DESCRIPTION: That portion of Unit 1 lying south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound. Unit 2: Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage.

BACKGROUND

Most of the Unit 1A moose population is localized in the Unuk River drainage and appears stable. Heavy timber in a narrow valley with braided river channels makes moose observation difficult. The best population estimates are based on track densities and distribution in fresh snow complementing aerial surveys. Good habitat is limited and moose numbers are low. The harvest is sporadic, ranging from 0-8 per year. Unit 1A moose are believed to be *Alces alces andersonii,* and likely emigrated from interior British Columbia via the Unuk River valley.

The U.S. Forest Service (USFS) prepared a vegetative type map of the Chickamin River valley, resulting from 1962 and 1963 field investigations (Burris 1964). The study suggested that sufficient forage was present to support moose. Measuring boards were installed to determine snow depth to ascertain if winter conditions were suitable for moose. The Chickamin supported a few moose before supplemental transplants in 1963 and 1964. These moose were captured on the Chickaloon Flats near Anchorage (Burris 1964). A short-term increase followed the release and several bulls were harvested during open hunting seasons. Chickamin moose populations subsequently declined and we have received no reports of moose there in recent years; recent aerial surveys suggest no moose remain there. Moose are occasionally reported from other parts of Unit 1A including Revillagigedo Island, along both sides of the Cleveland Peninsula, and along the south end of the mainland near the Portland Canal.

Although present-day rumors suggest that moose occurred sporadically on Prince of Wales Island in Unit 2 as far back as the 1940s, ADF&G received its first plausible report of moose in the unit in 1987 when USFS staff reported a cow and calf near Snakey Lakes. During fall 1991 a cow moose was struck by a highway vehicle near Control Lake. In June 1993 a USFS employee photographed a cow moose walking along the 30 Road, located roughly 0.5 miles south of Ratz Harbor. One bull was poached near Hollis in fall 1996. Additional reports indicate that a

population of moose, of unknown size and composition, inhabits the central portion of Prince of Wales Island. Currently there is no open moose hunting season in Unit 2.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

The following moose management objectives for Unit 1A are based on biological data and input from the public.

	Plan Objective	2001	2002
Post-hunt numbers	35	Unknown	Unknown
Annual hunter kill	3	3	2
Number of hunters	20	25	23
Hunter-days of effort	90	95	104
Hunter success	15%	12%	8%

METHODS

Aerial moose surveys are flown each winter (December–February) when weather and snow conditions become favorable.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Data are insufficient to make a quantitative determination of Unit 1A moose population trends during the past 5 years. However, moose populations appear to be stable at a low density and carrying capacity is also estimated to be low. Healthy brown bear, black bear, and wolf populations probably account for substantial mortality in this area, particularly on calves.

Increasing reports of moose in Unit 2 may indicate a growing moose population, or simply be a function of increased human access into once remote areas. No population data are available for Unit 2.

Population Composition

Only a few thorough Unuk River moose surveys have ever been completed. Crude population estimates are based on track density and distribution rather than relying only on the number or composition of moose observed. A complete survey was flown under ideal light and snow conditions during February 2001. A total of 16 moose were observed during 1 hour of flying, enumerating 11 cows, 3 bulls, and 2 calves. Additional track distribution in fresh snow suggested the total moose population is 35-50 moose within the Alaska portion of the drainage.

A survey during February 2000 along the Chickamin drainage under ideal survey conditions confirmed there are no moose remaining in the area.

Distribution and Movements

Moose are not restricted from moving between Canada and the United States along mainland drainages. However, moose have never been marked or collared in this area, and consequently we know little about their seasonal movement along the Unuk. Some of the best habitat along the Unuk River occurs upstream in Canada and likely supports a significant number of moose outside of Unit 1A. There are no geographical barriers in this area and consequently some of the moose undoubtedly move freely between the borders.

MORTALITY

HARVEST

Season and bag limit	Resident and nonresident hunters
Unit 1A	15 Sep–15 Oct (General hunt only)
One bull by registration permit only	
Unit 2	No open season.

Board of Game Actions and Emergency Orders. No regulatory changes were made by the Board of Game during this report period. However, the Federal Subsistence Board adopted a regulation during its 2002 meeting that extends the moose season in Unit 1A by 9 days. The regulation took effect September of 2003 and allows federally qualified hunters to take one moose during 6 September–15 October.

Hunter Harvest. The Unit 1A 8-year mean harvest is 3 bulls (Table 1). Three moose were harvested during 2001, and 2 were taken in 2002. The average antler spread for the 3 bulls in 2001 was 30 inches. In 2002 the average antler spread was 28 inches.

Permit Hunts. During fall 2001, 40 individuals obtained Unit 1A moose registration permits, of which 25 hunted (Table 1). Similarly in 2002, 45 hunters registered and 28 hunters reported going afield. This was similar to the long-term average ($\bar{x}$ = 23, range 20–45).

Hunter Residency and Success. Unit 1A moose hunters continue to be primarily Ketchikan and Metlakatla residents. Several of these hunters own cabins on the Unuk River. During this report period all successful hunters were Ketchikan residents (Table 2). Total hunter days were much lower during this report period than previous years, probably due to poor weather conditions during the hunting seasons.

Harvest Chronology. The 3 moose harvested during 2001 were taken during the first week of the season. However, during 2002 the harvest was split between the second and fourth week of the season (Table 3).

Transport Methods. Most hunters used boats to access the Unuk River in 2001 and 2002 (Table 4). Several hunters typically use small aircraft to locate moose from the air the day before hunting, but use boats to access the hunting area.

OTHER MORTALITY

The extent of wolf, black bear, and brown bear predation on adult and calf moose in Unit 1A is unknown.

CONCLUSIONS AND RECOMMENDATIONS

Access is difficult to the small Unit 1A moose population on the Unuk River drainage and the hunt attracts only a few hunters, most of whom are local residents. Due to limited suitable habitat, carrying capacity is low. Most moose harvested are young bulls with relatively small antlers, which have historically averaged about 30 inches in width. Hunter harvest is not a likely factor in limiting this moose population. Winter weather, snow conditions, and abundant predators including both black and brown bears and wolves are likely limiting the moose population. Consequently, we do not expect moose numbers to exceed current levels.

The Unit 1A registration permit provides accurate hunt-based data. The hunter harvest has been average while hunter effort during this report period was lower compared to recent years. Poor weather and the slowly declining economy in southeast Alaska are likely to blame for the low hunter effort along the Unuk.

We will continue to gather information about this moose population, and we anticipate additional proposals to the Federal Subsistence Board to further favor federally qualified rural residents.

We will continue to document Unit 2 moose sightings, and we recommend that Unit 2 remain closed to moose hunting.

LITERATURE CITED

BURRIS, O.E. 1964. Alaska wildlife stocking. Alaska Department of Fish and Game, Federal Aid in Wildlife Restoration Progress Report. Project W-11-D-1, Juneau.

PREPARED BY:

Boyd Porter
Wildlife Biologist III

SUBMITTED BY:

Dale Rabe
Management Coordinator

Please cite any information taken from this section, and reference as:

Porter, B. 2004. Unit 1A and 2 moose management report. Pages 1–8 *in* C. Brown, editor. Moose management report of survey and inventory activities 1 July 2001–30 June 2003. Alaska Department of Fish and Game. Project 1.0. Juneau, Alaska.

Table 1 Unit 1A moose harvest data by permit hunt, regulatory years 1993 through 2002

Hunt	Year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	Harvest						Total harvest
						Males	(%)	Females	(%)	Unk	(%)	
RM022	1993	62	17	42	3	3	(100)	0	(0)	0	(0)	3
	1994	81[a]	33	41	6	6	(100)	0	(0)	0	(0)	6
	1995	78	33	43	2	2	(67)	1[b]	(33)	0	(0)	3
	1996	63	27	32	4	4	(100)	0	(0)	0	(0)	4
	1997	59	27	28	4	4	(100)	0	(0)	0	(0)	4
	1998	53	24	26	3	3	(100)	0	(0)	0	(0)	3
	1999	34	14	19	1	1	(100)	0	(0)	0	(0)	1
	2000	51	24	26	1	1	(100)	0	(0)	0	(0)	1
	2001	40	15	22	3	3	(100)	0	(0)	0	(0)	3
	2002	45	17	21	2	2	(100)	0	(0)	0	(0)	2
	Average	54	23	30	3	3	(100)	0	(0)	0		3

[a] One permit not returned
[b] Illegal cow kill

Table 2 Unit 1A moose hunter residency and success, regulatory years 1993 through 2002

Year	Successful					Unsuccessful					Total hunters
	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	Local[a] resident	Nonlocal resident	Nonresident	Total	(%)	
1993	3	0	0	3	(7)	39	3	0	42	(93)	45
1994	4	2	0	6	(13)	39	2	0	41	(87)	47
1995	2	2	0	2	(4)	36	6	1	43	(96)	45
1996	4	0	0	4	(11)	27	5	0	32	(89)	36
1997	3	1	0	4	(13)	27	1	0	28	(87)	32
1998	3	0	0	3	(10)	24	2	0	26	(90)	29
1999	1	0	0	1	(5)	16	3	0	19	(95)	20
2000	1	0	0	1	(4)	26	0	0	26	(96)	27
2001	3	0	0	3	(12)	22	0	0	22	(88)	25
2002	2	0	0	2	(4)	34	9	0	43	(96)	45
Average	3	1	0	3	(8)	29	3	0	32	(92)	35

[a] Local resident hunters reside in Unit 1A.

Table 3 Unit 1A moose harvest chronology, regulatory years 1993 through 2002

Year	15–21 Sept	(%)	22–28 Sept	(%)	29 Sept–5 Oct	(%)	6–15 Oct	(%)	*n*
1993	0	(0)	0	(0)	1	(33)	2	(67)	3
1994	1	(17)	1	(17)	0	(0)	4	(66)	6
1995	1	(50)	0	(0)	1	(50)	0	(0)	2
1996	2	(50)	0	(0)	0	(0)	2	(50)	4
1997	1	(25)	0	(0)	2	(50)	1	(25)	4
1998	2	(67)	0	(0)	0	(0)	1	(33)	3
1999	1	(100)	0	(0)	0	(0)	0	(0)	1
2000	1	(100)	0	(0)	0	(0)	0	(0)	1
2001	3	(100)	0	(0)	0	(0)	0	(0)	3
2002	0	(0)	1	(50)	0	(0)	1	(50)	2
Average	1	(51)	0	(3)	0	(13)	1	(19)	3

Table 4 Unit 1A moose harvest percent by transport method, regulatory years 1993 through 2002

Year	Harvest percent by transport method										
	Airplane	(%)	Boat	(%)	Highway vehicle	(%)	Off-road vehicle	(%)	Unk	(%)	*n*
1993	1	(33)	2	(67)	0	(0)	0	(0)	0	(0)	3
1994	1	(17)	5	(83)	0	(0)	0	(0)	0	(0)	6
1995	0	(0)	2	(100)	0	(0)	0	(0)	0	(0)	2
1996	1	(25)	3	(75)	0	(0)	0	(0)	0	(0)	4
1997	0	(0)	4	(100)	0	(0)	0	(0)	0	(0)	4
1998	2	(67)	1	(33)	0	(0)	0	(0)	0	(0)	3
1999	0	(0)	1	(100)	0	(0)	0	(0)	0	(0)	1
2000	0	(0)	1	(100)	0	(0)	0	(0)	0	(0)	1
2001	0	(0)	3	(100)	0	(0)	0	(0)	0	(0)	3
2002	0	(0)	2	(100)	0	(0)	0	(0)	0	(0)	2
Average	1	(14)	2	(46)	0	(0)	0	(0)	0	(0)	3

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(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 1B (3000 mi^2)

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland, Cape Fanshaw to Lemesurier Point

BACKGROUND

HABITAT DESCRIPTION

Isolated populations of moose (*Alces alces*) occur in Unit 1B and are believed to be the *andersonii* subspecies. They migrated from interior British Columbia via the Coast Range and the Stikine River valley around the turn of the 20th century.

Moose occur in several areas of Unit 1B, with concentrations near Thomas Bay and along the Stikine River. Suitable habitat adjacent to Bradfield Canal has not been colonized, but moose do occur around Virginia Lake, Mill Creek, and Aaron Creek. LeConte Glacier and Bay divide Unit 1B for moose management purposes north and west of the Stikine River.

The Thomas Bay moose population is isolated from populations in Canada by the Coast Mountains. These moose occupy an area that was heavily logged from the late 1950s through the early 1970s. The Thomas Bay moose population may decline significantly as conifer regrowth in clearcuts matures and reduces forage production.

Moose inhabiting the Alaska portion of the Stikine drainage represent the westernmost tip of a mainland population emanating from Canada. The Alaska portion of this population was estimated at 300 animals in 1983 (Craighead et al. 1984). Since 1983 most winters have been mild and the moose population, based on harvest records and subjective impressions, appeared to increase until 1989.

HUMAN USE HISTORY

Moose are indigenous but recently established in Unit 1B. Since the mid-20th century, isolated populations of moose on the American side of the Stikine River valley and at Thomas Bay have been hunted for food and trophies.

Regulatory history

From 1959 to present, the Stikine River moose season has generally been from 15 September through 15 October with a one-bull limit. From 1972 to 1974, however, the harvest of antlerless moose was allowed by permit only. From 1990 to 1992 a harvest ticket was required to hunt moose on the Stikine, and since 1993 a registration permit (RM038) has been required. Antler

restrictions were implemented on the Stikine in 1995, defining a legal bull as having a spike-fork, 50-inch antler spread, or 3 or more brow tines on at least 1 side.

From 1959 to 1981 the Thomas Bay season was bulls-only and typically 31 days long, 15 September through 15 October. Since 1978 the use of motorized land vehicles to hunt moose has been prohibited at Thomas Bay. From 1980 to 1994 the moose season was from 1 through 15 October. Since 1984 a registration permit has been required to hunt moose, and antler restrictions were implemented defining a legal bull as having a spike, fork, or at least 50-inch antlers. In 1993 the antler restriction was amended to include bulls with 3 or more brow tines on at least 1 side. Since 1995 the season has been 15 September through 15 October.

Action by the Board of Game effective 1 July 1995 put all of Units 1B and 3 and that portion of Unit 1C south of Point Hobart under one registration permit hunt (RM038). A legal moose for this registration permit hunt is a bull with spike/fork or 50-inch antlers or 3 brow tines on at least 1 antler.

Historical harvest patterns

Average annual harvest of Stikine River moose from 1952 through 1959 was 26. During the 1960s the average harvest was 28, during the 1970s it was 26 and in the 1980s it was 39. The 1971 and 1972 harvests included 18 and 22 cows, respectively. During the 1990s the average annual harvest was 18; however, in 1994 the moose season was closed by emergency order in that portion of Unit 1B south of LeConte Bay and Glacier due to a lack of mature breeding bulls in the population, and in 1995 the last week of the season (the first year antler restrictions were implemented on the Stikine River) was closed by emergency order due to the high percentage of illegal moose taken.

The average annual harvest of bulls from Thomas Bay during the 1950s was 5, in the 1960s it was 8, in the 1970s it was 10, in the 1980s it was 18, and in the 1990s the annual harvest of bulls was 21. A scarcity of calves prompted closure of the season in 1982 and 1983.

Historical harvest locations

The vast majority of moose harvested in the unit are taken either from in the Stikine River drainage or at Thomas Bay. In recent years the distribution of moose in Unit 1B appears to be expanding, fed by source populations on the Stikine and at Thomas Bay.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

The following moose management objectives for Unit 1B are based on biological data and input from the public.

Stikine River

	Plan Objective	2001	2002
Post-hunt numbers	300	N/A	N/A
Annual hunter kill	30	17	15

Number of hunters	250	168	145
Hunter-days of effort	1,750	1,198	1,290
Hunter success	12%	10%	8%

Thomas Bay

	Plan Objective	2001	2002
Post-hunt numbers	200	N/A	N/A
Annual hunter kill	20	15	11
Number of hunters	160	113	113
Hunter-days of effort	675	794	788
Hunter success	12%	13%	13%

METHODS

Late winter surveys were flown along the Stikine River valley. Hunters and harvested moose were checked in the field during the Stikine River and Thomas Bay hunts. Field data were used to reconcile written hunter reports. Since 1997 hunters in Unit 1B have been asked on registration permits to report the number of moose (by sex and age class), wolves, and bears they observed during the hunting season.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

In 1983 the Stikine River population was estimated at 300 moose and increasing (Craighead, et al. 1984). Post-1983 harvest levels and subjective impressions suggested the Stikine population slowly increased and then began to decrease in 1988. The percentage of calves surviving to late winter declined from 1980 to 1989 and remained low until 1994. In 1995, 1996, and 1998 the percentage of calves surviving to late winter increased to 18%, 22%, and 24%, respectively (Table 1). Hunters took 57 bulls in 1988, and the kill dropped each succeeding year to a low of 3 in 1994 (taken under a federal permit; the state season was closed by emergency order in 1994).

The Thomas Bay population was estimated at 180 moose in the late 1970s (ADF&G files, Petersburg). Based on anecdotal reports and observed habitat utilization the current population is probably larger.

The Thomas Bay population in northern Unit 1B now appears to be stable at a high density. The Stikine River population, although increasing from 1994 through 1999, now appears to be stable and at moderate density.

Population Composition

Table 1 shows the results of all Stikine River valley surveys since 1991. Dense coniferous forest, variable snowfall, and inclement weather make adequate surveys difficult. No attempt was made

to differentiate between bulls and cows, but adults and calves were differentiated during late winter aerial surveys.

Information on the number of moose observed by hunters on registration hunt reports provides some of the limited information on population composition in the unit. In 2001 a total of 281 hunters reported observing a total of 2049 moose in Unit 1B, including 802 bulls, 889 cows, and 358 calves, for a bull-to-cow ratio of 90:100, and a calf-to-cow ratio of 40:100. In 2002, 258 hunters reported observing a total of 1252 moose, including 466 bulls, 494 cows, and 292 calves, for a bull-to-cow ratio of 94:100, and a calf-to-cow ratio of 59:100.

Distribution and Movements

Moose have been observed crossing Dry Straits between Farm Island on the Stikine River delta and Mitkof Island. At low tide this strait can be crossed easily and moose are reported to move in both directions. Radio telemetry of Stikine moose found no evidence of extensive seasonal migration (Craighead et. al., 1984). Rutting surveys in 1995 and 1996 identified Dry Wash, Andrew Island, and Barnes Lake as important rutting areas on the Stikine River. Moose appear to be well distributed in the Alaska portion of the Stikine River valley and Thomas and Farragut bays. Moose seem to be absent from the Bradfield Canal area, although several river valleys appear to have suitable habitat.

MORTALITY

Harvest

Season and Bag Limit	Resident and nonresident hunters
Unit 1B	15 Sep–15 Oct (General hunt only except in Stikine Drainage)
1 bull with spike-fork antlers or 50-inch antlers or antlers with 3 or more brow tines on 1 side by registration permit only	

Game Board Actions and Emergency Orders. No Board of Game actions were taken or emergency orders issued regarding Unit 1B moose during the report period.

Hunter Harvest. In 2001 the unitwide harvest was 32 moose and in 2002 it was 26. In 2001, 168 hunters harvested 17 moose on the Stikine portion of Unit 1B. In 2002, 145 hunters harvested 15 moose in the Stikine River drainage (Table 2). In 2001, 113 hunters (Table 3) harvested 15 moose at Thomas Bay, including 2 from Farragut Bay. In 2002, 113 hunters harvested 15 moose at Thomas Bay, including 3 from Farragut Bay.

