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MOOSE

Mary V. Hicks, Editor

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STATE OF ALASKA
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DEPARTMENT OF FISH AND GAME
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Project Title: **Southeast Moose Population Management**

Project Location: Unit 1A (5000 mi^2)
Ketchikan area including mainland areas draining into Behm and Portland Canals

Project Objectives and Activities

Management objectives for Unit 1A moose include the following:

Posthunt moose numbers	35
Annual hunter kill	3
Numbers of hunters	20
Hunter-days of effort	90
Hunter success	15%

Related Management Activities

Complete winter sex and age composition surveys and monitor harvests.

Work Accomplished During the Project Segment Period: For the sixth consecutive season, we monitored the moose harvest using registration permits issued out of the Ketchikan office. We also measured antlers and collected a tooth for aging. We did not fly aerial surveys during this report period.

Progress Meeting Project Objectives: We issued 34 registration permits during this report period, 19 fewer than last season. Fourteen permittees reported they did not hunt. Although there were 20 hunting permittees, only 1 bull was killed along the Unuk River. The observed hunter success rate (5%) was less than half of last season's 11% success rate. Numbers of hunters afield (20) met our objective, but the hunter success rate and the number of moose killed were below our objectives. Hunters expended 87 hunter-days of effort, less than half of last year's effort at 4 days per hunter. The antler width for the 1 harvested bull was 19.5 inches, also below the average.

Project Location: Unit 1B (3,000 mi^2)
Southeast mainland from Cape Fanshaw to Lemesurier Point

Project Objectives and Activities

1. Management objectives for Stikine River moose include the following:

Posthunt moose numbers	300
Annual hunter kill	30
Number of hunters	250
Hunter-days of effort	1750
Hunter success	12%

2. Management objectives for Thomas Bay moose include the following:

Posthunt moose numbers	200
Annual hunter kill	20
Number of hunters	160
Hunter-days of effort	675
Hunter success	13%

Related Management Activities

Conduct winter sex and age composition surveys and monitor the harvest.

Work Accomplished During the Project Segment Period: The moose hunt for Units 1B, 3, and that portion of 1C south of Point Hobart were included on a single registration permit. We issued 959 registration permits, 524 to Petersburg residents and 253 to Wrangell residents. Others were distributed to residents in smaller communities throughout the area.

We collected 16 incisors from harvested moose in Unit 1B to determine age. Twelve (75%) of the harvested moose were long yearlings, 3 (19%) ranged from 2–4 years of age, and the remaining one (6%) was 8 years old. We measured and photographed antlers from harvested moose.

On February 24, 1999 we conducted a helicopter survey along the Stikine River drainage. We counted 135 moose, 24% of which were calves. Moose were observed at a rate of 44 moose per hour.

Progress Meeting Project Objectives: A total of 185 permittees hunted 1454 days and harvested 20 moose in the Stikine River hunt for a success rate of 11%. None of the management objectives for Stikine River moose were met. A total of 107 permittees hunted 693 days and harvested 18 moose in the Thomas Bay area for a success rate of 17%. The Thomas bay harvest nearly met the harvest management objective, and observed hunter success rate exceeded the management objective. In addition to the legal sport harvest of 18 moose at Thomas Bay, 2 illegal moose were killed.

Project Location: Unit 1C (7600 mi^2)
Southeast mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay

Project Objectives and Activities: Because of increasing moose numbers and subsequent harvest growth in the Gustavus area, we divided the Chilkat Range into 2 management areas (Gustavus Forelands and the remainder of the Chilkat Range) with discrete management objectives. We also adjusted management objectives for the Taku River and Berners Bay hunts, based on more recent information on those moose herds.