Hunter Residency and Success. During this report period, 100% of all successful hunters on the Stikine River were Petersburg or Wrangell residents (Table 4). The overall success rate for Stikine River moose hunters was 10% in 2001 and 8% in 2002.

Petersburg residents continued to dominate the Thomas Bay and Farragut Bay moose hunts (Table 5). During this report period, 100% of all successful hunters at Thomas Bay and Farragut Bay were Petersburg residents. The overall success rate for Thomas Bay and Farragut Bay moose hunters was 13% in 2001 and 2002.

Harvest Chronology. Harvest chronology for Unit 1B moose has varied. In general, most bulls are killed during the first half of the season and the success rate declines throughout the season (Table 6). In 2001, the largest percentage of the annual harvest at Thomas Bay occurred during the fourth and first weeks of the season, respectively. The largest percentage of the annual harvest on the Stikine occurred during the fourth and first weeks of the season, respectively.

In 2002 the largest percentage of the annual harvest at Thomas Bay occurred during the first and third weeks of the season, respectively. The largest percentage of the annual harvest on the Stikine occurred during the first week followed by third and fourth weeks, which had identical harvests. Most hunters are in the field early in the season, and except for weekends, effort tends to drop off as the season progresses. Inclement weather does not appear to slow hunting effort early in the season.

Guided Hunter Harvest. No guided hunts are currently offered in the unit.

Transport Methods. With the exception of one hunter who reported using an airplane for access, during the report period all successful Unit 1B hunters reported using boats to reach the areas they hunted (Table 7). Motorized land vehicles are prohibited for moose hunting in the Thomas Bay hunt and the Stikine Wilderness. Motorized land vehicles may be used in Thomas Bay for any purpose except moose hunting.

Other Mortality

Wolves, black bears, and brown bears are moose calf predators, and wolves and brown bears take adult moose. The extent of predation on these moose herds is unknown, but it appears that in some years few calves are recruited into the Stikine herd.

HABITAT

Assessment

Moose populations at Thomas Bay responded favorably to the initial increase in available browse resulting from extensive clearcut logging between 1958 and 1975. Since that time the dense, closed-canopy forests resulting from natural regeneration of second growth stands has reduced available understory browse vegetation.

In 1991 the U.S. Forest Service (USFS) cleared a 100-acre plot along the Patterson River to investigate the feasibility of improving moose habitat. Regrowth has been browsed heavily during the summer, leaving little winter forage in this area.

Stikine River moose range lies mostly within the USFS Stikine/LeConte Wilderness area and the Stikine drainage. Moose habitat in this area, identified by Craighead et. al. (1984), is designated wilderness and cannot be artificially manipulated for improvement. Nineteen transects were surveyed in 1984 to determine the condition and availability of moose winter browse in the

Stikine River corridor (Craighead et. al. 1984). The transects were revisited in June 1991 and in June 1997. Preferred browse species were identified as willow (*Salix* spp.) and red osier dogwood (*Cornus stolonifera*). The total percent of available browse that was heavily utilized in June 1997 included 62.2% *Salix* spp. and 63.9% *Cornus* spp. (Elze and Posner 1997). In 1991 the percentage in the heavy use category was 15.8% for *Salix* spp. and 13.8% for *Cornus* (Stoneman 1992). In 1997 the majority of plants recorded were in the heavily used category compared to 1991 when most plants were in the zero to moderately used categories (Stoneman 1992).

In April 2003 the area biologist accompanied Region I research staff to Thomas Bay and the Stikine River to conduct preliminary assessments of browse utilization. A visual assessment of browse conditions at Thomas Bay revealed excessively high utilization rates, indicating that moose may be at carrying capacity. Browse utilization on the Stikine River appeared to be less intense indicating that moose are probably below carrying capacity along the river corridor.

Enhancement

It is estimated that precommercial thinning of second-growth stands will extend the habitat value of clearcuts for an estimated 20–30 years. In March 1997 ADF&G implemented a plan to enhance moose habitat on state land at Thomas Bay. Phase 1 of the plan called for reopening 10 miles of logging roads that were impassable due to dense vegetative growth and downed trees. Road-clearing operations were completed in June 1998. Phase 2 of the plan called for treating 380 acres of dense second growth primarily by precommercial thinning and partial strip clearing. The thinning of 4 second-growth units totaling 380 acres was completed in October 1998.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Thomas Bay moose populations responded favorably to the initial increase in available browse resulting from extensive clearcut logging between 1958 and 1975, but the dense, closed canopy forests caused by the natural regeneration of second-growth stands is decreasing the amount of available browse. As a result the quality of the habitat has been declining. The loss of habitat and the resulting decline in available food is of great concern to biologists and hunters. Left untreated, the young, second-growth conifer stands will shade and eventually eliminate understory browse vegetation, further reducing moose-carrying capacity. The only way to prevent further decline of moose habitat will be to institute habitat manipulation procedures.

For genetic or environmental reasons moose in the unit do not develop antler configurations that are predictable relative to age; therefore, some modification of the existing antler restrictions may be justified. Moose in the unit rarely achieve 50-inch antler spreads, and in Thomas Bay in particular the population appears to contain a surplus of sublegal bulls in excess of that needed to ensure timely breeding of cows.

CONCLUSIONS AND RECOMMENDATIONS

None of the Stikine management objectives were met in 2001 and 2002. Hunter-days of effort decreased from the previous report period. Hunter success was only slightly below the management objective in 2001 but fell well short of the objective in 2002. We believe the Stikine

moose population was increasing from 1994 until 1999, but it now appears to be stable at moderate density.

During this report period, the Thomas Bay moose harvest was below the management objective. The number of hunters increased slightly from the previous report period but still failed to meet the management objective in either 2001 or 2002. Hunter-days of effort also increased from the previous report period, and exceeded the objective during this report period. 2001 and 2002. Hunter success exceeded the management objective in both 2001 and 2002. The Thomas Bay moose population currently appears stable at a high level.

We recommend Units 1B and 3, and the extreme southern portion of Unit 1C continue to be managed by a common registration permit hunt. We also recommend that for the time being, the season dates remain from September 15 through October 15 with a bag limit of one bull with spike/fork or 50" antlers or at least 3 brow tines on one antler. Because moose found in Units 1B and 3 do not display antler characteristics that are predictable relative to age, some modification of the existing antler restrictions or lengthening of the season may be justified in the future.

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PREPARED BY:

Richard E. Lowell
Wildlife Biologist III

SUBMITTED BY:

Dale Rabe
Regional Management Coordinator

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Table 1 Unit 1B Stikine area aerial moose surveys, regulatory years 1991 through 2002

Yr month/day	Adults	Calves	(%)	Unidentified	Total moose	Moose/hour
1991						
03/03[c]	6	0	(0)	0	6	18
1992						
12/19[a]	59	12	(16)	2	73	21
03/25[a]	73	7	(9)	0	80	34
1993						
02/10[a,d]	46	4	(8)	0	50	39
1994						
03/02	34	0	(0)	0	34	
04/08	30	1	(3)	0	31	
1995						
02/25	76	17	(18)	0	93	26
1996						
3/08	122	35	(22)	0	157	47
1997						
	No data	-	-	-	-	-
1998						
2/24	103	32	(24)	0	135	44
1999	No data					
2000						
2/17[e]	2	2	(50)	0	4	4
3/22	9	2	(18)	0	11	8
6/11	11	7	(39)	0	18	9
2001						
2/7	3	2	(40)	3	8	8
2002						
3/14[f]	71	5	(7)	0	76	31
6/16	21	8	(38)	0	29	19

[a] Helicopter survey.
[b] River stage high, full leaf out in lower river, moose not visible.
[c] Helicopter survey aborted due to weather.
[d] Farm Island to 15 Mile Island only, then abandoned due to weather.
[e] Poor survey conditions on lower river, US/Canada boarder to Kakwan Point only
[f] Some older calves may have been classified as adults

Table 2 Unit 1B (Stikine) moose harvest, regulatory years 1991 through 2002

Year	Hunter harvest reported					
	M	(%)	F	(%)	Unk.	Total
1991	24	(96)	1	(4)	0	25
1992	18	(95)	1	(5)	0	19
1993	14	(100)	0	(0)	0	14
1994[a]	3	State season closed by emergency order				3
1995	5	(100)	0	(0)	0	5
1996	18	(100)	0	(0)	0	18
1997	17	(100)	0	(0)	0	17
1998[b]	24	(100)	0	(0)	0	24
1999	20	(100)	0	(0)	0	20
2000	14	(100)	0	(0)	0	14
2001	17	(100)	0	(0)	0	17
2002	15	(100)	0	(0)	0	15

[a] Taken under federal permits; state season closed by emergency order.

[b] Includes 1 DLP and 2 illegal kills.

Table 3 Unit 1B (Thomas and Farragut bays) moose harvest, regulatory years 1991–2002

Year	Hunter harvest reported						
	M	(%)	F	(%)	Illegal	Unk.	Total
1991	15	(100)	0	(0)	0	0	15
1992	27	(96)	1	(4)	1	0	28
1993	27	(100)	0	(0)	0	0	27
1994	11	(100)	0	(0)	0	0	11
1995[a]	15	(100)	0	(0)	0	0	15
1996[b]	24	(94)	1	(6)	0	0	25
1997	18	(100)	0	(0)	0	0	18
1998	24	(100)	0	(0)	1	0	24
1999	20	(100)	0	(0)	2	0	20
2000	6	(100)	0	(0)	0	0	6
2001	14	(100)	0	(0)	1	0	15
2002	10	(100)	0	(0)	1	0	15

[a] Includes one moose harvested in Port Houghton.

[b] Includes DLP.

Table 4 Unit 1B (Stikine) moose hunter residency and success, regulatory years 1991 through 2002

	Successful						Unsuccessful						
Year	Local[a] resident	Nonlocal resident	Non-resident	Unk.	Total	(%)	Local[a] resident	Nonlocal resident	Non-resident	Unk.	Total	(%)	Total hunters
1991[b]	23	1	1	0	25	(12)	146	34	5	5	190	(88)	215
1992	16	2	0	1	19	(8)	183	24	3	1	211	(92)	229
1993	14	0	0	0	14	(10)	121	6	0	0	127	(90)	141
1994[c]	State season closed by emergency order				3								
1995	5	0	0	0	5	(4)	91	6	0	0	97	(96)	102
1996	18	0	0	0	18	(14)	105	7	0	0	112	(86)	130
1997	16	1	0	0	17	(12)	117	8	0	0	125	(88)	142
1998	23	1	0	0	24	(13)	154	9	0	0	163	(87)	187
1999	18	2	0	0	20	(11)	147	18	0	0	165	(89)	185
2000	13	1	0	0	14	(8)	137	12	2	0	151	(92)	165
2001	17	0	0	0	17	(10)	134	14	3	0	151	(90)	168
2002	11	0	0	0	11	(8)	126	7	1	0	134	(92)	145

[a] Residents of Petersburg and Wrangell.

[b] Unsuccessful hunter data expanded to correct for nonreporting hunters.

[c] Three moose taken under federal permits.

Table 5 Unit 1B (Thomas and Farragut bays) moose hunter residency and success, regulatory years 1991 through 2002

Year	Successful					Unsuccessful					
	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Total hunters
1991[b]	14	1	0	15	(12)	96	12	0	108	(88)	123
1992[b]	25	2	1	28	(25)	77	6	0	83	(75)	111
1993[b]	26	1	0	27	(20)	103	4	1	108	(80)	135
1994	11	0	0	11	(9)	108	9	0	117	(91)	128
1995	14	1	0	15	(11)	108	8	0	116	(89)	131
1996	23	2	0	25	(16)	107	15	1	123	(84)	148
1997	18	0	0	18	(12)	116	11	1	128	(88)	146
1998	23	1	0	24	(19)	91	12	0	103	(81)	127
1999[c]	19	1	0	20	(19)	79	8	0	87	(81)	107
2000	6	0	0	6	(6)	91	5	2	98	(94)	104
2001[b]	15	0	0	15	(13)	92	5	1	98	(87)	113
2002	15	0	0	15	(13)	90	8	0	98	(87)	113

[a] Residents of Petersburg and Wrangell.

[b] Includes illegal kill.

[c] Includes 2 illegal kills.

Table 6 Unit 1B moose harvest chronology, regulatory years 1993–2002

Area	Year	15–21 Sept.	22–28 Sept.	29 Sept.–5 Oct.	6–15 Oct.
Thomas Bay	1993	0	0	19	8
	1994	0	0	9	2
	1995	8	3	2	2
	1996	11	5	3	6
	1997	5	4	6	3
	1998	9	6	5	4
	1999	5	4	7	4
	2000	3	2	1	0
	2001	3	2	2	8
	2002	7	1	4	3
Stikine	1993	5	1	4	4
	1994	State season closed by emergency order			
	1995	3	1	0	1
	1996	6	6	2	4
	1997	7	3	3	4
	1998	12	5	3	4
	1999	6	3	4	7
	2000	3	1	5	5
	2001	6	2	2	7
	2002	6	1	2	2

Table 7 Unit 1B successful moose hunter transport methods by area, regulatory years 1991–2002

Area	Year	Airplane	Boat	Highway vehicle	3- or 4-wheeler	Horse	Other	Total
Thomas Bay	1991	1	14	0	0	0	0	15
	1992	0	27	0	0	1	0	28
	1993	4	23	0	0	0	0	27
	1994	1	9	0	0	0	1	11
	1995	3	11	1	0	0	0	15
	1996	0	25	0	0	0	0	25
	1997	0	18	0	0	0	0	18
	1998	2	22	0	0	0	0	24
	1999	1	18	0	0	0	1	20
	2000	0	6	0	0	0	0	6
	2001	0	15	0	0	0	0	15
	2002	0	11	0	0	0	0	11
Stikine	1994		state season closed by EO					
	1995	0	5	0	0	0	0	5
	1996	2	16	0	0	0	0	18
	1997	0	17	0	0	0	0	17
	1998	2	22	0	0	0	0	24
	1999	0	20	0	0	0	0	20
	2000	0	14	0	0	0	0	14
	2001	1	16	0	0	0	0	17
	2002	0	14	0	0	0	0	15

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 1C (7600 mi^2)
GEOGRAPHICAL DESCRIPTION: That portion of the Southeast Alaska mainland from Cape Fanshaw to the latitude of Eldred Rock.

BACKGROUND

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. In 3 of the 4 moose management areas in this subunit, moose moved in naturally, while in one area they were introduced.

Taku River: The arrival date of moose in the Taku River drainage is not documented, but Swarth (1922) states that a moose was killed at the mouth of the Stikine River "some years" prior to 1919. If moose appeared at the same time on the Taku (which is a reasonable assumption given the proximal location and similar ecological makeup), then presumably they first occurred in the lower part of the river near the turn of the century. In 1960, ADF&G biologists observed 38 moose along the Taku River, and 27 moose were harvested there that year. Based on communications with Canadian biologists who conduct aerial surveys in the upper Taku, it appears likely that moose from Alaska migrate into Canada during winter. This explains the low winter aerial survey numbers we see on the Alaska side of the border.

Moose occur on the Whiting and Speel rivers south of the Taku. These animals may have originated from the Taku herd, or may have migrated into the Whiting drainage from the Canadian mainland. In recent years moose and their sign have been seen regularly in the Port Houghton area. These moose probably moved across the Fanshaw Peninsula from the Farragaut Bay/Thomas Bay population to the south.

Berners Bay: This moose population is one of the most popular herds to hunt in the Juneau area, but did not occur naturally. Fifteen calves from the Anchorage area were released in Berners Bay in 1958, and a supplemental release of 6 more calves occurred in 1960. In June 1960, 3 cows with a single calf each were observed, indicating that cows had bred at about 16 months of age. The first limited open season was held in 1963, when 4 bulls were killed. Since that time, the annual harvest has ranged from 5 to 23 animals. Managing the Berners Bay moose herd has been

a challenging task for ADF&G. 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 hunts, 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 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 shape the present management strategy 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.

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. Because of thick timber stands along the Endicott and the difficulty of gathering reliable aerial survey data, 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 1968. It is likely moose migrated to this area via the Excursion River drainage. Twenty years passed before the first moose was harvested at Gustavus in 1988, evidence that moose took a while to populate this area. Since then, the population has expanded rapidly to become the largest in the unit, accounting for the highest harvest. The number of animals in this herd has reached a level that is not sustainable, given limited winter range. Because of this concern ADF&G began a moose browse study on the forelands in 1999, and used resultant data to convince the Board of Game in 2000 to adopt a drawing permit hunt for cow moose.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

In 1998 we revised Unit 1C moose management objectives based on recent hunt and survey information. We separated the Gustavus Forelands herd from moose in the remainder of the Chilkat Range because of its discrete nature. Below is a list of the newly drafted management objectives:

1. Taku drainage: Maintain a post-hunting population of 100 moose, an annual harvest of 10, and a hunter success rate of 20%;
2. Berners Bay: Maintain a post-hunting population of 90 moose, an annual harvest of 18, and a hunter success rate of 90%;
3. Chilkat Range: Maintain a post-hunting population of 200 moose, an annual harvest of 20, and a hunter success rate of 22%;
4. Gustavus Forelands: Maintain a population of 250, an annual harvest of 40, and a hunter success rate of 33%.

METHODS

Aerial surveys were conducted throughout most of the subunit during the report period. Survey flights were accomplished both years at Berners Bay and the Gustavus Forelands, but no surveys were flown of the Taku River. One registration permit hunt (RM046) and 3 drawing permit hunts (DM041, DM042 and DM043) were used to manage moose hunting effort in Unit 1C. Berners Bay moose were managed under one bull-only hunt and a separate antlerless hunt. The remainder of Unit 1C (excluding that area south of Pt. Hobart) was managed under the RM046 registration permit hunt for bull moose, and a draw permit (DM043) for cow moose at Gustavus. Since 1995, the area south of Pt. Hobart has been included in the antler-restriction hunt conducted in Units 1B and 3 (RM038), and all moose taken there were included in the management report covering those areas. A condition of all drawing and registration hunts required successful hunters to bring in incisors from harvested moose for aging. Other data collected from the permit hunt reports included the hunt length, hunter residency, hunt location, commercial services used, and transport means (for all hunters), and date of kill (for successful hunters).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Taku: Little information is available regarding the number of moose in the Taku River drainage. A winter 2000 aerial survey enumerated 37 moose (Table 1), but the fall 2000 harvest of 23 moose was the highest since 26 moose were killed in 1985. We have never counted many moose along the Alaska portion of the Taku, suggesting that the main wintering area for these moose is in Canada. In spite of our low survey numbers, hunters have had reasonable success hunting moose on the Taku. It is likely that most moose harvested along the Taku spend a majority of the year (including winter) in Canada, and animals moving downriver from Canada during the hunting season supplement the local population. Some of the Alaska harvest undoubtedly comes from across the border, but we cannot quantify this illegal take. Aerial surveys conducted by Canadian biologists along the lower Tulsequah River in Canada during February 2000 enumerated 213 moose, with a bull to cow ratio of 98:100. If we consider these animals as part of the same population that are hunted along the Alaska portion of the Taku River, then our present harvest objectives for the Taku appear sustainable. Recently there has been no harvest on the lower Taku in Canada (Karen Diemert, personal communication). South of the Taku River on the Alaska mainland, a few moose have been harvested in the Port Houghton area over the years. These moose are an extension of the population using Thomas and Farragut bays south of the Fanshaw Peninsula, and are distinct from other Unit 1C moose populations. Most of the effort directed at Port Houghton moose comes from Petersburg.

Berners Bay: The Berners Bay moose population appears to be near the estimated carrying capacity, between 100 and 150 animals, and is being maintained with selective harvests to adjust the bull to cow ratio (Table 1). Berners Bay surveys in 2001 and 2002 enumerated 66 and 58 moose, respectively. The 2002 count was one of the lowest in the last 12 years, and the low number of calves (4) was reason for concern. This contrasts sharply with the 1999 survey of 108 animals that was the highest in recent history. This high survey count was more likely due to

ideal survey conditions than to a large increase in moose numbers. Since 1993 we have issued up to 20 drawing permits annually for Berners Bay, with the number and sex of moose to be taken determined by aerial survey results.

Chilkat Range: The status of the Chilkat Range moose population is unknown, as surveys have not been conducted due to limited snow cover and dense forest canopy. We did conduct a survey of the upper Endicott River and Adams Inlet in 2000 (Table 1) and counted 125 moose, but nearly all of these animals were in Glacier Bay National Park (GBNP). Moose in the Adams Inlet area of GBNP likely cross Endicott Gap and move to the Endicott River during the spring and summer, supplementing the herd along the west side of Lynn Canal. How many of these animals are available to hunters on non-park lands is unknown. Based on harvest records and anecdotal information from hunters, the number of moose in the Chilkat Range appears to be stable.

Gustavus Forelands: Based on winter aerial surveys during 1999–2002, the Gustavus Forelands moose population appears to be steadily increasing (Table 1). Both the total number of moose and the number of calves in the herd indicate a rapidly expanding population. Although habitat conditions due to isostatic rebound on lands where glaciers have recently retreated have stimulated moose productivity, the moose population has reached a density that we believe is unsustainable given the small amount of winter habitat.

Population Composition

We only conducted thorough aerial surveys of 2 of the 4 Unit 1C moose populations during the report period and were unable to get reliable composition data in either place. The other surveys provided us with overall moose numbers and a breakdown of adults and calves, but we could not quantify bulls due to the late timing of the surveys and advanced antler drop (Table 1). This is often the case in Southeast Alaska, where adequate snow conditions for observing moose do not usually occur until midwinter. We collected lower jaws from each harvested moose from successful hunters, providing us with the age structure of the harvest (Tables 2 & 3).

Taku: We did not conduct any aerial surveys of the Taku River during this report period. This was due to lack of snow as well as mechanical problems associated with our survey aircraft. The mean age of harvested moose was 2.7 years during the report period, compared to 2.0 years for 1999 and 2000. This continuing harvest of young bulls indicates a healthy population with good recruitment. We will continue our dialogue with Canadian biologists to keep abreast of their aerial survey data from the upper Taku River in Canada.

Berners Bay: A November 1999 aerial survey allowed us to gather fairly reliable composition data. We calculated a bull to cow ratio of 17 bulls to 100 cows, and a calf to cow ratio of 16 calves to 100 cows. The ratio of bulls to cows is the lowest in the last 10 years, but may be partly due to some of the bulls having shed their antlers; 3 bulls were seen during the survey with only one antler. The percent calves in the herd was the second lowest since 1990. The surveys during this report period were both without composition data due to their timing, but we were able to quantify the number of moose and percent calves in the herd. During 2001 fifteen percent of the herd was calves but in 2002 this percent dropped to 7. This was the lowest calf percentage since 1990.

Mean age at harvest of Berners Bay moose was 3.5 years for males and 4.6 years for females during the report period. This compares to a mean age of 4.2 years for males and 2.8 years for females during the previous report period.

Chilkat Range: No aerial surveys were conducted in this area during the report period.

The mean age of harvested moose was 4.4 years, higher than the mean of 2.9 years from the previous report period.

Gustavus Forelands: We conducted aerial surveys in each of the 2 years of the report period. We were unable to gather bull composition information due to antlers being dropped, but we were able to count calves and calculate percent calves in the herd for 2001 and 2002 (22% and 26% respectively).

The mean age at harvest was 2.4 years compared to 2.2 during the previous report period. The harvest of young bulls is a further reflection of a productive moose herd.

MORTALITY

Harvest

Season and bag limits	Resident and nonresident hunters
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 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 by registration permit only: or	15 Sep–15 Oct (General hunt only)

1 antlerless moose by drawing permit only; up to 10 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)

Game Board Actions and Emergency Orders. At the fall 2000 Board of Game meeting, the board adopted a department proposal to increase the number of Berners Bay drawing permits from 20 to 30. The board also adopted a proposal to allow ADF&G to implement a drawing hunt for up to 10 cow moose on the Gustavus Forelands beginning in fall of 2001. The board followed this with adoption of a proposal in 2002 to increase the allowable cow harvest at Gustavus to 35. Emergency orders (EOs) were issued to close the season early in the Gustavus area during both years of the report period. In both years the guideline harvest level of 45–50 bulls was met during the first week of October.

Hunter Harvest. The Berners Bay drawing permit hunt was managed for a harvest of 15 moose from 1993 through 1995. In 1996 the take increased to 17 as a result of a Fish and Wildlife undercover operation (Table 4). The permit allocation remained at 15 (8 bulls and 7 cows) for both years of the subsequent report period, but was increased to 18 permits in 1999 (10 bulls and 8 cows) and 20 permits (10 bulls and 10 cows) in 2000. During 2001, 20 permits were issued in the same manner as 2000, but that number was decreased to 15 (8 bulls and 7 cows) in 2002. Hunter success was 82% in 2001 and 64% in 2002. In 2001, hunters with bull permits had a higher success rate (89%) than those with cow permits (75%), and the same held true the following year with 71% success for hunters with bull permits, and only 57% success for cow hunters. The percentage of permittees who hunted was almost identical between bulls and cows with 89% and 88% hunting respectively. The balance of Unit 1C (except for the newly established cow season at Gustavus) was managed under a registration permit, with biologists keeping the kill within a guideline harvest level rather than a strict quota. The Chilkat Range harvest ranged from 6 to 28 from 1990 to 1998 (Table 5), with the 1998 harvest of 28 the highest ever recorded. The 2001 harvest was 12, and in 2002 the harvest was 15. The annual average harvest of 13.5 for this report period was slightly lower than the annual average harvest of 16.5 during the past 10 years.

The Gustavus Forelands bull moose harvest is currently being managed for a harvest of 45-50 bull moose under a registration permit, and 0–10 cow moose under a drawing permit. In both 2001 and 2002 the bull moose season was closed by EO after meeting the guideline harvest level. During the cow hunt in November, all 10 permittees were successful.

The Taku harvest ranged between 6 and 23 from 1991 to 2000. The 1997 harvest of 6 was the lowest in the past 10 years, due to few moose being seen rather than a decline in hunting effort (Table 4). The 2000 harvest of 23 moose was the highest in the past 10 years. This is the highest harvest recorded in the Taku drainage since 1985 when 26 moose were harvested. The annual

average harvest of 17 for this report period was slightly higher than the annual average harvest of 15.4 during the past 10 years.

Permit Hunts. Over 1600 applications were submitted during each year of the report period for the Berners Bay drawing permit hunts. The proximity of Berners Bay to Juneau and the high hunter success rate explains the popularity of this hunt. From 1990 to 2000 hunter success exceeded 90% each year, but during this report period the success rate dropped down to 82% and 64% for 2001 and 2002 respectively. An additional 459 people applied for the 10 cow permits for Gustavus during fall 2002, the first year that hunt was held.

Since the registration permit format was implemented for Unit 1C (except Berners Bay, and more recently cow moose at Gustavus), more than 200 permits have been issued annually (Table 4). In 2001, a total of 555 permits were issued, followed by 551 in 2002. The increase in interest stems mainly from the popularity of the Gustavus hunt; roughly 49% of hunting permittees went to Gustavus during this report period. As in most hunts, not all the permittees actually participated in a hunt. In 2001 only 69% of the 555 permittees hunted, while 71% of 555 permittees hunted in 2002.

Hunter Residency and Success. Most moose harvested in Unit 1C continue to be taken by residents of the subunit (Table 6). During the report period, residents of the subunit took 136 of 158 harvested moose, other Alaska residents took 14, and nonresidents took 7. Southeast moose hunting areas are not readily accessible via highway vehicles, and residents from elsewhere in Alaska have better moose hunting opportunities closer to home. Nonresidents eager to take moose focus on areas with larger moose populations and a better chance of getting a trophy animal. Twenty-one percent of all Unit 1C hunters were successful in 2001, and in 2002 the success rate remained relatively stable at 20%. Hunters at Gustavus continued to experience higher success rates during this report period (30%) than did Taku River hunters (20%) or Chilkat Range hunters (15%).

Harvest Chronology. Similar to recent years, the 2001 and 2002 moose harvest was heavily weighted toward the early part of the season. This is partly because nearly all hunters participate on opening day, and hunt less as the season goes on. Also, the Gustavus hunt, that attracts the majority of hunters in the subunit, has been closed by EO in early October during each of the past 2 years thereby ending most moose hunters' seasons. Generally about 30% of the Gustavus Forelands harvest takes place in the first 3–4 days of the hunt.

Transport Methods. The type of transport used by successful hunters varies by hunt area, and difficulties with the logistics of access would be expected.

Taku: In the Taku hunt 97% of successful hunters used boats for access during the current report period (Table 7). Most hunters used boats equipped with jet units to access the upper reaches of the river, then base out private cabins near the Canadian border.

Berners Bay: In Berners Bay all successful hunters used boats for access (Table 7), 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 airboaters who then take them into Berners for their hunt.

Chilkat Range: Hunters in the Chilkat Range used both airplanes and boats for access. In 2001–2002, airplane and boat access were evenly divided (Table 7). Generally, most airplane access to this area is in the upper Endicott River, while most boat access takes place at St. James Bay.

Gustavus Forelands: Successful Gustavus Forelands hunters use a variety of access methods. During the report period an average of 41% used highway vehicles, 30% walked, 13% used boats, 2% used all-terrain vehicles, and 14% used airplanes for access. 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 vehicle or on foot. The high percentage of hunters who list walking as their mode of access are residents of Gustavus who walk out their back door to hunt.

Other Mortality. Winters were mild during both report years, so known natural mortality was probably limited to a few wolf kills on the Gustavus Forelands. Other mortality included 3 moose that were caught in wolf snares and either died or had to be put down.

Habitat. We initiated a moose browse monitoring project in 1999 that is still ongoing. The aim of this project is to monitor willow utilization by moose on the Gustavus Forelands. Preliminary data analysis suggests that the moose population is higher than the range can support. Data generated by this study was used by the Board of Game in its decision to adopt a proposal to allow a cow moose hunt at Gustavus.

CONCLUSIONS AND RECOMMENDATIONS

Taku: All Taku River management objectives were surpassed during both years of the report period. In 2001 a total of 19 moose were harvested with a hunter success rate of 22%. The 2002 harvest was 15 moose with a hunter success rate of 18%. Based on aerial surveys we did not meet the 100-moose population objective. However, we believe that most Taku moose spend the winter in Canada, thereby making this management objective difficult to measure.

Berners Bay: We did not meet management objectives for the number of moose harvested (18) during either year of the report period; 14 moose were killed in 2001 and only 9 in 2002. The objective for 90% hunter success each year was not met either, with 82% and 64% of the hunters harvesting moose in 2001 and 2002, respectively. We met the population objective of 90 posthunt animals each year, with the 108 moose surveyed in 1999 and 79 moose in 2000 indicating that well over 90 moose were present.

Chilkat Range: We did not meet any management objectives for the Chilkat Range during the report period. Harvest objectives call for an annual kill of 20 moose and a hunter success rate of 22%. The 2001 harvest was only 12 moose with a success rate of 16%, while in 2002 the harvest was 15 moose with a success rate of 14%. Reasons for this decline in harvest and success are not known because we have no population information in this area. Although we have a population objective of 200 moose in this area, we are unable to conduct reliable surveys to quantify the population.

Gustavus Forelands: We were not able to meet the harvest management objectives in both years of the report period, although emergency orders to close the season were issued to prevent higher

harvests. In 2001 the harvest was 45 bull moose, and 49 moose were taken in 2002, both surpassing the objective of 40 moose. The objective for a 33% hunter success rate was not met in 2001, when only 22% of all hunters killed a moose, or in 2002, when 27% of hunters were successful. During this report period the number of hunters targeting Gustavus continued to rise. The current trend of increased hunter effort will not allow for higher success rates unless our harvest objective increases as well. The population objective of 250 moose was met, given that we saw 207 animals on our survey and estimated 250–300 were present.

Rising effort and harvest on the Gustavus Forelands increases the importance of acquiring consistent aerial survey data for moose in that portion of the subunit. Acquiring additional browse utilization information as well as herd composition data is a priority here. Continued implementation of a cow hunt during the next report period to lower the productivity of that herd is advised.

We believe that a continuation of the permit registration system should accommodate current population objectives throughout Unit 1C, and we will continue to collect teeth from harvested moose for age analysis. Areas supporting the most critical winter browse should be analyzed, even cursorily, to estimate the status of moose populations in relation to carrying capacity. This is particularly true in the Gustavus area where habitat information complements our aerial survey information to help us anticipate management decisions.

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Prepared by:

Neil L. Barten
Wildlife Biologist III

Submitted by:

Dale Rabe
Regional Management Coordinator

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Table 1 Unit 1C aerial moose survey data, regulatory years 1990 through 2002

Year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
					Berners Bay 1990–2002					
1990	14	53	18	0	85	2.6	26	34	21	33
1991	---	---	11	50	61	1.2	---	---	18	50
1992	14	61	8	0	83	2.8	23	13	10	29
1993	---	---	12	45	67	2.8	---	---	18	24
1994	17	45	13	0	75	2.0	38	29	17	38
1995–1996					No survey					
1997	6	11	12	31	60	2.1	---	---	20	29
1998	14	9	10	37	70	2.6	---	---	14	27
1999	14	11	13	70	108	2.4	17.3	16	12	45
2000	---	10	12	57	79	2.4	---	---	15	33
2001	---	10	10	46	66	2.0	---	---	15	34
2002	---	4	4	50	58	2.2	---	---	7	26
					Chilkat Range 1968–2002					
1968	1	2	1	0	4		50	50	25	
1975	0	3	2	0	5		0	67	40	
1986	3	10	6	0	19	1.5	30	60	32	
1987–1991					No survey					
1992	---	---	11	79	97	1.3	---	---	13	75
1993–1995					No survey					
1996	---	---	---	20	20	---	---	---	---	
1997					No survey					
1998	6	15	16	35	72	1.1	---	---	22	64
1999					No survey					
2000	---	6	6	113	125	1.7	---	---	---	75
2001					No survey					
2002					No survey					
					Taku River 1978–2002					
1978	3	30	15	---	49	3.4	10	50	31	14
1983	2	40	12	---	54	1.7	5	30	22	32
1986	2	42	1	---	45	1.8	5	2	2	25
1987					No survey					
1988	2	16	4	---	22	1.6	13	25	18	14
1989–1997					No survey					
1998	---	1	1	3	5	---	---	---	---	---
1999					No survey					

Table 1 continued

Year	Bulls	Cows	Calves	Unknown	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
					Taku River 2000–2002					
2000	---	5	7	36	37	2.1	---	---	19	18
2001					No survey					
					Gustavus Forelands 1998–2002					
1998	---	48	54	131	185	1.9	---	---	29	95
1999					No survey					
2000	---	45	45	117	207	3.7	---	---	22	57
2001	1	52	62	161	276	2.0	---	---	22	138
2002	---	75	82	155	312	2.5	---	---	26	125

Table 2 Unit 1C moose age at harvest, Berners Bay, regulatory years 1990 through 2002

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
									Males										
1990	0	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	5	100	3.5
1991	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	5	100	3.3
1992	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	5	20	3.5
1993	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	7	100	4.3
1994	0	2	1	2	0	1	0	0	0	0	0	0	0	0	0	1	8	88	4.7
1995	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	7	100	1.7
1996	0	5	1	0	0	1	0	0	0	0	0	0	0	0	0	0	7	100	1.7
1997	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	8	100	2.4
1998	0	2	3	0	0	0	0	0	2	0	0	0	0	0	0	0	8	88	3.4
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
									Females										
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---
1991	0	0	4	0	0	0	0	1	0	0	0	0	0	0	0	0	5	100	1.8
1992	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	4	75	1.7
1993	0	1	0	2	0	0	1	0	1	1	0	1	0	0	0	0	7	100	5.9
1994	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	1	7	71	6.6
1995	0	1	1	1	2	0	0	1	0	0	0	0	0	0	0	0	6	100	3.5
1996	0	0	1	0	2	0	0	0	1	0	1	0	0	1	0	0	7	100	6.1
1997	0	1	0	3	2	0	0	0	0	0	1	0	0	0	0	0	7	100	4.0
1998	0	2	3	1	0	0	0	0	0	0	0	0	0	1	0	0	7	100	3.4
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	3.3
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

Table 3 Unit 1C moose age at harvest, excluding Berners Bay, regulatory years 1990 through 2002[a]

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
Chilkat Range																			
1990	0	6	1	1	0	1	0	0	0	0	0	0	0	0	0	0	16	69	2.3
1991	0	3	0	2	0	0	0	0	1	0	0	0	0	0	0	0	6	100	3.3
1992	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	9	56	2.9
1993	0	5	0	2	3	0	1	0	0	0	1	0	0	0	0	0	17	71	3.8
1994	0	3	0	1	0	0	0	2	0	0	1	0	0	0	0	0	7	100	4.8
1995	0	3	3	2	0	0	2	1	1	1	0	0	0	0	0	0	14	93	4.4
1996	0	3	4	5	1	3	1	0	0	4	0	0	0	0	0	0	21	98	4.1
1997	0	5	0	3	1	1	0	1	0	1	0	0	0	0	0	0	13	92	3.3
1998	0	10	2	7	1	0	2	2	1	0	0	0	0	0	0	0	28	89	2.9
1999	0	5	3	0	1	1	0	0	0	0	0	0	0	0	0	0	11	91	2.5
2000	0	1	3	6	1	0	1	0	0	1	0	0	0	0	0	0	14	93	3.2
2001	0	2	2	1	1	2	0	2	0	0	0	0	0	0	0	0	12	83	4.2
2002	0	4	2	0	3	2	0	0	0	1	0	0	0	0	0	0	15	80	3.8
Gustavus Forelands																			
1990	0	1	2	2	1	0	1	0	0	0	0	0	0	0	0	0	8	88	3.5
1991	0	2	1	1	0	0	1	0	0	0	0	0	0	0	0	0	6	83	3.1
1992	0	1	2	1	1	1	0	1	0	0	0	0	0	0	0	0	11	64	3.9
1993	0	3	5	4	0	1	0	0	0	0	0	0	0	0	0	0	13	100	2.8
1994	0	7	4	1	1	3	0	0	1	0	0	0	0	0	0	0	20	85	3.1
1995	0	4	9	3	2	1	0	0	0	0	0	0	0	0	0	0	21	90	2.8
1996	0	18	5	4	1	1	0	0	0	0	0	0	0	0	0	0	30	97	2.2
1997	1	11	9	2	2	0	2	0	0	0	0	0	0	0	0	0	31	86	2.0
1998	2	24	10	5	3	0	0	0	0	0	0	0	0	0	0	0	48	92	1.4
1999	3	20	10	2	1	2	0	0	1	0	0	0	0	0	0	0	42	93	2.2
2000	0	23	8	9	4	2	0	0	0	0	0	0	0	0	0	0	47	98	2.2
2001	2	18	9	6	4	0	0	1	1	0	0	0	0	0	0	0	46[b]	89	2.6
2002	1	22	13	6	2	0	0	0	1	0	0	0	0	0	0	0	49	92	2.3

[a] Does not include 3 cow moose taken illegally in Gustavus in 2000.
[b] Includes 1 cow moose shot inadvertantly.