1. Management objectives for Taku River moose include the following:

Posthunt moose number	100
Annual hunter kill	10
Number of hunters	50
Hunter-days of effort	225
Hunter success	20%

2. Management objectives for Berners Bay moose include the following:

Posthunt moose number	90
Annual hunter kill	18
Posthunt bull to cow ratio	25:100
Number of hunters	20
Hunter-days of effort	40
Hunter success	90%

3. Management objectives for Chilkat Range moose include the following:

Posthunt moose numbers	200
Annual hunter kill	20
Number of hunters	90
Hunter-days of effort	270
Hunter success	22%

4. Management objectives for Gustavus Forelands moose include the following:

Posthunt moose numbers	250
Annual hunter kill	40
Number of hunters	120
Hunter-days of effort	360
Hunter success	33%

Work Accomplished During the Project Segment Period: We issued 484 registration permits and 18 drawing permits to moose hunters in 1999. Hunters reported their hunting activity on registration permits for 3 hunt areas, the Taku River, the Chilkat Range, or Gustavus Forelands. Drawing permits were issued for the Berners Bay hunt. Three hundred and nine permittees hunted the registration moose hunt, and 16 of 18 drawing permit holders hunted. Permit results for hunters reporting hunt locations are shown in the following table. Complete hunt information was not available for all hunters; for example, only 296 of the 309 registration permit hunters provided a hunt location.

Management Area		Hunters	Moose Killed	Success	Days Hunted
Chilkat Range		89	12	13%	403
Gustavus		142	42	29%	688
Taku River		65	17	26%	186
Unknown hunt location		13	0		--
Berners Bay	(bulls)	10	10	100%	24
	(cows)	6	5	83%	19

We conducted an aerial survey of Berners Bay moose on November 29, 2000. We counted 108 moose, including 14 antlered bulls, 11 cows, 13 calves, and 70 of unidentified sex and age. Lack of snow cover prevented us from conducting surveys in the remainder of the subunit.

Unit 1C hunters were required to submit incisors from harvested moose. Ages were determined by Matson's Laboratory (Milltown, MT USA).

Progress Meeting Project Objectives: Management objectives for the Berners Bay moose population and hunt were partially met. Fifteen permittees harvested moose, fewer than the objective of 18, but the hunter success of 93% surpassed the goal of 90%. Surprisingly, only 5 of the 8 cow permits were filled, while all 10 available bulls were taken. Several hunters reported high water in the fall of 2000 and attributed their inability to fill permits due to moose staying on higher timbered terrain than usual. Hunters spent 43 days afield in Berners Bay; the objective was 40 days. The posthunt population size is probably near 125 or more animals (exceeding the target of 90).

All management objectives for the Taku moose population were not met. The harvest of 17 surpassed the objective of 10, the 65 hunters surpassed the objective of 50, and the percent success was 26, higher than the objective of 20%. Hunters spent only 186 days afield, compared to the objective of 200 days.

Only one of the management objectives for the Chilkat Range moose population was met. Four hundred and three hunter days were expended, exceeding the objective of 270. However, the harvest of 12 moose and the percent success of 13 were both below the objectives of 20 and 22, respectively. The number of hunters was 89, very near the objective of 90. The high hunter days and low harvest for this area were partially due to high water that caused moose to use higher and more timbered habitat than usual.

All but 1 of the management objectives were not met for the Gustavus moose population. The kill of 42 moose was higher than the objective of 40, the number of hunters (142) exceeded the objective of 120, and the number of hunter-days (688) exceeded the objective of 360. The hunter success of 29% was slightly lower than the objective of 33%. As with the remainder of the Chilkat Range, the high water apparently affected the ability of hunters to find moose during the hunting season.

Project Location: Unit 1D (2700 mi^2)
Southeast mainland north of the latitude of Eldred Rock, excluding Sullivan Island and the drainages of Berners Bay

Project Objectives and Activities

Management objectives for Unit 1D moose include the following:

Posthunt moose numbers	350
Posthunt bull to cow ratio	25:100
Annual hunter kill	25
Number of hunters	200
Hunter-days of effort	600
Hunter success	13%

Related Management Activities

Conduct winter sex and age composition surveys and monitor the harvest.

Work Accomplished During the Project Segment Period: Two hundred Tier II permits were issued. Staff monitored the hunt, measured antlers, and collected incisors for aging. An aerial survey of Chilkat Valley winter habitat was conducted in February 2000. During the survey we counted 75 moose, but because of survey timing, we were unable to obtain reliable sex and age composition data. This count is 50% lower than the previous survey, but the decline can be attributed to habitat use by moose during the survey that lowered sightability, rather than an actual decrease in moose numbers. This assumption is supported by the abundant moose trails from open meadows to dense stands of timber where we were unable to count animals.