Table 3 continued

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age Class 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											
1990	0	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	20	60	2.3
1991	0	5	4	1	0	0	0	1	0	0	0	0	0	0	0	0	14	78	3.1
1992	0	3	3	1	1	1	1	0	0	0	0	0	0	0	0	0	19	53	3.4
1993	0	3	4	1	3	1	0	0	0	0	0	0	0	0	0	0	15	73	2.9
1994	0	8	3	2	1	0	0	0	0	0	0	0	0	0	0	0	16	88	2.2
1995	0	7	4	0	1	1	1	0	0	0	0	0	0	0	0	0	14	100	2.6
1996	0	10	3	0	0	0	1	0	0	0	0	0	0	0	0	0	15	93	2.1
1997	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	6	83	3.1
1998	0	11	0	2	0	0	0	0	0	0	0	0	0	0	0	0	13	100	1.8
1999	1	9	4	1	0	0	0	0	0	0	0	0	0	0	0	0	17	88	1.8
2000	0	15	3	3	1	0	1	0	0	0	0	0	0	0	0	0	23	100	2.2
2001	0	6	5	5	1	0	0	0	0	0	0	0	0	0	0	1	19	95	3.3
2002	0	10	1	1	0	0	0	0	0	0	0	0	0	0	0	0	15	80	1.8

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age Class 7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
								Gustavus Forelands (Cow Harvest)											
2002	0	1	1	2	1	3	1	0	0	0	0	0	0	0	0	1	10	100	5.5

Table 4 Unit 1C moose hunter effort and success, regulatory years 1990 through 2002[1]

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued[1]	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days
					Berners Bay					
1990	5	5	14	2.8	0	0	0.0	5	14	2.8
1991	10	10	20	2.0	0	0	0.0	10	20	2.0
1992	10	9	23	2.6	0	0	0.0	9	23	2.6
1993	15	14	29	2.1	1	7	7.0	15	36	2.4
1994	15	14	38	2.7	0	0	---	14	38	2.7
1995	15	13	40	3.1	1	6	6.0	14	46	3.3
1996	17	14	35	2.5	0	0	---	14	35	2.5
1997	15	15	42	2.8	0	0	0	15	42	2.8
1998	15	15	29	1.9	0	0	0	15	29	1.9
1999	18	16	43	2.7	0	0	0	16	43	2.7
2000	20	15	42	2.8	2	13	6.5	17	55	3.2
2001	20	14	30	2.5	3	15	5.0	17	45	2.6
2002	15	9	26	2.9	5	28	5.6	14	54	3.9
					Chilkat Range					
1990	331	16	57	3.6	94	267	2.8	106	350	3.3
1991	316	6	17	2.8	37	143	3.9	43	160	3.7
1992	317	9	41	4.6	62	234	3.8	71	275	3.9
1993	352	17	69	4.1	62	259	4.2	79	328	4.2
1994	346	7	15	2.1	47	173	3.7	54	188	3.5
1995	380	13	34	2.6	96	375	3.9	109	409	3.8
1996	396	17	31	1.8	65	308	4.7	82	339	4.1
1997	489	13	42	3.2	92	370	4.2	105	412	3.9
1998	441	28	85	3.0	58	190	3.3	86	275	3.2
1999	476	11	47	4.3	81	374	4.6	92	421	4.6
2000	455	14	47	3.4	82	326	4.0	96	373	3.9
2001	555	12	56	4.7	61	228	3.7	73	284	3.9
2002	551	15	50	3.3	96	410	4.3	111	460	4.1
					Gustavus Forelands					
1990[2]	---	8	26	---	NA	NA	---	NA	NA	---
1991	---	6	21	3.5	29	163	5.6	35	184	5.3
1992	---	11	38	3.5	36	163	4.5	47	201	4.3
1993	---	13	59	4.5	45	229	5.1	58	288	5.0
1994	---	20	96	4.8	64	281	4.4	84	377	4.5
1995	---	21	90	4.3	69	294	4.3	90	384	4.3
1996	---	30	115	3.8	65	331	5.1	95	446	4.7
1997	---	31	125	4.0	73	279	4.1	104	404	4.1
1998	---	48	139	3.0	71	255	3.7	119	394	3.4
1999	---	42	173	4.1	103	528	5.1	145	701	4.8

[1] Total permit numbers include hunters without effort information. RY 2000 does not include 2 illegal cows and 1 duplicate permit.

Table 4 Continued

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days	NR hunters	Total days	Avg. days
					Gustavus Forelands					
2000	---	47	183	3.9	85	396	4.7	132	579	4.4
2001	---	46	194	4.2	160	748	4.7	206	942	4.6
2002	---	49	176	3.6	130	667	5.1	179	843	4.7
					Taku River					
1990	---	20	89	4.5	94	339	4.0	114	424	4.0
1991	---	14	52	3.7	88	358	4.1	102	410	4.0
1992	---	19	79	4.2	104	409	3.9	123	488	4.0
1993	---	16	40	2.7	77	318	4.4	93	358	4.1
1994	---	17	40	2.4	70	323	4.8	87	363	4.3
1995	---	14	48	3.4	71	254	3.6	85	302	3.6
1996	---	15	57	4.4	85	320	3.8	100	377	3.8
1997	---	6	25	5.0	85	365	4.5	91	390	4.5
1998	---	14	49	3.5	47	219	4.7	61	268	4.4
1999	---	16	40	2.5	48	146	3.0	64	186	2.9
2000	---	23	49	2.1	45	162	3.6	68	211	3.1
2001	---	19	61	3.2	68	230	3.4	87	291	3.3
2002	---	15	47	3.1	69	268	3.8	84	315	3.8
					Gustavus Forelands (Cow Harvest)					
2002	10	10	14	1.4	0	0	0	10	14	1.4

[1] 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.
[2] Effort information for unsuccessful hunters at Gustavus Forelands is combined with the Chilkat Range for 1990

Table 5 Unit 1C moose historical harvests, number of hunters, and percent success, regulatory years 1990 through 2002

Year	NR males	NR females	NR unknown	Total kill	NR hunters	% success
			Berners Bay			
1990	5	0	0	5	5	100
1991	5	5	0	10	10	100
1992	5	4	0	9	9	100
1993	7	7	0	14	15	93
1994	8	6	0	14	14	100
1995	7	6	0	13	14	93
1996	7	7	0	14	14	100
1997	8	7	0	15	15	100
1998	8	7	0	15	15	100
1999	10	5	0	15	16	94
2000	8	7	0	15	15	100
2001	8	6	0	14	17	82
2002	5	4	0	9	14	64
			Chilkat Range			
1990	16	0	0	16	106[1]	23
1991	6	0	0	6	47	13
1992	11	0	0	11	42	26
1993	17	0	0	17	90	19
1994	7	0	0	8	56	14
1995	13	0	0	13	109	12
1996	17	0	0	17	82	21
1997	13	0	0	13	105	12
1998	28	0	0	28	86	33
1999	11	0	0	11	100	11
2000	14	0	0	14	105	13
2001	12	0	0	12	73	16
2002	15	0	0	15	111	14

Table 5 continued

Year	NR males	NR females	NR unknown	Total kill	NR hunters	% success
			Gustavus Forelands			
1990	8	0	0	8	n/a	n/a
1991	6	0	0	6	35	17
1992	9	0	0	9	47	19
1993	13	0	0	13	58	22
1994	19	0	0	19	84	23
1995	21	0	0	0	90	23
1996	30	0	0	29	95	31
1997	30	1[3]	0	31	104	29
1998	47	1[3]	0	48	118	40
1999	41	1[3]	0	42	146	29
2000	46	3[3]	0	49	132	37
2001	45	1[3]	0	46	206	22
2002	49	0	0	49	179	27
			Taku River			
1990	20	0	0	20	114[2]	18
1991	14	0	0	14	102	14
1992	19	0	0	19	123	15
1993	16	0	0	16	93	17
1994	17	0	0	17	87	18
1995	14	0	0	14	85	16
1996	15	0	0	15	97	15
1997	6	0	0	6	91	15
1998	14	0	0	14	61	23
1999	16	0	0	16	65	25
2000	23	0	0	23	69	33
2001	19	0	0	19	87	22
2002	15	0	0	15	84	18
			Gustavus Forelands (Cow Harvest)			
2002	0	10	0	10	10	100

[1] Twelve of 106 hunters were assigned to the Chilkat Range (based on proportion hunting in each area) because they reported no specific area within Unit 1C.

[2] Twelve of 114 hunters were assigned to the Taku River (based on proportion hunting in each area) because they reported no specific area within Unit 1C.

[3] Illegal take.

Table 6 Unit 1C annual moose kill by community of residence, regulatory years 1990–2002

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non-resident
					Berners Bay				
1990	5	0	5	0	0	0	0	0	0
1991	10	0	9	0	0	0	1	0	0
1992	9	0	9	0	0	0	0	0	0
1993	14	0	13	0	0	0	1	0	0
1994	14	0	13	0	0	0	1	0	0
1995	13	0	11	0	0	0	0	2	0
1996	14	0	14	0	0	0	0	0	0
1997	15	0	13	1	0	0	0	0	1
1998	15	0	12	1	0	1	1	0	0
1999	15	0	14	0	0	0	1	0	0
2000	15	0	14	0	0	1	0	0	0
2001	14	0	12	1	0	0	0	1	0
2002	9	0	8	0	0	0	1	0	0
					Chilkat Range				
1990	16	0	13	0	0	0	3	0	0
1991	6	0	6	0	0	0	0	0	0
1992	9	0	8	0	0	0	1	0	0
1993	17	0	11	0	0	0	5	1	0
1994	7	0	6	0	0	0	0	1	0
1995	13	2	10	0	0	0	0	1	0
1996	17	0	14	0	0	0	0	3	0
1997	13	0	12	0	0	0	0	1	0
1998	28	1	20	0	0	0	1	6	0
1999	11	0	7	0	0	0	0	2	1
2000	14	1	10	1	0	0	0	1	1
2001	12	0	10	0	0	0	1	1	0
2002	15	0	13	0	0	0	0	2	0
					Gustavus Forelands				
1990	8	7	1	0	0	0	0	0	0
1991	6	6	0	0	0	0	0	0	0
1992	11	10	0	0	0	0	0	0	1
1993	11	2	0	0	0	0	0	0	0
1994	20	15	4	0	0	0	0	0	1
1995	21	13	7	0	0	0	0	1	0
1996	30	22	7	0	0	0	0	0	1
1997	31	20	7	1	0	0	0	2	1
1998	48	27	16	1	0	0	1	2	1
1999	42	21	13	0	0	0	1	6	1
2000	49	29	15	0	0	0	1	3	1
2001	46	21	18	2	0	0	1	2	2
2002	49	23	20	2	0	0	0	2	2

Table 6 continued

Year	Total kill	Gustavus	Juneau	Sitka	Wrangell	Petersburg	Haines	Other Alaska	Non-resident
					Taku River				
1990	20	0	18	1	0	1	0	0	0
1991	14	0	13	0	0	1	0	0	0
1992	19	0	15	0	0	2	0	1	1
1993	15	0	12	0	0	2	1	0	0
1994	17	0	10	0	0	2	0	2	0
1995	14	0	12	1	0	0	0	1	0
1996	15	1	14	0	0	0	0	0	0
1997	6	0	5	1	0	0	0	0	0
1998	14	0	13	1	0	0	0	0	0
1999	17	0	16	1	0	0	0	0	0
2000	28	0	21	1	1	0	0	0	0
2001	19	0	18	0	0	0	0	0	1
2002	15	0	13	2	0	0	0	0	0
					Gustavus Forelands (Cow Harvest)				
2002	10	0	10	0	0	0	0	0	0

Table 7 Unit 1C successful moose hunters transport methods, regulatory years 1993–2002

	Airplane		Boat		3 or 4 wheeler		Hwy vehicle		Foot	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
					Berners Bay					
1993	0	---	14	(100)	0	---	0	---	0	---
1994	0	---	14	(100)	0	---	0	---	0	---
1995	1	(8)	12	(92)	0	---	0	---	0	---
1996	1	(7)	13	(93)	0	---	0	---	0	---
1997	0	---	15	(100)	0	---	0	---	0	---
1998	0	---	15	(100)	0	---	0	---	0	---
1999	0	---	15	(100)	0	---	0	---	0	---
2000	0	---	15	(100)	0	---	0	---	0	---
2001	0	---	14	(100)	0	---	0	---	0	---
2002	0	---	9	(100)	0	---	0	---	0	---
					Chilkat Range					
1993	5	(29)	12	(71)	0	---	0	---	0	---
1994	0	---	7	(100)	0	---	0	---	0	---
1995	5	(38)	8	(62)	0	---	0	---	0	---
1996	9	(53)	8	(47)	0	---	0	---	0	---
1997	6	(46)	7	(54)	0	---	0	---	0	---
1998	9	(32)	19	(68)	0	---	0	---	0	---
1999	8	(73)	3	(27)	0	---	0	---	0	---
2000	7	(50)	7	(50)	0	---	0	---	0	---
2001	5	(42)	7	(58)	0	---	0	---	0	---
2002	8	(57)	6	(43)	0	---	0	---	0	---
					Gustavus Forelands					
1993	1	(8)	4	(31)	1	(8)	4	(31)	3	(23)
1994	1	(5)	3	(15)	0	---	11	(55)	5	(25)
1995	3	(14)	7	(33)	0	---	2	(10)	0	---
1996	1	(3)	7	(23)	3	(10)	4	(13)	12	(40)
1997	0	---	9	(31)	0	---	4	(14)	16	(55)
1998	0	---	10	(21)	0	---	21	(44)	17	(35)
1999	5	(12)	9	(22)	1	(2)	14	(34)	12	29
2000	5	(11)	6	(13)	1	(2)	20	(43)	14	(30)
2001	10	(22)	6	(13)	0	---	9	(19)	21	(46)
2002	3	(6)	6	(13)	2	(4)	30	(62)	7	(15)
					Taku River					
1993	4	(25)	11	(69)	0	---	0	---	1	(6)
1994	3	(18)	14	(82)	0	---	0	---	0	---
1995	2	(14)	12	(86)	0	---	0	---	0	---
1996	6	(33)	12	(67)	0	---	0	---	0	---
1997	0	---	6	(100)	0	---	0	---	0	---
1998	0	---	14	(100)	0	---	0	---	0	---
1999	0	---	17	(100)	0	---	0	---	0	---
2000	2	---	21	(100)	0	---	0	---	0	---
2001	1	(5)	18	(95)	0	---	0	---	0	---
2002	0	---	14	(100)	0	---	0	---	0	---
					Gustavus Forelands (Cow Harvest)					
2002	2	(20)	1	(10)	0	---	7	(70)	0	---

Table 8 Unit 1C moose hunters commercial services use, regulatory years 1991 through 2002

Year	Unit residents		Other AK residents		Non-residents		Total use		Transport	Non-guided services	Other services
	No	Yes	No	Yes	No	Yes	No	Yes			
					Berners Bay						
1991	6	2	0	0	0	0	6	2	0	0	2
1992	9	1	0	0	0	0	9	1	0	0	1
1993	13	0	1	0	0	0	14	0	0	0	0
1994	11	0	1	0	0	0	12	0	0	0	0
1995	13	0	1	0	0	0	14	0	0	0	0
1996	12	1	0	0	0	0	12	1	1	0	0
1997	13	0	1	0	0	1	14	1	1	0	0
1998	12	0	2	1	0	0	14	1	0	0	1
1999	15	1	0	0	0	0	15	1	0	0	0
2000	15	0	2	0	0	0	17	0	0	0	0
2001	13	0	2	0	0	0	15	0	0	0	0
2002	13	0	1	0	0	0	14	0	0	0	0
					Chilkat Range						
1992	88	6	12	4	0	1	100	11	10	1	0
1993	37	2	20	7	0	0	57	10	5	3	2
1994	26	5	19	0	0	0	45	4	0	0	0
1995	72	2	29	0	0	0	101	2	2	0	0
1996	56	5	13	0	0	0	64	5	5	0	0
1997	66	4	13	0	1	3	80	7	7	0	0
1998	70	1	11	4	0	0	81	5	5	0	0
1999	74	7	4	2	0	1	78	10	10	0	0
2000	57	5	11	1	0	2	68	8	8	0	0
2001	55	5	11	1	0	0	66	6	5	1	0
2002	72	9	12	0	5	0	89	9	9	0	0
					Gustavus Forelands						
1992	8	0	0	0	0	0	8	0	0	0	0
1993	55	4	3	0	0	0	58	4	4	0	0
1994	81	1	0	0	1	0	82	2	2	0	0
1995	80	0	10	0	0	0	90	0	0	0	0
1996	78	3	12	1	0	1	95	5	5	0	0
1997	81	2	7	0	1	2	89	4	1	2	1
1998	104	2	9	0	1	0	114	2	2	0	0
1999	107	2	5	1	1	0	113	3	3	1	0
2000	100	3	4	0	3	0	107	3	3	0	0
2001	138	8	32	2	19	3	189	13	9	3	3
2002	145	6	17	0	7	0	169	6	5	0	1

Table 8 continued

Year	Unit residents		Other AK residents		Non-residents		Total use		Transport	Non-guided services	Other services
	No	Yes	No	Yes	No	Yes	No	Yes			
					Taku River						
1992	56	8	8	2	0	0	64	10	7	0	3
1993	61	7	71	7	0	0	132	14	12	2	0
1994	50	4	23	3	0	0	73	7	7	0	0
1995	70	5	9	0	0	0	79	5	3	0	2
1996	71	5	3	1	0	2	74	8	2	2	4
1997	60	6	4	0	0	0	64	6	5	0	1
1998	53	3	4	0	0	0	57	3	3	0	0
1999	53	1	6	0	1	0	56	1	1	0	0
2000	53	1	3	0	0	0	56	1	0	1	0
2001	75	3	4	0	2	0	81	3	3	0	0
2002	74	3	5	0	0	0	79	3	3	0	0
					Gustavus Forelands (Cow Harvest)						
2002	7	3	0	0	0	0	7	3	2	0	1

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 1D (2700 mi^2)

GEOGRAPHICAL DESCRIPTION: That portion of the Southeast Alaska mainland lying north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay.

BACKGROUND

Most Unit 1D moose inhabit the Chilkat River watershed and the Chilkat Peninsula. Within this area there is an estimated 200–250 mi^2 of summer range and 110–120 mi^2 of winter range, including 80 mi^2 of preferred winter range. Small areas of moose habitat are also located in the Chilkoot, Katzehin, and Warm Pass valleys, and along the western shore of Lynn Canal (ADF&G 1990).

Moose migrated to the Chilkat River Valley from drainages in Canada around 1930. Moose populations peaked in the Chilkat Valley in the mid 1960s, when as many as 700 animals may have been present (ADF&G 1991). By the early 1970s the moose population had sharply declined, possibly because of overuse of the range and overharvest. Survey data collected during the mid 1980s suggested that the herd had declined to 400 animals. More recent surveys suggest that the moose population is around 250 to 350 animals. Some care must be taken in interpreting the survey data because not all areas of the unit were surveyed each year, which undoubtedly accounts for some discrepancy in moose numbers between years.

During the late 1980s and early 1990s, Unit 1D residents expressed concern over the decrease in moose numbers from the highs seen in the 1960s, the subsequent decline in hunting opportunity, and the "stampede" nature of the “any-bull” registration permit hunts with low harvest quotas. To control the unpredictable nature of the hunt, regulations were introduced (a spike-fork/50-inch/3 brow tine requirement) but these were preempted when a Tier II subsistence hunt was implemented by the Board of Game (BOG) for the 1990 season. Widespread dissatisfaction with the allocation of 20 Tier II permits and concern over the status of the herd contributed to local opposition to holding a hunt in 1991, and no permits were issued that year. In 1992 the season was closed by emergency order before Tier II permits were issued. In March 1993 the BOG authorized a Tier II antler restriction hunt for Unit 1D. This hunt allowed more hunter opportunity while affording protection to bulls that did not meet antler requirements. The objective of restricted antler hunts is to spare a large proportion of the young and middle-aged

bulls from harvest to strengthen the breeding age segment of the population while allowing many local hunters the opportunity to pursue a moose.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population management objectives identified by staff for Unit 1D are as follows:

1. Maintain a post-hunt population of at least 200 moose;

2. Maintain a post-hunt bull-to-cow ratio of 25:100;

3. Reach a harvest of 20–25 moose with a hunter success rate of 12% (or approximately 10% of the surveyed moose).

METHODS

Chilkat River Valley aerial surveys were conducted in December 2001, but not in 2002 (Table 1). Areas covered included the Chilkat River Valley from Murphy Flats to Turtle Rock, and the Klehini, Takhin, Tsirku, Kelsall, and Chilkoot river valleys.

Each year, prior to the moose hunt, we held an informational meeting in Haines to discuss the identification of legal and illegal moose. We showed the video "Is This Moose Legal?" to help hunters interpret the spike-fork/50-inch/3 brow tine regulation used to manage the Unit 1D hunt.

In 2001 and 2002 we maintained a moose check station in Haines and required hunters to check in their harvested moose within 2 days of the kill. Incisors were collected from harvested moose as a condition of the Tier II permit. All permittees were required to turn in a hunt report card specifying if they hunted, hunt duration, hunt location, transport means (for all hunters), and date of kill (for successful hunters). We also collected data on antler measurements and configurations.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We conducted a winter survey in 2001, but lack of a survey aircraft prevented us from conducting a survey in 2002. During the survey, 220 moose were counted, nearly the same number as the previous year, and comparable to the surveys going back to the early 1980s (Table 1). Based on this number of observed animals, we estimate the moose population in the Chilkat Valley is between 250 and 350 animals.

Population Composition

Survey conditions during the 2001 count were excellent, and we were able to classify all animals seen as bulls, cows or calves. We classified 13.6 % of the moose seen on this survey as calves,

similar to percentages seen in previous years (Table 1). The bull-to-cow ratio was determined to be 25:100 and the calf-to-cow ratio was 20:100. Mean age at harvest was 4.0 years during this report period, a decrease from the mean age of 4.7and 4.4 years during the previous 2 report periods (Table 2).

It is interesting to compare the age at harvest from the 1980s to the post-Tier II era (1993) and to the present. While the mean age was less than 4 years old for the seasons 1983–1989 (when any bull was legal), the mean age was greater than 5 years old from 1993 through 1995 (immediately after the antler restriction regulation was implemented). The mean age has been around 4 years during 1996–2000. The age distribution of animals harvested from 1993 to 1995 is skewed toward older animals, most likely a result of the spike-fork/50-inch/3 brow tine regulation implemented in 1993 and the fact that no hunts were held during 1991 and 1992. The increase in older bulls available after 2 closed seasons provided for a harvest of older animals for a time, but since then, the mean age has declined.

MORTALITY

Harvest

Season and bag limit	Resident hunters	Nonresident hunters
1 bull with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on 1 side by Tier II subsistence hunting permit only; up to 200 permits may be issued.	15 Sep–30 Sep (Subsistence hunt only)	No open season.

Game Board Actions and Emergency Orders: During both years of this report period, Unit 1D moose hunting remained open for the entire 2-week season. In addition to the limiting aspects of a spike-fork/50-inch/3 brow tine hunt, we also managed for a harvest guideline of 25 bulls, although this guideline wasn't reached in either year. During the fall 2002 meeting, the Board of Game passed a regulatory change to increase the number of Tier II permits from 200 to 220, to go into effect in fall of 2003. ADF&G promulgated this change to compensate for hunters not using their permits and effectively excluding other residents wanting to participate in this Tier II hunt from doing so.

Hunter Harvest: In the 2001–02 period, the mean annual harvest was 19 moose, which is the same as the previous report period, but lower than the decade's high harvest of 27 in 1995 and 1996. This variability in harvest is likely due to weather conditions and changing hunting patterns rather than a reflection of the population size.

Permit Hunts: All moose hunting in Unit 1D is administered under a Tier II subsistence permit system. Two hundred permits were issued during each year of the report period (Table 3). The proposal increasing the number of permits available in the draw was made to give a greater number of applicants the opportunity to hunt, and it is expected that the number of applicants will increase with passage of this regulation.

Hunter Residency and Success: During the report period local residents were the primary Unit 1D moose hunters, although all Alaskans were eligible to apply for this (or any other Tier II hunt). Residents of Haines or Klukwan (Table 4) took 37 of the 39 moose harvested in 2001–2002. Hunter success was 12% during this report period, which is similar to the previous 4 years and within our management objectives (Table 3). However, this hunter success is substantially lower than the 10-year high of 17% during 1995–1996 (Table 5). Successful hunters took an average of 3.7 days per kill in 2001 and 2002 (Table 3). Total hunter days were 1031 in 2001 and 1049 in 2002 (Table 3), similar to the previous 2 report periods, but nearly double the hunter days expended from 1992 to 1994. The increase in hunter days in recent years is partly due to the guideline harvest not being reached, allowing the season to run its 2-week length. This is also reflected in an increase in number of days hunted by successful hunters.

Harvest Chronology: Since 1995 the opening date of the Tier II moose season has been 2 weeks earlier than former years, beginning on 15 September rather than 1 October. Because of this earlier start date, it can be difficult for hunters to locate and positively identify a legal bull due to the presence of leaves on trees and shrubs.

Transport Methods: Most Unit 1D moose hunters use boats or highway vehicles (Table 6). During the 2001 and 2002 hunting seasons, 82% and 55% of successful hunters used boats, respectively. Nearly all of the remaining successful hunters used highway vehicles (Table 6).

Commercial Services: Only one hunter reported the use of commercial services during the report period (Table 7). This is not surprising because virtually all hunters reside within or very near the subunit, and are well equipped for moose hunting. Also, many hunters have hunted together for a number of years, and in some instances share transportation and camps.

Other Mortality: Unit 1D residents have suggested that the local brown bear population has increased in recent years, and that bear predation on moose calves may be partly responsible for low recruitment rates observed. Data are not available to support this contention. During this report period, aerial surveys documented calf percentages similar to those seen in recent years, and predation is not indicated as a problem. In some years deep snow may contribute to calf mortality, although conditions during this report period were relatively mild. Deteriorating range conditions may also play a role in low calf production and survival (Hundertmark et al. 1983), and this is something that should be examined more closely.

The abundance of willows adjacent to the Haines Highway has led to several moose-vehicle collisions over the years. However, we have not collected information on these kills consistently over time, nor have we been able to obtain jaws, and thus ages, from these moose. We estimate that on average 2–4 moose are struck and killed by highway vehicles in the subunit each winter.

Poaching occurs, but the number of moose lost to this activity is not known. There is some degree of unreported harvest of illegal bull moose that are shot and left by hunters, although we believe that this number is relatively small.

Habitat: Nearly all moose habitat in this subunit lies within the Haines State Forest, managed under multiple-use guidelines of the 1986 Haines State Forest Management Plan. The plan's goals include an annual timber harvest of up to 8.8 million board feet (approximately 300 to 580

acres), at a rotation rate of 125 years. While some increased browse production may occur in logged areas, the extent, duration, and value of deciduous reproduction in these areas has not been determined. The long-term usefulness of cutover areas to moose will be reduced if timber harvest occurs in high-value wintering areas, and if cutover areas are managed to produce second-growth coniferous stands rather than deciduous browse species. It is also important to note that in Southeast Alaska it has not been determined how important coniferous stands are for moose during periods of deep snow, when they may provide critical escape cover from predation and better foraging opportunities.

Habitat changes within nonforested portions of the area are also of concern, although only anecdotally documented in recent years. Research in the early 1980s showed a low proportion of young willow plants in shrub stands in the Chilkat River valley, and it is suspected that postglacial land uplift (isostatic rebound) is causing permanent habitat change. Removal of decadent alder and cottonwood overstories in order to release willow, red-osier dogwood, and other browse species may counteract long-term changes, at least for awhile. Somewhat conversely, hunters in some areas (e.g., upper Chilkat River) report sufficient browse but few moose seen. There is some degree of local interest in mechanically changing vegetation in areas close to Haines, but no efforts have been made to date.

CONCLUSIONS AND RECOMMENDATIONS

The management objectives at the beginning of this report were adapted from the Strategic Plan for Management of Moose in Region I, Southeast Alaska 1990–94 (ADF&G, 1991). The old objective of maintaining a population of 350 moose, based on our aerial survey information, may be somewhat labile, depending upon areas surveyed and whether correction factors are used for moose sightability and survey conditions. We believe it is more practical to use a minimum population level of 200 moose as a management objective. The harvest objective of 20–25 bulls was met. The increased number of hunter days for successful and unsuccessful hunters may reflect a longer open season during this reporting period. We met the objective of a 12% hunter success rate.

The effect of predation upon moose calf survival in this area is unknown. An apparently healthy brown bear population (as well as a less prominent black bear population) may account for substantial summer mortality, according to anecdotal accounts, but there are no objective data for predation observations for this area. Winter wolf predation does not appear to be a serious problem, except when moose movements are restricted by extremely deep snow. However, an actively trapping populace likely maintains a check on this source of predation.

McCarthy (ADF&G 1990) called for investigation into the relationship between timber harvest and moose habitat in the Chilkat River valley. Other means of converting decadent hardwood stands to encourage growth of browse species should be pursued and tried on a pilot basis, while maintaining adequate coniferous growth to serve as escape cover.

Surveys for the last few years suggest that moose numbers in Unit 1D are no longer declining and indicate that the population has remained relatively stable over the past 15 years. The present regulatory structure supports a moose population concomitant with habitat capabilities.

Predation, deep snows, and mediocre habitat point to the need for regular surveys to better understand the status and trend of the population.

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PREPARED BY:
Polly Hessing
Wildlife Biologist II

SUBMITTED BY:
Dale Rabe
Regional Management Coordinator

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Table 1 Unit 1D moose aerial survey data, regulatory years 1982 through 2000

Regulatory year	Total males	Total females	Total calves	Unk	Total moose	Count time (hrs)	Bulls per 100F	Calves per 100F	Calves % in herd	Moose per hour
1982	34	115	51	---	200	4.8	30	44	36	42
1983	16	148	47	---	211	5.8	11	32	22	36
1984	15	135	37	---	187	5.2	11	27	20	36
1985	23	155	29	---	207	5.5	15	19	14	38
1986	33	93	13	---	139	3.5	36	14	14	40
1987[1]	---	---	29	174	203	---	---	---	14	53
1988[2]	---	---	31	206	252	4.4	---	---	12	57
1989	18	45	10	---	73	1.5	40	22	14	48
1990[3]	18	67	6	---	91	3.5	30	9	7	26
1991	23	138	22	---	183	7.8	17	17	13	23
1992	27	98	21	---	149	2.9	28	21	14	52
1993	---	---	19	157	176	5.8	---	---	11	31
1994	41	77	27	---	149	4.3	53	35	18	35
1995					No survey					
1996	48	121	31	7	207	3.8	40	26	16	54
1997	10	37	36	115	198	4.1	---	---	18	48
1998	20	23	25	103	171	5.2	---	---	15	39
1999[4]	---	4	4	67	75	4.9	---	---	---	15
2000	28	30	35	129	222	5.5	18	22	15.7	56
2001	38	153	30	---	221	5.2	25	20	13.6	42
2002					No survey					

[1]Late winter survey, sex and age ratios unreliable. In a second late winter survey, a total of 215 moose (29 calves) were counted at a rate of 57 moose per hour.

[2]Late-winter survey, sex and age ratios unreliable.

[3]Numbers are for 12/14/1990 survey. A second survey, flown only in the Chilkat Valley on 3/22/1991, resulted in a total count of 28 moose in 2.9 hours.

[4]Marginal survey conditions, minimal composition information.

Table 2 Unit 1D age structure of harvested moose, regulatory years 1983 through 2002

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age class 7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% aged	Mean age
1983	1	3	7	10	6	0	1	2	0	1	0	0	0	0	0	0	62	50	3.8
1984	2	15	12	2	2	1	0	0	0	0	0	0	0	0	0	0	36	94	2.3
1985	0	7	4	1	0	1	0	0	0	0	0	0	0	0	0	0	14	93	2.3
1986										Season closed									
1987	0	3	6	7	3	1	0	0	0	0	0	0	0	0	0	0	22	91	3.2
1988	0	6	5	3	1	1	1	0	0	0	0	0	0	0	0	0	18	94	2.9
1989	0	10	5	2	2	0	0	0	0	0	0	0	0	0	0	0	18	100	2.3
1990																	19	0	---
1991–1992										Season closed									
1993	0	2	3	3	4	2	3	1	4	0	1	0	1	0	0	0	24	100	5.1
1994[1]	0	0	0	1	1	8	2	2	0	0	0	0	1	0	0	0	17	94	5.7
1995	0	0	1	5	4	3	5	3	3	1	2	0	0	0	0	0	27	100	6.1
1996	0	5	2	3	2	4	2	2	1	1	0	0	0	0	0	0	27	78	4.5
1997	0	2	0	3	6	1	1	1	0	1	0	0	0	0	0	0	15	88	4.6
1998	0	4	2	0	7	2	0	1	0	1	2	0	0	0	0	0	19	100	4.8
1999	0	6	2	3	2	3	2	0	2	0	1	0	0	0	0	0	21	100	4.3
2000	0	2	4	1	2	3	3	0	2	0	0	0	0	0	0	0	18	95	4.6
2001	0	8	1	1	3	1	1	1	1	0	0	0	0	0	0	0	17	100	3.5
2002	0	3	2	4	5	1	1	2	2	0	0	0	0	0	0	0	22	91	4.5

[1]Does not include an illegally harvested bull, age 3.

Table 3 Unit 1D moose hunter effort and success, regulatory years 1983 through 2000

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	# hunters	Total # days	Avg. # days	# hunters	Total # days	Avg. # days	# hunters	Total # days	Avg. # days
1983	---	62			292			354		
1984	---	35	149	4.3	314	1540	4.9	349	1,689	4.8
1985	---	14	43	3.1	29	109	3.8	43	152	3.5
1986					Season closed					
1987	294	22	22	1.0	208	208	1.0	230	230	1.0
1988	259	18	18	1.0	188	188	1.0	206	206	1.0
1989	272	18	18	1.0	208	208	1.0	226	226	1.0
1990	20	19	48	2.5	1	7	7.0	20	55	28
1991–1992					Season closed					
1993	176	24	45	1.9	83	182	2.3	107	227	2.2
1994	200	17	20	1.2	130	284	2.2	147	304	2.1
1995	200	27	58	2.1	130	401	3.1	157	459	3.0
1996	181	24	70	3.3	121	735	6.1	145	805	5.7
1997	200	17	50	3.8	130	891	6.9	145	941	6.6
1998	200	19	79	4.4	146	976	6.8	164	1,055	6.5
1999	200	21	87	4.1	137	972	7.1	158	1059	6.7
2000	200	18	74	4.1	138	821	5.9	156	895	5.7
2001	200	17	68	4.0	137	963	7.0	154	1031	6.7
2002	200	22	78	3.5	135	971	7.2	157	1049	6.7

Table 4 Unit 1D annual moose kill by community of residence, regulatory years 1984–2002

Regulatory year	Total kill	Haines	Skagway	Juneau	Sitka	Other Alaska	Non-resident
1984	35	23	1	7	2	1	0
1985	14	14	0	0	0	0	0
1986				Season closed			
1987	22	22	0	0	0	0	0
1988	18	18	0	0	0	0	0
1989	18[1]	18	0	0	0	0	0
1990	19	19	0	0	0	0	0
1991–1992				Season closed			
1993	24	22	0	2	0	0	0
1994	17	17	0	0	0	0	0
1995	27[2]	26	0	1	0	0	0
1996	27[3]	23	0	0	0	1	0
1997	17	16	0	1	0	0	0
1998	19	18	0	1	0	0	0
1999	21	19	0	2	0	0	0
2000	18	16	0	1	0	1	0
2001	17[4]	16	0	0	1	0	0
2002	22	21	1	0	0	0	0

[1]Includes 3 illegally harvested bulls.
[2]Includes 1 illegally harvested bull, 1 unrecovered bull, and 2 illegally harvested cows.
[3]Data are only available for 51 of the 54 moose listed for 1995–96.
[4]Includes 1 illegally harvested bull.

Table 5 Unit 1D historical moose harvests, number of hunters, and percent success, regulatory years 1980 through 2002

Regulatory year	NR males	NR females	NR unknown	Total kill	NR hunters	Percent success
1980	48	0	0	48	342	14
1981	36	2	0	38	315	11
1982	24	1	0	25	267	9
1983	62	0	0	62	354	17
1984	35	1	0	36	349	10
1985	14	0	0	14	43	33
1986			Season closed			
1987	22	0	0	22	230	10
1988	18	0	0	18	206	9
1989	18	1	0	19	226	8
1990	19	0	0	19	20	95
1991–1992			Season closed			
1993	24	0	0	24	107	22
1994	17	0	0	17	147	12
1995	27[1]	0	0	27	157	17
1996	25	2	0	27	145	17
1997	17	0	0	17	145	12
1998	19	19	0	19	164	12
1999	21	0	0	21	163	13
2000	18	0	0	18	160	11
2001	17	0	0	17	154	11
2002	22	0	0	22	157	14

[1]Includes 2 illegal bulls, 1 unrecovered bull, and 2 cows. These show up in the total kill of 27.