Unit 1D hunters were required to submit incisors of harvested moose. Ages were determined by Matson's Laboratory (Milltown, MT). Ages ranged from 1 to 10 with an average of 3.8 years.

Progress Meeting Project Objectives: The 1999 Tier II moose hunt in Unit 1D resulted in the harvest of 20 legal and 1 illegal moose by 163 hunters, with an 11% hunter success rate. Both the number of moose harvested and the percent success were below the management objectives of 25 and 13%, respectively. Hunters spent a total of 1076 days hunting, passing the hunt objective of 500 days for the fourth time since the hunt was reopened as an antler-restriction hunt.

Project Location: Unit 3 (3000 mi^2)
All islands west of Unit 1B, north of Unit 2, south of the centerline of Frederick Sound, and east of the centerline of Chatham Strait

Project Objectives and Activities

Management objectives for Unit 3 moose include the following:

Posthunt moose numbers	400

Annual hunter kill	40
Number of hunters	470
Hunter-days of effort	2300
Hunter success	10%

Related Management Activities

Conduct winter sex and age composition surveys and monitor the harvest.

Work Accomplished During the Project Segment Period: Moose hunts for Units 1B, 3, and that portion of 1C south of Point Hobart are included on a single registration permit. We issued a total of 959 registration permits, 524 to Petersburg residents and 253 to Wrangell residents. Others were distributed to residents in smaller communities throughout the area.

We collected 22 incisors from harvested moose in Unit 3 to determine age. Thirteen (59%) of the harvested moose were yearlings, 4 (18%) were 2–4 years of age, and the remaining 5 (23%) ranged from 5–9 years of age. We measured and photographed antlers from harvested moose.

No moose surveys were conducted in Unit 3.

Progress Meeting Project Objectives: A total of 492 permittees hunted 3125 days and harvested 23 moose, for a success rate of 5%. Of the 23 moose harvested, 9 were taken on Mitkof Island, 13 on Kupreanof Island, and 1 on Wrangell Island. Management objectives for the number of hunters and days of hunter effort were met. The number of moose killed and percent hunter success did not meet management objectives. In addition to the legal harvest of 23 moose, we documented 2 illegal kills and 1 DLP.

Project Location: Unit 5 (5800 mi^2)
Cape Fairweather to Icy Bay, eastern Gulf Coast

Project Objectives and Activities

1. Management objectives for Yakutat Forelands moose include the following:

Posthunt moose numbers	900
Annual hunter kill	70
Posthunt bull to cow ratio	20:100
Number of hunters	200
Hunter-days of effort	800
Hunter success	35%

2. Management objectives for Nunatak Bench moose include the following:

Posthunt moose numbers	50
Annual hunter kill	5

Number of hunters	10
Hunter-days of effort	60
Hunter success	50%

3. Management objectives for Malaspina Forelands moose include the following:

Posthunt moose numbers	250
Annual hunter kill	25
Posthunt bull to cow ratio	20:100
Number of hunters	50
Hunter-days of effort	200
Hunter success	50%

Related Management Activities

Conduct winter sex and age composition surveys and monitor the harvest.

Work Accomplished During the Project Segment Period: We issued 185 registration permits for Unit 5 moose hunts (148 for Unit 5A and 37 for Unit 5B). Many hunters who acquired a state registration permit also picked up a federal subsistence permit enabling them to hunt on federal lands before the state season. Although all moose harvested under the federal permits are reported to us, the information from unsuccessful federal permittees is difficult or impossible to obtain. These federal subsistence permits cause considerable confusion in tabulating hunter effort due to duplicated hunter effort reports. Furthermore, federal permit information is not collected systematically.

Division of Wildlife Conservation staff and enforcement officials from the U.S. Forest Service monitored the hunts. We analyzed harvest and hunter data from registration permit reports. Teeth were collected for age determination.

Moose surveys were conducted on the Yakutat Forelands during mid-December 1999 to early January 2000. Both FS personnel and Yaktuat ADF&G personnel assisted with these surveys. We counted 463 moose, but due to the timing of these surveys, we did not collect reliable sex and age composition data. We surveyed the Nunatak Bench in early February and counted 22 moose. We were unable to do a survey in Unit 5B due to poor snow conditions. Unit 5 hunters were required to submit incisors of harvested moose, and these incisors were sent to Matson's Laboratory (Milltown, MT USA) for age analysis.