Table 6 Unit 1D transport methods used by successful moose hunters, regulatory years 1987–2002

	Airplane		Boat		ORV		Highway vehicle		Other	
Year	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
1987	3	(14)	12	(12)	1	(5)	6	(27)	0	---
1988	0	---	16	(88)	1	(6)	1	(6)	0	---
1989	2	(11)	10	(55)	2	(11)	4	(22)	1	(1)
1990	0	---	10	(58)	0	---	7	(37)	2	(8)
1991–1992	Season closed									
1993	0	---	13	(54)	0	---	10	(45)	1	(4)
1994	0	---	13	(81)	0	---	3	(19)	0	---
1995	0	---	5	(22)	0	---	15	(65)	3	(13)
1996	3	(13)	10	(42)	0	---	10	(42)	1	(4)
1997	0	---	10	(71)	0	---	4	(29)	0	---
1998	1	(6)	11	(65)	2	(8)	3	---	0	---
1999	2	(10)	15	(71)	0	(0)	4	(19)	0	(0)
2000	0	(0)	12	(67)	2	(11)	4	(22)	0	(0)
2001	1	(6)	14	(82)	0	---	2	(12)	0	---
2002	2	(9)	12	(55)	2	(9)	5	(23)	0	---

Table 7 Unit 1D commercial services used by moose hunters, regulatory years 1993–2002

	Unit residents		Other AK residents		Total use		Other
Year	No	Yes	No	Yes	No	Yes	services
1993	60	1	3	1	73	2	2
1994	104	1	3	0	107	1	1
1995	97	0	3	0	100	0	0
1996	82	1	5	0	87	1	0
1997	76	2	3	0	79	2	0
1998	133	1	6	0	139	1	0
1999[1]	126	2	15	0	141	2	1
2000[2]	132	1	12	1	144	2	1
2001[3]	128	1	8	0	136	1	0
2002[4]	134	0	9	0	143	0	0

[1] Eleven percent did not report whether or not they used commercial services.
[2] Seven percent did not report whether or not they used commercial services.
[3] Twelve percent did not report whether or not they used commercial services.
[4] Ten percent did not report whether or not they used commercial services.

Table 8 Unit 1D moose harvest by Wildlife Analysis Areas (WAA), regulatory years 1990 through 2002

Year	WAA								
	4302	4303	4304	4405	4406	4407	4408	Unknown	Total
1990	7	7	2	0	0	0	0	3	19
1991–1992			No season						---
1993	7	13	0	0	0	0	0	4	24
1994	5	10	0	0	0	0	0	2	14
1995	13	6	0	0	0	0	0	8	27
1996	8	8	0	3	0	0	0	3	22
1997	6	4	1	0	0	0	0	3	14
1998	10	2	0	0	0	0	0	6	18
1999	6	5	0	0	0	0	2	8	21
2000	6	5	0	0	0	0	2	5	18
2001	8	5	0	2	0	0	2	0	17
2002	11	7	1	1	0	1	1	0	22

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Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 3 (3000 mi^2)

GEOGRAPHIC DESCRIPTION: Islands of the Petersburg, Kake, and Wrangell area.

BACKGROUND

Isolated populations of moose (*Alces alces*) occur on the major islands of Unit 3 and are believed to be the *andersonii* subspecies. Moose on the Unit 3 islands emigrated in the past several decades from the Stikine and possibly Thomas Bay populations on the Unit 1B mainland. Increased sightings during the 1980s and 1990s suggest that moose populations and distribution are increasing in the Unit.

HABITAT DESCRIPTION

Because Unit 3 moose appear to depend on deciduous vegetation in clearcut areas rather than the more persistent riparian or glacial forelands vegetation typical of most Southeast Alaska moose range, it is unclear whether a viable population can be sustained over the long term.

Unit 3 moose habitat consists primarily of old-growth spruce-hemlock forest and clearcut areas. Extensive clearcutting on many of the islands has resulted in early successional vegetation that may temporarily provide good moose browse. No estimate has been made of the amount or quality of moose range in the unit.

HUMAN-USE HISTORY

Regulation History

From 1960 through 1967 the Unit 3 moose season was open from 15 September through 15 October with a one-bull limit. The season was closed from 1968 until 1990 when the season reopened on Wrangell Island from 1 to 15 October, with a one-bull bag limit, a spike-fork or 50” antler restriction, and a harvest ticket requirement. In 1991 the season reopened on Mitkof Island from 1 through 15 October with a one-bull bag limit, a spike-fork or 50” antler restriction, and a harvest ticket requirement. In 1993 the remainder of Unit 3 was opened from 1 through 15 October with a one-bull bag limit, a spike-fork, 3-brow tine or 50” antler restriction, and a registration permit requirement throughout the unit. From 1995 to present the season dates have been 15 September through 15 October.

Action by the Board of Game effective 1 July 1995 put all of Units 1B and 3 and that portion of Unit 1C south of Point Hobart under a common registration permit hunt (RM038). A legal moose for this hunt is a bull with a spike/fork or 50-inch antlers or 3 brow tines on at least 1 side.

Historical harvest patterns

The average annual harvest during the 1990s was 19 bulls, although during 1990 the season was open only on Wrangell Island, and during 1991 and 1992 the season was opened only on Wrangell and Mitkof islands. Between 1993 (the year the entire unit opened to moose hunting) and 2000, the average annual harvest was 24 bulls.

Unit 3 moose harvest chronology has varied. Most bulls are killed during the first half of the season and the harvest rate declines as the season progresses (Table 2). Most hunters are in the field early in the season, then effort drops except on weekends. Inclement weather does not seem to reduce hunting effort early in the season.

Historical harvest locations

In 1990, the year the season first opened in Unit 3, moose hunting was restricted to Wrangell Island and 3 bulls were killed. In 1992 and 1993, the season was opened on both Wrangell and Mitkof islands, and a total 10 and 17 bulls were harvested, respectively. Since 1993, the year all of Unit 3 was opened to moose hunting, the majority of moose harvested in the unit have come from Mitkof and Kupreanof islands.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

During the formulation of the Region I moose plan in the late 1980s (ADF&G 1990), we were unaware that by the mid-1990s a moose population would be established in Unit 3 capable of supporting an annual harvest. Harvesting a Unit 3 moose is often opportunistic, and habitat management and road construction will undoubtedly have greater effect on moose numbers and hunting opportunity compared to other factors. We cannot estimate how long Unit 3 habitat will support a viable moose population. The issue of rebuilding Sitka black-tailed deer populations on the Unit 3 islands compounds the complexity of establishing moose management goals. Moose numbers are currently high enough to support a hunting season in Unit 3, and we intend to continue the hunt as long as it does not affect the integrity of the population. We have established the following draft goals for Unit 3 moose, which include a crude estimate of the population size, limited knowledge of habitat utilization and moose movements, and anecdotal information from people in the field.

ADF&G first set management objectives for Unit 3 moose in 1996. Prior to that year, the harvest was sporadic and we were unsure how persistent the population or harvest would be. After 5 years when the annual harvest increased from 8 moose to as many as 19 and hunter participation grew from 24 to nearly 400 hunters, we decided some preliminary management objectives were necessary. However, ADF&G has never tried to estimate the Unit 3 moose population by aerial survey because of the difficulty of seeing moose in a mostly forested landscape. Consequently, in succeeding years when harvest and hunter numbers continued to increase it became apparent that

more moose inhabited the islands than was originally thought. Objectives were increased to match the apparent capacity of the herd to sustain the increased harvest and effort.

Unit 3:	Plan Objective	2001	2002
Post hunt numbers	400	N/A	N/A
Annual hunter kill	40	23	26
Number of hunters	470	459	457
Hunter-days of effort	2300	2759	2978
Hunter success	10%	5%	6%

METHODS

Hunters and harvested moose were opportunistically checked in the field. Additionally, hunters were required to bring antlers of harvested moose to ADF&G to verify compliance with antler restrictions. Hunters were also required to submit the lower jaw of harvested moose for aging purposes. Since 1997 hunters have been asked to report on their registration permit reports the total number of moose (by sex and age class), wolves, and bears they observed during the hunting season.

RESULTS AND DISCUSSION

Because so little is known about Unit 3 moose – their permanence or their ability to sustain a hunt – objectives have been set at current levels of harvest, effort, and success. ADF&G considers the Unit 3 hunt to be an opportunistic hunt on a population whose permanence is unknown because it relies on atypical habitat. Without information on the current population or habitat-carrying capacity, population objectives are only speculative. Without that information we have supported only hunts with self-limiting regulations (such as spike-fork/50"/3 brow-tine antler restrictions). We believe such hunts enable the population to thrive as permitted by the carrying capacity of the habitat while providing hunting opportunity. Long-term persistence of Unit 3 moose may depend upon a major habitat enhancement program or continued clearcut logging, which may be detrimental to deer populations. ADF&G is currently unwilling to take such a proactive approach. Our current objectives are to “passively manage” the hunt, keeping seasons open as long as moose appear to be abundant, noting harvest and hunter effort, but not actively attempting to increase them.

POPULATION STATUS AND TREND

Population Size

Data are insufficient to make a quantitative determination of the Unit 3 moose population. We believe Unit 3 moose numbers are at low-to-moderate density and appear to be increasing.

The Unit 3 moose population is the most enigmatic in Southeast Alaska. Numbers, distribution, sex and age ratios, calf-to-cow ratios, and other population characteristics are unknown. No surveys have ever been conducted in Unit 3. Dense forest cover and the lack of any winter concentration areas make aerial surveys impractical. Harvest data and anecdotal information collected by ADF&G wildlife biologists over a period of many years continue to suggest an

expanding population. Densities seem to be the greatest on Mitkof and eastern Kupreanof islands. Information is insufficient, however, to accurately estimate moose numbers in the unit. Predators, including wolves and black bears, exist on most islands in the unit, and a few brown bears exist on some islands close to the mainland, but the extent of predation is unknown.

Population Composition

No aerial surveys of moose populations have been conducted in the unit. Information on the number of moose observations reported by hunters on registration hunt report cards provides the only available information on population composition. In 2001 a total of 459 hunters reported observing 1170 moose, including 381 bulls, 520 cows, and 269 calves, for a bull-to-cow ratio of 73:100 and a calf-to-cow ratio of 52:100. In 2002, 457 hunters reported observing 972 moose, including 296 bulls, 425 cows, and 251 calves, for a bull-to-cow ratio of 70:100 and a calf-to-cow ratio of 59:100.

Distribution and Movements

Moose appear to be expanding their range in Unit 3 despite the lack of deciduous riparian vegetation typical of most moose habitat in the region. Moose have been seen crossing Dry Straits between Farm Island on the Stikine River delta and Mitkof Island. At low tide this strait can be crossed easily and moose are reported to move in both directions. Moose appear to be well distributed on Mitkof, Wrangell, and Kupreanof islands. Moose have become well established, and their numbers appear to be increasing on Etolin, Zarembo, and Kuiu islands.

MORTALITY

Harvest

Season and Bag Limit	Nonresident and resident hunters
Unit 3	15 Sep–15 Oct (General hunt only except in Stikine Drainage)
1 bull with spike-fork antlers or 50-inch antlers or antlers with 3 or more brow tines on one side by registration permit only	

Game Board Actions and Emergency Orders. No Board of Game actions were taken or emergency orders issued regarding Unit 3 moose during the report period.

Hunter Harvest. In 2001, 459 hunters harvested 23 moose in Unit 3 (Table 1). In 2002, 457 permittees harvested 26 moose.

Hunter Residency and Success. Almost all Unit 3 moose hunters are local residents from Petersburg, Kake, and Wrangell (Table 4). The overall hunter success rate was 5% in 2001 and 6% in 2002.

Harvest Chronology. In 2001 the largest percentage of the annual harvest occurred during the first and last week of the season (Table 2). In 2002 the largest percentage of the annual harvest occurred during the last week, followed by identical harvests in the first and second weeks of the season.

Harvest in particular WAA's. In both 2001 and 2002 the highest percentage of the annual harvest occurred in WAA # 2007 on Mitkof Island and in WAA # 5132 on Kupreanof Island, respectively.

Guided hunter harvest. No guided moose hunts are currently offered in the unit.

Transport Methods. Hunters in Unit 3 relied on highway vehicles and boats to reach the field (Table 3).

Other Mortality

Predation by wolves on adult and calf moose has been reported in Unit 3. Substantial predation of moose calves by black bears has been documented in other areas and probably occurs in Unit 3. One cow moose was poached and its carcass left to lay on Mitkof Island after the close of the moose hunting season in 2002.

HABITAT ASSESSMENT

Assessment

Little is known about what constitutes suitable and preferred moose habitat in Unit 3, or if that habitat can sustain a viable moose population over a long period of time. Recent increases in moose distribution and abundance in Unit 3 are likely linked to timber harvest. Early successional clearcuts likely contributed to the increase in moose distribution and abundance by providing temporary increases in browse availability. It is unclear whether moose will persist in Unit 3 as existing clearcuts advance in age and browse availability decreases.

Enhancement

No habitat enhancement projects specifically intended to benefit moose have been attempted in the unit. Although primarily intended as a silvicultural practice, precommercial thinning and pruning has been performed in some young second-growth stands in the unit. These efforts provide a secondary benefit to moose by improving and extending habitat suitability by reducing canopy cover, which permits sunlight to reach the forest floor and increase the production of understory forage plants. These benefits are relatively short-lived, approximately 20–25 years, after which time canopy closure again results in loss of understudy vegetation.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

The long-term effects of clearcut logging will probably be detrimental to moose populations. Left untreated, the dense, closed canopy forests characteristic of young, naturally regenerating second-growth conifer stands will reduce moose carrying capacity. The only way to prevent further decline of moose habitat will be to institute additional habitat manipulation procedures.

For genetic or environmental reasons moose in the unit do not exhibit a strong correlation between age and antler configurations; therefore, some modification of the existing antler restrictions may be justified. Moose in the unit rarely achieve 50-inch antler spreads, and the population appears to contain more illegal bulls than are needed to ensure timely breeding of cows.

CONCLUSIONS AND RECOMMENDATIONS

The Unit 3 moose population appears to have responded favorably to the initial increase in available browse resulting from extensive clearcut logging, but the dense, closed canopy forests caused by the natural regeneration of second-growth stands will eventually decrease the amount of available browse. The loss of habitat and resulting decline in food availability is of concern to biologists and hunters.

In 2001 and 2002 the Unit 3 moose hunt exceeded the objectives for number of hunters and days afield, but the objectives for annual harvest or success rate were not met. The Unit 3 moose population appears to be expanding.

We recommend that for the time being, Units 1B and 3 remain unified under one registration permit with season dates from 15 September through 15 October, a 1-bull bag limit, and a requirement for spike/fork or 50" antlers or at least 3 brow tines on 1 antler. Because Unit 3 moose do not display antler characteristics that correlate well with age, some modification of the existing antler restrictions or lengthening of the season may be justified in the future.

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PREPARED BY:

Richard E. Lowell
Wildlife Biologist III

SUBMITTED BY:

Dale Rabe
Regional Management Coordinator

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Table 1 Unit 3 moose harvest, regulatory years 1993 through 2002

Year	Hunter harvest reported							
	M	(%)	F	(%)	Unk.	Total	Illegal	Total
1993	13	(100)	0	(0)	0	13	0	13
1994	19	(100)	0	(0)	0	19	0	19
1995	13	(100)	0	(0)	0	13	0	13
1996	21	(100)	0	(0)	0	21	3	24
1997	22	(100)	0	(0)	0	20	2	22
1998	40	(100)	0	(0)	0	40	2	42
1999[c]	24	(100)	0	(0)	0	24	2	26
2000	30	(100)	0	(0)	0	30	1	31
2001[c]	22	(100)	0	(0)	0	22	1	23
2002	25	(100)	0	(0)	0	25	1	26

[a] Wrangell Island only.
[b] Wrangell and Mitkof islands.
[c] Includes one DLP.

Table 2 Unit 3 moose harvest chronology in, regulatory years 1993–2002

Year	15–21 Sep	22–28 Sep	29 Sep–5 Oct	6–15 Oct	Total
1993	0	0	7	6	13
1994	0	0	15	4	19
1995	4	1	5	3	13
1996	9	6	4	5	24
1997	4	7	5	6	22
1998	14	13	7	8	42
1999	7	5	5	9	26
2000	11	7	5	8	31
2001	11	2	3	7	23
2002	6	6	5	9	26

Table 3 Unit 3 successful moose hunter transport methods, regulatory years 1993–2002

Year	Airplane	Boat	Highway vehicle	3/4 wheeler	Horse	Unknown	Total
1993	1	0	12	0	0	0	13
1994	0	3	16	0	0	0	19
1995	1	1	11	0	0	0	13
1996	1	5	17	1	0	0	24
1997	0	8	13	1	0	0	22
1998	0	9	32	0	0	1	42
1999	3	5	17	1	0	0	26
2000	2	6	23	0	0	0	31
2001	0	5	18	0	0	0	23
2002	0	7	19	0	0	0	26

Table 4 Unit 3 moose hunter residency and success, regulatory years 1993–2002

	Successful					Unsuccessful					
Year	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Local[a] resident	Nonlocal resident	Non-resident	Total	(%)	Total hunters
1993	12	1	0	13	(4)	305	15	3	323	(96)	336
1994	18	1	0	19	(5)	351	23	0	374	(95)	393
1995	13	0	0	13	(4)	306	18	0	324	(96)	337
1996	23	1	0	24	(7)	319	10	1	330	(93)	354
1997	22	0	0	22	(6)	329	21	0	350	(94)	372
1998	40	2	0	42	(9)	399	24	1	424	(91)	466
1999	26	0	0	26	(5)	429	32	2	463	(95)	492
2000	27	4	0	31	(6)	435	33	5	473	(94)	504
2001	20	3	0	23	(5)	404	31	1	436	(95)	459
2002	25	1	0	26	(6)	393	0	0	431	(94)	457

[a] Residents of Kake, Petersburg, and Wrangell.

Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 PO BOX 25526
JUNEAU, AK 99802-5526

MOOSE MANAGEMENT REPORT

From: 1 July 2001
To: 30 June 2003

LOCATION

GAME MANAGEMENT UNIT: 5 (5800 mi^2)

GEOGRAPHICAL DESCRIPTION: Cape Fairweather to Icy Bay, eastern Gulf of Alaska coast

BACKGROUND

Moose were first documented along the lower Alsek River in eastern Game Management Unit 5 in the late 1920s or early 1930s. Range expansion to the west followed slowly, with animals not documented on the Malaspina Forelands west of Yakutat Bay until the 1950s. It is believed that the glaciers and waters of Icy Bay curtailed westward movement of this moose population.

The moose population in Unit 5 grew rapidly and peaked in the early 1960s, with a population estimate exceeding 2000 animals. The population began declining toward a more realistic carrying capacity (thought to be substantially lower than 2000) in the mid 1960s. Poor reproductive success and severe winters in 1970 and 1972 depressed moose numbers further and resulted in the Unit 5A moose-hunting season being closed from 1974 to 1977. After the hunting closures in the mid 1970s, the Yakutat Forelands moose population slowly increased to its present level of 600–800 animals. The population appears to be at the carrying capacity of the habitat. The Nunatak Bench area was closed to hunting after rising water levels from the Hubbard Glacier ice dam flooded much of the moose habitat there in summer 1986. Following the retreat of the Hubbard Glacier and the subsidence of the waters of Russell Fiord in fall 1986, brushy vegetation recolonized the shoreline and moose reoccupied this range. Based on 1994 surveys, the Board of Game (BOG) reopened moose hunting in this area, beginning with the 1995 season.

Since 1978 Unit 5 moose hunting has been managed under a registration permit system.

In 1991 a federal subsistence season was instituted and ran concurrently with the state season. This federal season restricted hunting on federal public lands to local resident hunters during the first week of the season. In 1996 the Federal Subsistence Board lengthened the federal season by one week, starting it a week earlier than the state season. Although the concurrent seasons had been managed under the state's registration permit system, the new "early hunt" has been administered under a separate federal registration permit issued by the U. S. Forest Service (USFS) and the National Park Service and prohibits hunting on federal public lands except by Yakutat residents from 8 October through 21 October. However, there is a block of 9 townships of nonfederal land near Yakutat where nonfederally qualified subsistence users can legally hunt during the first week of the state season that begins 15 October.