Progress Meeting Project Objectives: Only 1 of the Yakutat Forelands management objectives was met: the objective of a posthunt moose population of 900 animals. We counted (50% sightability) 463 moose on our survey and estimated 800–1000 moose on the forelands. The hunter kill of 39 moose was the lowest in this area since 1987 when 38 moose were harvested. Lack of hunter success is attributed to heavy rains and high water that flooded traditional hunting areas. Moose apparently inhabited timbered habitat that was better drained than the meadows yet more difficult for hunters to locate. The kill of 39 is considerably lower than the objective of 70 moose. Hunters reported 29 moose on state registration permits, 8 on federal subsistence permits,

and 2 moose taken under federal ceremonial permits. The number of hunters (104 under the state registration permit and 49 under the federal subsistence permit) totaled 153, lower than the objective of 200. The actual number of hunters is probably even lower because some hunters report their hunt on both state and the federal permits. Hunter effort under the state registration hunt (361 days) was much lower than the objective of 800 days, and 24% hunter success was substantially below the objective of 35%.

For the Nunatak Bench moose population, only the population objective was met. On an aerial survey on February 10, we counted 22 moose, which is probably near the objective of 50 after correction for sightability of 50%. We issued 11 registration permits, but only 4 permittees hunted for a total of 14 days, lower than the objectives of 10 hunters and 60 hunter-days, respectively. None of the permittees was successful, leaving the harvest and percent success at zero, much lower than the objectives of 5 moose and 50% success, respectively.

None of the management objectives for the Malaspina Forelands was met. The percent success by hunters (58%) exceeded the objective of 50%. Only 12 people hunted this area, harvesting 7 moose during 61 hunter-days. This compares poorly to our objectives of 50 hunters, 25 harvested moose, and 200 hunter-days.

Segment Period Project Costs

	Personnel	Operating	Total
Planned	44.5	22.5	67.0
Actual	39.8	16.0	55.8
Difference	4.7	6.5	11.2

Explanation of costs: We did not conduct all moose surveys planned for the year.

Submitted by

Bruce Dinneford
Management Coordinator

Project Title: **Southcentral Moose Population Management**

Project Location: Unit 6 (10,150 mi^2)
Prince William Sound and north Gulf Coast

Project Objectives

Unit 6A (East): Maintain a posthunting population of 300–350 moose and a minimum bull:cow ratio of 30:100.

Unit 6A (West): Maintain a posthunting population of 300–350 moose and a minimum bull:cow ratio of 15:100.

Unit 6B: Maintain a posthunting population of 300–350 moose and a minimum bull:cow ratio of 15:100.

Unit 6C: Increase the posthunting population to 400 moose by 2006 and maintain a minimum posthunting bull:cow ratio of 15:100.

Work Accomplished During the Project Segment Period: The 1999 reported harvest in Unit 6 was 86 moose. In Unit 6A (East), 20 bulls were taken. In Unit 6A(West) 19 bulls and 2 cows were taken by 32 hunters for a success rate of 69%. Unit 6B had 19 bulls and 2 cows taken by 129 hunters for a success rate of 16%. In 6C 19 bulls and 4 cows were taken by 23 hunters for a success rate of 100%. Hunters harvested 3 bull moose in Unit 6D.

We conducted aerial surveys in Units 6A (West) and 6B. The estimated number of moose in 6B was 255, with 5% calves and a bull:cow ratio of 17%. In 6A (West) we estimated 412 moose with 13% calves. We could not estimate bull:cow ratios in 6A (West) because some antlers were shed before snow conditions were adequate to conduct surveys, and we could not conduct surveys in 6A (East) because of inadequate snow conditions.

Progress Meeting Project Objectives: The moose population in Unit 6B fell below the objective because of movement into 6A (West) and winter mortality. The population in 6A (West) exceeded the objective. We will adjust the harvest during 2000 accordingly.

Project Location: Unit 7 (3520 mi^2)
Kenai Peninsula

Project Objectives: To maintain the existing moose population with a posthunting sex ratio of no less than 15 bulls:100 cows.

Work Accomplished During the Project Segment Period: We surveyed 2 count areas and classified 151 moose. Bull:cow and calf:cow ratios were 45 and 29, respectively.

The winter of 1999–2000 was again considered worse than normal with deep snow throughout most of the eastern peninsula. Winter mortality was slightly higher than average, including 32 moose killed by motor vehicles and 3 by train. There were a few reported cases of starvation although records were not kept for Unit 7. The moose population probably decreased slightly during this reporting period.

Preliminary harvest statistics indicated that approximately 296 hunters reported hunting in Unit 7 during the 20 August–20 September season, harvesting 40 bull moose for a 13.5% success rate. This represented a 24% decline in hunter numbers and 13% decline in harvest. We categorized 40% as spike-fork bulls, 57% as 50-inch or bulls with 3 or more brow tines, and 3% as unknown or illegal.

Progress Meeting Project Objectives: Objectives continue to be met or exceeded throughout most of Unit 7. In response, the Board of Game authorized additional hunting opportunity in a portion of Units 7 and 15A by permit. Twenty-five permits were issued in 1999; however, only 2 moose were taken. It is important that any management changes in Unit 7 be extended to Unit 15 to avoid shifts in hunting pressure.

Increased logging activities in Unit 7 to combat spruce bark beetles (*Dendroctonus rufipennis*) may provide increased visibility and access to moose hunters. Habitat quality may also be affected when overstory is removed. We need to continue to monitor effects of logging on moose in Unit 7.

Project Location: Units 9 and 10 (36,000 mi^2)
Alaska Peninsula and Unimak Island

Project Objectives

- Maintain existing moose densities in areas with moderate (0.5–1.5 moose/mi^2) or high (1.5–2.0 moose/mi^2) densities.
- Increase low-density populations (where habitat conditions are not limited) to 0.5 moose/mi^2.
- Maintain sex ratios of at least 25 bulls:100 cows in medium- to high-density populations and at least 40 bulls:100 cows in low-density areas.

Work Accomplished During the Project Segment Period: We conducted fall composition surveys in all 3 trend areas in Unit 9C, in the 2 historic trend areas and 1 new area in Unit 9E and in 2 trend areas in 9B. We classified 135 moose in 9B and ratios were 57 bulls and 4 calves:100 cows. In 9C we counted 550 moose with ratios of 37 bulls and 9 calves:100 cows. In 9E, 164 moose were counted with ratios of 48 bulls and 10 calves:100 cows. Widespread drop in calf recruitment is reason for concern, but bull:cow ratios are within desired levels in most areas.

Preliminary 1999 harvests for general seasons were 4, 55, 38, and 82 moose for Units 9A, 9B, 9C and 9E, respectively. For the first time in 30 years, a moose hunt (DM312) was held in Unit 9D. Ten permits were issued, and 4 hunters participated during this winter hunt. Hunters harvested 1 bull.

Progress Meeting Project Objectives: Efforts to monitor moose density and composition in 9E indicate density objectives were being met. Estimates of bull:cow ratios in all areas counted in recent years met or exceeded the desired ratios.

Project Location: Unit 11 (12,800 mi^2)
Wrangell Mountains

Project Objectives: To maintain the existing moose population with a posthunting sex ratio of no less than 15 adult bulls:100 cows.

Work Accomplished During the Project Segment Period: Fall sex and age composition counts were conducted in 1 count area (CA-11) in Unit 11 during 1999. We counted 122 moose at a rate of 28 moose per hour. The bull:cow ratio was 109 bulls:100 cows, and calves composed 9% of the moose counted. The observed density was 0.4 moose/mi^2.

Preliminary harvest data indicate that hunters killed 37 moose in Unit 11 during the 1999–00 season. Of these, nonresidents took 5 (13%) moose; hunter success in the unit was 37%. The average hunt lasted 8 days, a 33% decline from the average time (12 days) hunters spent in the field during the 1998–99 season. The mean antler size in the harvest was 49.4 inches. Harvest chronology data show the last 2 weeks of the season accounted for 62% (n = 23) of the harvest. In 1999, successful moose hunters in Unit 11 most commonly used aircraft and 4-wheelers for transportation to the field.

Staff discussed proposals on land-use patterns, access, and development with appropriate and administering agencies. We conducted an annual review and discussed proposed changes in the Copper River Fire Management Plan with participating agencies and landowners.