MANAGEMENT DIRECTION

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 Region I, Southeast Alaska (ADF&G 1991). They are compared with current population estimates and use levels (these estimates include data from both state and federal hunts).

	Current report period means (2001–2002)	Plan objective
Unit 5A Yakutat Forelands		
Posthunt moose numbers (estimated)	600–800	1000
Annual hunter kill	41	70
Number of hunters (annually)	190	250
Hunter-days of effort (annually)	830	1025
Hunter success (annual)	24%	28%
Unit 5A Nunatak Bench		
Posthunt moose numbers (estimated)	54	50
Annual hunter kill	1.5	5
Number of hunters (annually)	2.5	10
Hunter-days of effort (annually)	5.5	60
Hunter success (annual)	60%	50%
Unit 5B Malaspina Forelands		
Posthunt moose numbers (estimated)	200	250
Annual hunter kill	6	25
Number of hunters	25	50
Hunter-days of effort	134	200
Hunter success	24%	50%

METHODS

Aerial surveys were conducted in portions of Unit 5A and 5B during the report period as dictated by snow cover (Table 1). All surveys were flown with a Cessna 185 or 206 aircraft because better-suited survey aircraft are not available in Yakutat.

Three registration permit hunts were used to manage moose hunting effort in Unit 5: RM061, RM062 and RM059. In addition, we oversee a federal permit for the RM061 area. A condition of all registration hunts required successful hunters to bring in incisors from harvested moose for aging. Other data collected from the permit hunt reports included the hunt length, hunter residency, hunt location, commercial services used, transport means, and date of kill.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

In the Yakutat and Malaspina forelands, where the heavy coniferous forest makes it difficult to detect moose, we assume a moose sightability of about 50% (Smith and Franzman 1979). Nunatak Bench lacks coniferous stands, resulting in much higher sightability. Given the wide range of survey intensity from year to year, perhaps the best gauge of moose numbers is the number of moose observed per hour of survey time (Table 1).

Unit 5(A) Yakutat Forelands: Aerial surveys suggest that the moose population size on the Yakutat forelands has remained relatively stable over the past 20 years (Table 1). During this report period we were only able to conduct a partial moose survey during RY 2001 due to poor snow conditions. This most recent survey enumerated 274 animals, but included only 50% of the survey area. The sighting rate of 41 moose per hour is comparable to other years. Because of the inconsistent survey coverage, the number of moose seen per hour of surveying is probably a better benchmark than overall numbers of moose for interpreting moose population density. It is important to look critically at this moose-per-hour data by examining the survey areas as well as the time spent surveying. Longer survey times over the past 10 years correspond to lower sighting rates; this is probably due to a larger survey area including areas away from moose concentrations, thereby lowering sighting rates.

In March 2002 the USFS in Yakutat began a cooperative study with ADF&G to assess several parameters of the moose population on the Yakutat Forelands. These are moose sightability, productivity, fitness, and seasonal habitat use. Initially, 20 cow moose were captured and fitted with global positioning system (GPS) radio collars. Blood was drawn to determine pregnancy status, fecal pellets were collected for diet analysis, rump fat was measured via ultrasound for a condition index, and an incisor tooth was collected for age analysis. The moose were then radiotracked throughout the summer and fall, noting presence or absence of calves when possible, and downloading location data from the GPS collars. In early winter of 2002 and spring 2003 these marked animals were recaptured and again processed. In addition, more animals were radiocollared (both cows and bulls) to meet the objectives of the study.

Unit 5(A) Nunatak Bench: The moose herd at Nunatak Bench continues to hold its own despite a 65 foot rise in water level at the site during summer 2002. As happened in 1989, the Hubbard Glacier advancement created a dam that resulted in a rise in the water level in this area. However, unlike in 1989, the moose population hasn't appeared to suffer from this event this time around, based on the most recent aerial survey count (Table 1). The extremely high count of 54 moose in 2000 was probably more due to good survey conditions than to a sudden increase in moose numbers.

Unit 5(B) Malaspina Forelands: The Unit 5B moose population appears to be relatively stable, based on the most recent aerial surveys conducted in RY2001 (Table 1). Although the number of moose seen isn't as high as in some past surveys, the number of moose seen per hour of surveying suggests the moose density hasn't changed much over time. We estimate the moose population in 5B to be 150–200 animals.

Population Composition

Although we recorded composition during 2001 for the Nunatak Bench and Malaspina Forelands moose herds, these figures are not wholly accurate due to survey timing (Table 1). Several of the bull moose we counted had only one antler remaining, and likely there were others that had lost both antlers. Because of this, our estimate of bulls is low and of cows is inflated, resulting in recorded bull- and calf-to-100 cow ratios that are lower than actual. However, we were able to conduct a reliable composition survey in spring 2002 on the Yakutat Forelands with the aid of a helicopter (Table 1).

Since 1984 the mean age at harvest of Unit 5A Yakutat Forelands moose has ranged from a low of 2.2 years in 1995, to a high of 4.4 years in 2002 (Table 2). Mean age at harvest increased from 3.6 during the previous report period to a mean of 4.2 years during 2001–02. This increased age at harvest is substantially higher than the previous 10-year mean of 3.2. However, the harvest of 1.5 aged bulls rebounded to 31% during the current report period from a 20-year low of 15% during 1999–2000 (Table 2).

In contrast to the relatively consistent age of moose harvested in Unit 5A, the mean age of harvested Malaspina Forelands moose has been erratic, ranging between 2.7 and 5.4 years since 1990. The limited access and resultant lower hunting pressure on the Malaspina Forelands probably allows bulls to reach an older age than those on the Yakutat Forelands (Table 2). Also, we are dealing with a smaller sample size of harvested moose in 5B that leads to this phenomenon.

The low moose harvest at Nunatak Bench has not allowed us to gather any meaningful age distribution information.

MORTALITY

Harvest

Season and bag limits	Resident and nonresident hunters
Unit 5A, except Nunatak Bench	15 Oct–15 Nov
1 bull by registration permit only; up to 60 bulls may be taken; the commissioner may close the season in that portion west of the Dangerous River when 30 bulls have been taken from that area	
Unit 5A, Nunatak Bench	15 Nov–15 Feb
1 moose by registration permit only; up to 5 moose may be taken	
Unit 5B	1 Sep–15 Dec
1 bull by registration permit only; up to 25 bulls may be taken	

Game Board Actions and Emergency Orders. No emergency orders regarding Unit 5 moose hunting were issued during the report period.

Hunter Harvest. The annual harvest of moose in Unit 5A ranged from 38 to 61 during 1984–1998, with a mean of 51. However, during the last 2 report periods, the mean harvest has declined to 41 animals (Table 3). The reasons for this decline are not clear, although hunter effort, foul weather, and some loss of moose from heavy snows during the winter of 1998–99 are likely factors. We cannot determine with any certainty if there was a decline in hunter effort due to missing federal permit information. For the 2002 season, both a state and a complete federal database were compiled, which show that hunter effort appears to be fairly consistent with effort prior to the dual registration permit system implemented in 1996.

The harvest in Unit 5B also declined precipitously during this report period. The mean annual harvest dropped to an all-time low of 6 moose, with only 3 being taken in 2002. A glance at hunter effort in Table 3 indicates a lack of effort was not the reason for the low harvest; rather, it appears to be a lack of moose. The 21 unsuccessful hunters spent an average of 5.4 days afield in search of a moose, and given that any bull is legal in this area, this suggests that few bulls were seen. Further investigation into the hunting effort during 2002 revealed 2 reasons somewhat responsible for this low harvest. First, 75% of the hunting effort took place at Esker Stream, and after 2 bulls were harvested, the remaining hunting effort did not yield any moose. Second, in 2002 the number of guided hunters was only a portion of what it had been in previous years (Table 7), and they only harvested 1 moose compared to the 3–5 animals taken by guided hunters in previous years (Table 4). An aerial survey conducted in 2001 (Table 1) indicated the moose density based on moose seen per hour of flying was comparable to previous surveys.

The harvest of 3 moose at Nunatak Bench was equivalent to the previous report period. Two animals were taken in 2001 and 1 was taken in 2002 (Table 3).

Permit Hunts. The total number of permits (both state and federal) issued for the Yakutat Forelands hunt (RM061) exceeded 300 for both 2001 and 2002, in part due to Yakutat residents obtaining both permits (Table 5). This continues to cause considerable confusion for ADF&G personnel when tabulating hunting effort. We were unable to gather federal permit information for approximately 40% of federal hunters for 2001; however, we were able to obtain complete information for 2002.

The Nunatak Bench hunt (RM059) received less than half of the hunting effort (5 hunters vs. 12) of the previous 2-year period, but the number of moose harvested was identical at 3. Difficult access to this area makes it a very challenging place to hunt and few people are willing to even attempt a hunt at Nunatak.

The Unit 5B hunt (RM062) also received more hunting pressure during this report period (50 hunters) compared to the previous 2 years (38 hunters). Despite increased effort, the harvest dropped from 18 bulls taken during 1999–2000 to only 12 bulls taken during this report period. Nonresident effort in 2002 dropped 58% from the previous year, which partially accounts for the decrease in the total harvest.

Staff from the Department of Public Safety/Division of Fish and Wildlife Protection and both ADF&G fisheries divisions continued to assist with permit issuance and monitoring of these permit hunts. Enforcement personnel from the USFS also helped monitor the Unit 5A hunt during the report period. Reminder cards and certified letters were used to increase compliance

with reporting requirements for the state permit hunts. The federal permit process complicates matters because some hunters pick up both a state and a federal permit, while other hunters get one or the other. In addition, the federal hunt reporting requirements are not as stringent as ours, in that delinquent hunt reports are not pursued.

Hunter Residency and Success. Local residents hunt primarily in Unit 5A on the Yakutat Forelands (Table 4). Beginning with state regulations in 1987, local residents were able to hunt the first week of the season before it opened to nonlocal hunters. In 1991 federal subsistence regulations allowed local residents exclusive hunting rights on federal lands for the first week of the concurrent state and federal seasons. The 1996 implementation of a federal season preceding the state season by a week has further enhanced opportunity for local hunters. The first portion of the moose hunt traditionally accounts for a majority of the 5A harvest, and since most easily accessible land is under federal management, harvest by Yakutat residents predominates. Local hunters took 71% of the bulls harvested in 5A in 2001–2002. The majority of moose taken by local hunters were taken during the first 2 weeks of the season. Later in the season, use increased by nonlocal hunters in areas farther from Yakutat (especially east of the Dangerous River) and in those areas accessible only by airplane. Nonlocal Alaskans hunting in Unit 5A took 10 moose (26% of bulls taken under registration permits) in 2001 and 10 (22%) in 2002. Most nonlocal Alaska hunters are from Juneau. Nonresidents took 3 moose in Unit 5A during the 2001 season and 1 in 2002 (Table 4).

Since 1986 the overall success of Unit 5A hunters has ranged from 19 to 35 percent (Table 3). In 2001 hunter success was 25%, then 24% in 2002. Information gathered for the 2002 hunt, which includes complete federal data, suggests that hunter effort is near the level reached in 1993, when effort reached an all-time high (Table 5). Considerable time has been spent to incorporate federal data and suggests that 1996–2000 hunter effort is underrepresented. Care should be taken in interpreting these data because of the ambiguous federal hunt information.

Hunting effort at Nunatak Bench during the report period was substantially lower than the previous report period (11 hunter days for 5 hunters during 2001–2002 versus 28 days for 12 hunters during 1999–2000). Hunter success during this report period was 60% compared to 25% during the previous 2 years. Local hunters harvested all 3 moose taken at Nunatak Bench during the report period (Table 4).

The Malaspina Forelands hunt is less dominated by local use because it is less convenient to hunt, and inclement weather often deters local hunters from short excursions to this area. Local residents took 3 of 12 moose (25%) harvested during the report period, compared to 22% during the previous 2 years. Nonlocal state residents killed 4 of the moose during the report period, while nonresidents took the largest proportion, at 5 animals (41%). Nonresident harvest dropped 50% from the previous report period. All nonresident hunters were guided.

Harvest Chronology. Moose harvest from Unit 5 early in the state season is relatively low, partly because only Unit 5B is open from 1 September through 14 October (Table 4), and this area typically accounts for only a small portion of the total Unit 5 harvest. Most of the Unit 5 harvest takes place during the first weeks of the 5A season, when areas adjacent to Yakutat and easily accessible by boat or highway vehicle are first open. Most of the harvest on the Yakutat Forelands took place during the first part of the state season, but unlike the previous report period, the guideline harvest was not reached during either year, and the season remained open

until the scheduled closing date of 15 November. Moose were harvested throughout the latter part of the season, but in small numbers.

Two of 3 moose taken at Nunatak Bench were harvested in November and the third was taken in January. Most moose harvested in this area are taken in January or February when they are nearer the beach and easier to access, and when days lengthen, allowing for more hunting opportunity.

The Malaspina Forelands harvest is generally concentrated during the latter part of September and early October. This was the case during this report period, largely the result of nonresident hunting coincident with the beginning of the rut.

Transport Methods. Transport methods used in the Yakutat Forelands during the current report period differed from the previous report period (Table 6). The use of aircraft dropped from 37 to 27% for successful hunters. The use of boats (40%) surpassed highway vehicles (19%) as the next most popular method. Three- and 4-wheelers accounted for 14% of the transportation used, and are probably underrepresented because some hunters reporting highway vehicles or "other" probably used off-road vehicles as well. Many unsuccessful hunters also use these machines for access. Virtually every fish camp has one or more of these machines present, and although these off-road vehicles have been used in Yakutat for many years, more hunters seem to be using them in a less incidental fashion and more as a primary method of access. These machines are commonly used to drag whole moose from a kill site to the nearest road. Rutted meadows from wheeled vehicles are now a common sight in Unit 5A.

Despite the importance of aircraft for hunter transportation, relatively few Yakutat residents use them. Most locals hunt with the aid of riverboats, ATV's, or highway vehicles, while most nonresident hunters charter aircraft for access. The use of aircraft generally increases later in the season as nonlocal hunters begin hunting in nonroaded portions of the unit.

Commercial Services. Commercial services were used by 13% of Unit 5 moose hunters during the report period (Table 7). Nonlocal hunters were more likely to use commercial services, with transport to the field being used the most. Commercial services were used by a higher percentage of Unit 5B hunters than in Unit 5A. This undoubtedly reflects the fact that the Malaspina Forelands are more difficult to access.

Other Mortality. One male, one female, and one moose of unidentified sex were harvested under federal ceremonial permits, and one male and one female were taken under state ceremonial permits during the report period. This represents a 50% decline in the federal ceremonial harvest from the previous report period, but an increase from 0 to 3 in the state ceremonial harvest.

The winter of 1998–1999 was severe, with deep snow persisting until late May on much of Unit 5. Anecdotal information from a local pilot suggests that many moose succumbed to wolf and bear predation during late winter and spring.

Habitat. ADF&G staff did not undertake any habitat assessment or enhancement procedures during the period.

CONCLUSIONS AND RECOMMENDATIONS

Complete fall sex and age composition counts of all Unit 5 moose herds need to be conducted, if possible, during the next report period. Reliable survey data will allow us to better interpret the

decline in moose harvest and make necessary adjustments to our management strategies if necessary. Hopefully, the moose study that is underway will provide us with a sightability model we can use in interpreting our survey data to more accurately estimate the moose population. Age data on harvested moose should continue to be collected and carefully scrutinized. In addition, a joint state-federal permit for the RM061 hunt needs to be pursued to allow us to reliably capture hunting effort.

Most management goals for Unit 5 moose hunts were not met during this report period. The most glaring shortfalls have been in the harvest objectives. These objectives have not been met for any of the 3 moose populations in recent history and should be changed to more realistic numbers.

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PREPARED BY:
Neil L. Barten
Wildlife Biologist III

SUBMITTED BY:
Dale Rabe
Management Coordinator

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Table 1 Unit 5 aerial survey data, regulatory years 1984 through 2002

Year	MM	FF	Calves	Unk	Total	Count time (hrs)	MM Per 100 FF	Calves per 100 FF	Percent calves in herd	Moose per hour
					5A Yakutat Forelands					
1984	90	229	60	---	379	12.1	39	26	16	31
1985	50	168	41	---	259	11.0	30	24	16	24
1986	34	166	60	---	260	11.3	20	36	23	23
1987	---	---	83	---	322	11.2	---	---	26	29
1988	91	339	85	---	515	10.3	27	25	17	50
1989						No survey				
1990	43	309	93	---	445	6.8	14	30	21	66
1991[1]	---	---	---	---	204	8.0	---	---	---	26
1992	---	---	37	---	196	5.9	---	---	19	33
1993[2]	---	---	---	---	219	6.3	---	---	---	35
1994[3]	51	124	51	158	397	9.3	20	32	21	41
1995	14	71	78	303	466	8.5	---	---	17	55
1996	10	68	8	---	86	1.9	15	12	9	45
1997						No survey				
1998	7	17	17	333	374	6.7	---	---	---	56
1999						No survey				
2000	1	10	11	343	365	9.1	---	---	---	40
2001[6]	26	32	33	183	274	6.7	NA	NA	12	41
2002[7]	28	146	21	0	195	NA	19	14	11	NA
					5A Nunatak Bench					
1984	10	13	4	---	27	0.5	77	31	15	54
1985						No survey				
1986	5	4	1	---	10	0.5	125	25	10	20
1987–1993						No survey				
1994	3	18	---	---	25	0.3	16	22	16	75
1995	5	6	6	16	33	0.3	---	---	18	110
1996–1998						No survey				
1999	---	---	---	33	33	0.4	---	---	---	83
2000	---	1	1	52	54	0.8	---	---	---	69
2001[8]	8	4	3	20	35	0.5	23	9	13	66
2002						No survey				
					5B Malaspina Forelands					
1981[4]	21	88	25	---	134	3.1	24	28	19	43
1982	26	103	16	---	145	8.4	25	16	11	17
1983	---	---	21	---	66	1.8	---	---	32	37
1984–1986						No surveys				
1987[5]	---	---	14	---	69	2.8	---	---	20	25
1988–1994						No surveys				
1995	4	10	11	84	109	1.75	---	---	10	62
1996–1998						No surveys				
1999	---	---	---	38	38	0.8	---	---	---	48
2000	---	2	3	108	113	2.2	---	---	---	51
2001[8]	22	8	9	52	91	2.0	24	15	10	46
2002						No survey				

[1] NPS survey using a PA-18, from 3/1 to 3/5, 1991, from the mouth of the Doame River northwest to the Dangerous River.
[2] USFS survey using a C-185 done from 2/14 to 2/17, 1994, between Yakutat and Dry Bay.
[3] Age and sex ratios reflect flights made in a PA-18 (5.5 hrs. from 12/2 to 12/3, 1994); total numbers include flights in both PA-18 and C-185 (3.62 hrs. from 12/6 to 12/7, 1994.
[4]Bancas Point to Sitkagi Bluffs only.
[5] Sex and age ratios unreliable.
[6.]Includes only that area between Yakutat Bay and the Dangerous River.
[7.]Composition survey using a helicopter. Not meant to quantify moose numbers.
[8.]Composition not wholly accurate as some antlerless moose were likely bulls.

Table 2 Unit 5 age structure of harvested moose, regulatory years 1984 through 2002

Year	0.5	1.5	2.5	3.5	4.5	5.5	6.5	Age 7.5	Class 8.5	9.5	10.5	11.5	12.5	13.5	14.5	15.5	Total kill	% Aged	Mean Age
									Yakutat Forelands										
1984	2	13	11	6	7	3	2	3	0	0	0	0	0	0	0	0	49	96	3.2
1985	1	15	10	10	2	1	3	1	0	1	1	1	0	0	0	0	46	100	3.4
1986	3	10	13	8	4	9	3	1	0	2	0	0	0	0	0	0	54	98	3.6
1987	1	14	7	3	7	2	1	0	1	0	0	0	0	0	0	0	38	95	3.0
1988	0	17	16	5	2	3	1	0	1	0	1	0	0	0	0	0	47	98	2.9
1989	0	10	16	7	5	4	0	1	0	0	0	0	0	0	0	0	45	96	3.1
1990	0	16	18	14	4	3	2	0	0	0	0	0	0	0	0	0	57	100	2.9
1991	0	20	18	7	4	1	0	1	1	0	0	0	0	0	0	0	52	100	2.7
1992	0	13	5	5	3	1	2	1	0	0	0	0	0	0	0	0	50	60	3.0
1993	0	12	7	14	3	2	1	2	1	0	0	0	0	0	0	0	50	84	2.8
1994	0	23	8	6	5	4	0	3	2	1	0	1	0	0	0	0	60	90	2.9
1995	0	20	12	4	2	3	1	0	1	0	0	0	0	0	0	0	45	96	2.2
1996	0	19	12	9	5	2	5	1	0	2	0	0	0	0	0	0	60	92	2.8
1997	1	22	18	8	4	3	1	0	2	0	1	0	0	1	0	0	61	97	2.7
1998	1	15	11	10	6	2	4	1	0	2	0	0	0	0	0	0	55	95	2.9
1999	0	6	15	6	7	0	2	1	0	0	0	0	0	0	0	0	41	90	3.2
2000	0	6	6	9	7	3	2	2	1	0	0	0	0	0	0	0	37	97	3.9
2001	1	11	4	5	5	2	4	1	2	0	0	0	0	1	0	0	38	95	3.9
2002	0	12	5	6	4	2	3	4	2	0	1	1	1	0	0	0	45	91	4.4
									5A Nunatak Bench										
1995									No age data										
2000	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	100	5.0
2001	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	50	3.5
2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	---
									5B Malaspina Forelands										
1990	0	5	2	3	2	1	0	1	0	0	0	0	0	0	0	0	14	100	3.2
1991	0	3	3	1	2	2	1	0	3	0	0	0	0	0	0	0	17	88	4.5
1992	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	7	86	3.3
1993	0	2	4	3	3	0	1	0	0	0	0	0	0	0	0	0	15	87	2.8
1994	0	0	0	1	3	1	1	0	1	0	0	0	0	0	0	0	7	100	4.9
1995	0	2	5	1	3	0	0	0	1	0	0	0	0	0	0	0	12	100	2.9
1996	0	1	2	1	2	3	1	0	0	2	1	1	0	0	0	0	16	88	5.4

Table 2 continued

Year								Age	Class								Total	%	Mean
	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
1997	0	1	2	3	1	0	0	1	2	0	0	0	0	0	0	0	13	77	4.1
1998	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	10	90	2.7
1999	0	1	1	1	2	0	1	1	0	0	0	0	0	0	0	0	7	100	4.4
2000	0	1	1	5	1	0	0	0	1	0	0	0	0	0	0	0	11	82	3.8
2001	0	4	0	2	1	1	0	0	1	0	0	0	0	0	0	0	9	100	3.5
2002	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	67	3.0

Table 3 Unit 5 historical harvests, hunters, and success, regulatory years 1984–2002

Year	Nr MM	Nr FF	Nr unk.	Total kill	Nr hunters	Percent success
			5A Yakutat Forelands			
1984	49	0	0	49	230	21
1985	46	0	0	46	129	36
1986	54	0	0	54	198	27
1987	38	0	0	38	199	19
1988	47	0	0	47	153	31
1989	45	0	0	45	163	28
1990	57	0	0	57	178	32
1991	52	0	0	52	175	30
1992	50	0	0	50	199	25
1993	50	1[1]	0	51	204	25
1994	60	1[1]	0	61	208	29
1995	48[2]	2	0	50	185	24
1996	60	1	0	61	190	32
1997	59	1	1	61	194	30
1998	54	1	0	55	195	27
1999	41	1	0	42	114	35
2000	37	0	0	37	146	25
2001	37	1	0	38	152	25
2002	43	1	1	45	187	24
			5A Nunatak Bench			
1984	3	3	0	6	14	43
1985	2	0	0	2	3	67
1986–1994			Season closed			
1995–1996			No moose harvested			
1997	2	0	0	2	2	100
1998	0	1	0	1	3	33
1999	0	0	0	0	5	0
2000	2	1	0	3	7	43
2001	2	0	0	2	2	100
2002	0	1	0	1	3	33
			5B Malaspina Forelands			
1984	15	0	0	15	50	30
1985	13	0	0	13	62	21
1986	9	0	0	9	34	26
1987	8	0	0	8	34	24
1988	11	0	0	11	40	28
1989	12	0	0	12	44	27
1990	14	0	0	14	49	40
1991	17	0	0	17	39	44
1992	7	0	0	7	25	28
1993	15	0	0	15	31	48
1994	7	0	0	7	26	27
1995	12	0	0	12	28	43
1996	16	0	0	16	31	52
1997	13	0	0	13	29	45
1998	10	0	0	10	24	42

Table 3 continued

Year	Nr MM	Nr FF	Nr unk.	Total kill	Nr hunters	Percent success
1999	7	0	0	7	12	58
2000	11	0	0	11	26	42
2001	9	0	0	9	26	35
2002	3	0	0	3	24	13

[1] Illegal kills not included in the calculation of hunter success.
[2] Includes 3 bulls harvested under ceremonial permits; not included in hunter success ratios.

Table 4 Unit 5 annual moose kill by community of residence, regulatory years 1984 through 2002

Year	Total kill	Yakutat	Juneau	Ketchikan	Sitka	Pelican	Hoonah	Petersburg	Haines	Wrangell	Other AK	Non-resident
						5A Yakutat Forelands						
1984	49	18	16	2	6	0	2	1	0	1	1	2
1985	44	28	13	0	3	0	0	0	0	0	0	0
1986	54	22	16	1	4	1	3	0	4	0	2	1
1987	38	27	7	0	1	0	0	0	0	0	2	1
1988	47	38	6	0	0	0	1	0	0	0	1	1
1989	45	40	2	0	1	0	0	0	0	0	2	0
1990	50	45	11	1	0	0	0	0	1	0	3	2
1991	52	28	15	0	2	0	0	0	1	0	5	2
1992	50	32	7	0	0	3	0	0	3	0	2	3
1993	50	31	11	0	3	1	0	0	0	0	2	2
1994	60 [1]	38	14	1	0	2	0	0	0	0	3	2
1995	50[2]	35	14	0	0	1	0	0	0	0	0	0
1996	60	45	7	0	1	0	0	0	0	0	3	4
1997	61	45	13	0	0	1	0	0	0	0	1	1
1998	55	38	10	0	0	0	0	0	0	0	4	3
1999	41	27	10	0	0	0	0	0	0	0	1	3
2000	37	27	7	0	0	0	0	0	0	0	1	2
2001	38	25	8	0	0	0	0	0	0	0	2	3
2002	45	34	6	0	1	0	0	0	2	0	1	1
						5A Nunatak Bench						
1984–1996							(No Data)					
1997	2	2	0	0	0	0	0	0	0	0	0	0
1998	1	1	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	3	1	0	0	0	0	0	2	0	0	0	0
2001	2	2	0	0	0	0	0	0	0	0	0	0
2002	1	1	0	0	0	0	0	0	0	0	0	0
						5B Malaspina Forelands						
1984	15	5	1	6	0	0	0	0	0	0	0	3
1985	13	8	2	1	0	0	1	0	0	0	1	0
1986	9	3	2	0	0	0	0	0	0	0	0	4
1987	8	5	1	0	0	0	0	0	0	0	0	2
1988	11	5	3	1	1	0	0	0	0	0	1	0
1989	12	7	2	1	0	0	0	0	0	0	1	1
1990	14	9	3	0	0	0	0	0	0	0	1	1
1991[3]	17	7	4	1	0	0	0	0	0	0	3	1
1992	7	4	3	0	0	0	0	0	0	0	0	0
1993	15	3	2	1	0	0	0	0	0	0	0	9
1994	7	3	2	0	0	0	0	0	0	0	1	1
1995	12	4	3	0	1	0	0	0	0	0	0	4
1996	16	6	2	0	0	0	1	0	1	0	0	6
1997	13	4	1	0	0	0	0	0	0	0	1	7

Year	Total kill	Yakutat	Juneau	Ketchikan	Sitka	Pelican	Hoonah	Petersburg	Haines	Wrangell	Other AK	Non-resident
1998	10	4	2	0	0	0	0	0	0	0	0	4
1999	7	2	0	0	0	0	0	0	0	0	0	5
2000	11	2	2	0	1	0	0	0	0	0	1	5
2001	9	1	4	0	0	0	0	0	0	0	0	4
2002	3	2	0	0	0	0	0	0	0	0	0	1

[1] Does not include 1 known illegal kill.
[2] Includes 5 moose harvested under ceremonial permits, 3 bulls and 2 cows.
[3] Includes 1 kill by hunter of unknown residency.

Table 5 Unit 5 hunter effort and success, regulatory years 1990 through 2002[1]

		Successful hunters			Unsuccessful hunters			Total hunters		
Year	Permits issued	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
				5A Yakutat Forelands						
1984	---	49	132	2.7	181	978	5.4	230	1110	4.8
1985	---	44	117	2.7	84	457	5.4	128	574	4.6
1986	---	54	171	2.7	143	696	4.9	197	867	3.6
1987	---	38	109	2.9	161	948	5.9	199	1057	5.6
1988	206	47	95	2.0	106	281	2.7	153	376	2.4
1989	213	45	107	2.4	118	620	5.3	163	727	4.3
1990	213	57	110	1.9	122	497	4.2	178	607	3.5
1991	236	52	162	3.1	123	425	3.4	175	587	3.6
1992	238	50	130	2.6	149	771	6.0	199	901	4.5
1993	239	50	204	4.1	154	979	6.5	204	1183	5.9
1994	268	60	167	2.9	148	712	4.8	208	879	4.4
1995	245	45	99	2.3	140	471	3.4	185	570	3.1
1996	277	60	147	2.6	76	427	3.6	190	574	3.0
1997	300	59	154	2.8	110	453	4.1	194	607	3.1
1998	303	52	102	2.0	135	373	2.8	195	475	2.4
1999	157	41	101	2.5	73	282	4.2	114	383	3.6
2000	173	37	92	2.6	108	626	6.0	146	718	5.2
2001	198	38	130	3.4	126	604	4.8	164	734	4.5
2002	221	45	137	3.0	171	788	4.6	216	925	4.3
				5A Nunatak Bench						
1984	---	6	27	4.5	8	24	3.0	14	51	3.6
1985	---	2	44	22.0	1	10	10.0	3	32	10.7
1986–1994					Season Closed					
1995	19	0	0	0	3	3	1.0	3	3	1.0
1996	9	0	0	0	3	4	1.3	3	4	1.3
1997	10	2	3	1.5	0	0	0	2	3	1.5
1998	11	1	2	2.0	2	5	2.5	3	7	2.3
1999	12	0	0	0	5	14	3.5	5	14	3.5
2000	14	3	6	2.0	4	8	2.0	7	14	2.0
2001	9	2	5	2.5	0	0	0	2	5	2.5
2002	9	1	2	2.0	2	4	2.0	3	6	2.0
				5B Malaspina Forelands						
1984	---	15	40	2.7	40	191	4.8	55	231	4.2
1985	---	13	34	2.6	49	226	4.6	62	260	4.2
1986	---	9	40	4.4	27	139	5.1	36	179	5.0
1987	---	8	56	2.8	16	83	5.2	24	139	5.8
1988	58	11	39	3.5	29	120	4.1	40	159	4.0
1989	65	12	47	3.9	32	143	4.7	44	190	4.3
1990	60	14	53	3.8	35	80	2.4	49	133	2.8
1991	60	17	51	3.0	22	90	4.5	39	141	3.8
1992	52	7	22	3.1	18	61	3.4	25	83	3.3
1993	54	15	30	2.0	16	91	5.7	31	121	3.9
1994	42	7	109	15.6	19	26	1.9	26	135	6.4
1995	56	12	46	3.8	15	57	3.8	27	103	3.8
1996	55	16	71	4.4	14	75	5.4	30	146	4.9

Table 5 continued

Year	Successful hunters				Unsuccessful hunters			Total hunters		
	Permits issued	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days	Nr hunters	Total days	Avg. days
					5B Malaspina Forelands					
1997	48	13	44	3.4	16	62	4.8	29	106	4.1
1998	43	10	44	4.4	14	63	4.5	24	107	4.6
1999	37	7	36	5.1	5	25	6.3	12	61	5.5
2000	46	11	54	4.9	15	71	5.1	26	125	5.0
2001	45	9	31	3.4	17	118	6.9	26	149	5.7
2002	36	3	6	2.0	21	113	5.4	24	119	5.0

[1] Includes data from both federal and state moose permits. Not all information is available for each hunter; calculations for any given field may only include a subset of hunters.

Table 6 Unit 5 transport methods used by successful hunters, regulatory years 1990 through 2002[1]

Year	Airplane		Boat		3 or 4 wheeler		ORV		Highway vehicle		Foot	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
					5A Yakutat Forelands							
1990	29	(51)	10	(18)	7	(12)	0	---	11	(19)	0	---
1991	29	(56)	6	(12)	7	(13)	0	---	10	(19)	0	---
1992	22	(44)	8	(16)	9	(18)	0	---	11	(22)	0	---
1993	25	(50)	12	(24)	6	(12)	0	---	5	(10)	2	(4)
1994	24	(41)	15	(25)	9	(15)	0	---	9	(15)	2	(3)
1995	15	(37)	11	(27)	9	(23)	1	(3)	4	(10)	0	---
1996	13	(22)	15	(26)	10	(17)	0	---	16	(28)	4	(7)
1997	17	(44)	6	(16)	4	(11)	0	---	11	(29)	0	---
1998	16	(29)	15	(28)	8	(15)	0	---	15	(28)	0	---
1999	10	(32)	15	(48)	0	---	0	---	6	(19)	0	---
2000	12	(44)	11	(41)	0	---	0	---	4	(15)	0	---
2001	11	(32)	14	(41)	1	(3)	0	---	8	(24)	0	---
2002	10	(23)	17	(39)	9	(20)	1	(2)	7	(16)	0	---
					5A Nunatak Bench							
1995	0	---	0	---	0	---	0	---	0	---	0	---
1996	0	---	0	---	0	---	0	---	0	---	0	---
1997	0	---	2	(100)	0	---	0	---	0	---	0	---
1998	0	---	1	(100)	0	---	0	---	0	---	0	---
1999	1	(25)	3	(75)	0	---	0	---	0	---	0	---
2000	0	---	7	(100)	0	---	0	---	0	---	0	---
2001	0	---	2	(100)	0	---	0	---	0	---	0	---
2002	0	---	1	(100)	0	---	0	---	0	---	0	---
					5B Malaspina Forelands							
1990	9	(69)	4	(31)	0	---	0	---	0	---	0	---
1991	14	(82)	2	(12)	0	---	1	(6)	0	---	0	---
1992	5	(100	0	---	0	---	0	---	0	---	0	---
1993	12	(80)	0	---	3	(20)	0	---	0	---	0	---
1994	5	(71)	2	(29)	0	---	0	---	0	---	0	---
1995	8	(89)	0	---	0	---	1	(11)	0	---	0	---
1996	8	(58)	1	(7)	3	(21)	0	---	0	---	2	(14)
1997	3	(22)	4	(31)	4	(31)	1	(8)	0	---	1	(8)

Table 6 continued

Year	Airplane		Boat		3 or 4 wheeler		ORV		Highway vehicle		Foot	
	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)	Total	(%)
						5B Malaspina Forelands						
1998	6	(60)	1	(10)	3	(30)	0	---	0	---	0	---
1999	2	(29)	1	(14)	4	(57)	0	---	0	---	0	---
2000	9	(82)	0	---	2	(18)	0	---	0	---	0	---
2001	6	(75)	0	---	2	(25)	0	---	0	---	0	---
2002	2	(67)	0	---	0	---	1	(33)	0	---	0	---

[1] Not all information is available for each hunter; calculations for any given field may only include a subset of hunters.

Table 7 Unit 5 commercial services used by hunters, regulatory years 1991 through 2002[1]

Year	Unit residents No	Unit residents Yes	Other AK residents No	Other AK residents Yes	Nonresidents No	Nonresidents Yes	Total use No	Total use Yes	Transport	Registered guide	Other Services
					5A Yakutat Forelands						
1991	11	7	0	13	0	3	11	23	19	2	2
1992	123	8	40	17	5	1	168	26	22	0	4
1993	122	11	26	18	3	2	151	31	28	2	1
1994	131	9	26	24	0	0	157	33	32	1	0
1995	111	9	21	26	3	3	135	38	36	1	0
1996	44	1	16	18	4	2	64	21	19	1	1
1997	67	5	21	13	4	7	92	24	22	1	2
1998	101	1	18	17	7	5	126	23	18	3	1
1999[2]											
2000[2]											
2001	82	2	23	16	1	4	99	22	19	2	1
2002	130	3	33	12	2	1	165	16	15	1	0
					5A Nunatak Bench						
1995	3	0	----	----	----	----	3	0	----	----	----
1996	3	0	----	----	----	----	3	0	----	----	----
1997	2	0	----	----	----	----	3	0	----	----	----
1998	3	0	----	----	----	----	3	0	----	----	----
1999	2	0	4	0	----	----	6	0	0	0	0
2000	3	0	3	0	----	----	6	0	0	0	0
2001	2	0	0	0	0	0	2	0	0	0	0
2002	3	0	0	0	0	0	3	0	0	0	0
					5B Malaspina Forelands						
1991	1	4	0	9	0	0	1	13	9	0	4
1992	2	3	3	5	0	4	5	12	5	7	0
1993	1	5	6	7	0	7	7	19	13	6	0
1994	6	0	0	8	1	1	7	9	8	1	0
1995	6	9	1	5	3	4	10	18	15	2	1
1996	3	1	2	9	0	9	5	19	11	8	1
1997	1	3	0	1	0	5	1	9	3	5	0
1998	3	1	0	2	3	4	6	7	4	5	0
1999	3	1	0	0	0	5	3	6	1	5	0

Table 7 continued

Year	Unit residents No	Unit residents Yes	Other AK residents No	Other AK residents Yes	Nonresidents No	Nonresidents Yes	Total use No	Total use Yes	Transport	Registered guide	Other Services
					5B Malaspina Forelands						
2000	2	3	2	3	0	14	4	20	6	14	0
2001	1	2	1	9	0	13	2	24	12	12	0
2002	6	2	4	7	0	5	10	14	9	5	0

[1] Not all information is available for each hunter, therefore the calculations for any given field may only include a subset of hunters.
[2] Data not available at time of report submittal.