Progress Meeting Project Objectives: Survey data collected in Unit 11 during 1999 indicated moose numbers increased slightly in the count area last fall. Calf recruitment to fall was 21 calves/100 cows in 1999, up from 8 and 15 calves per 100 cows observed in 1997 and 1998, respectively. The bull:cow ratio declined from a high of 128 bulls:100 cows observed in 1997, to 109:100 in 1999. The moose-per-hour figure increased slightly in 1999 from the previous year but still remains well below the 40 moose-per-hour figure of the mid to late 1980s. Count data for the past 6 years fluctuate between years, but the trend appears to be stable in low-density populations. Low calf recruitment is a special cause for concern because winters have been relatively mild during the past 3 years.

The bag limit and season dates for the state hunt in Unit 11 were changed in 1993. The definition of a legal bull changed from any bull to one with spike-fork-50" inch spread or 3 brow tines, and

the season was lengthened by 17 days with season dates of 20 Aug–20 Sep. Although the harvest increased initially by 30% under the new regulations, the total kill remains low and does not exceed harvest levels observed during the late 1980s. Even though the season was lengthened, the conservative bag limit has kept the total harvest low. Harvest chronology data for 1993 through 1999 indicate the most opportune time to hunt moose is the last 5 days of the season in September, when moose are more vulnerable because of leaf drop and the onset of rut.

The current harvest level is considered sustainable, and human harvests have minimal effect on moose abundance in the unit. Wolf predation continues to be relatively high on moose. During winter moose are the most important food source for wolves because there is a scarcity of alternate prey species, especially since the Mentasta caribou herd has been moving out of Unit 11 into Unit 12 to winter. Snow depths in Unit 11 averaged 19 inches during the winter of 1999–2000, 22% below the 1964–1999 average of 24.5 inches.

Project Location: Unit 13 (23,400 mi^2)
Nelchina Basin

Project Objectives: To increase the moose population to an estimated 20,000–25,000 with yearly sex and age ratios of 25–30 calves:100 cows, 25–30 bulls:100 cows, and yearly harvests between 1200 and 2000 moose.

Work Accomplished During the Project Segment Period: Staff conducted fall sex and age moose counts in 10 count areas located throughout the unit. A total of 4738 moose were counted at a rate of 46 moose per hour. The bull:cow ratio was 21 bulls:100 cows with 17 adult bulls:100 cows. The calf to cow ratio was 14 calves:100 cows.

Hunting season dates were shortened by 11 days in Unit 13; the season was open from 1–20 September. The bag limit remained unchanged. A legal animal is a bull having 50+-inch antler spread, or 3 brow tines, or a spike or forked antler on one side. In addition to the general hunt, a Tier II state subsistence hunt was also held, with season dates of 15–31 August; 150 permits were issued.

Snow depths recorded at permanent sites located throughout the unit are used to categorize the severity of winter. Winters in which the average snow depth is $\geq$30 inches are considered severe. When at or near the historic (1964–present) average, they are considered moderate, and when well below the historic average, they are considered mild. We determine snow depths by flying over the sites and recording the snow level on permanent markers. The average snow depths for February, March, and April are used for a winter severity index. Flights are conducted on or as near the first of each month as possible. The 2000 measurements produced a unit winter severity well above the 34-year (1964–97) average and was considered severe; it was extremely severe in western portions of the unit. Because of the severe winter, a survey was flown in 13E during late April to determine overwinter calf survival.

Preliminary harvest data show hunters reported taking 689 moose in Unit 13 during the 1999–2000 season. This harvest is 27% below the 1998 harvest of 939 moose. A breakdown of the moose harvest shows that 649 bulls, 1 cow, and 4 of unknown sex were taken during the general state season, and 35 bulls were taken in the state Tier II hunt. Harvest data are not available for the federally regulated fall subsistence hunt held on federal land in Unit 13. We modeled moose, wolf, and bear populations in Unit 13A and unitwide, using the Predator/Prey model developed by Mark McNay, (ADF&G, PredPrey v. 1).

Land-use proposals were commented on regarding potential effects on moose habitat. Staff attended DNR meetings on forest practices and uses for Unit 13 and submitted comments on habitat improvement for moose.

Staff reviewed the Copper River Fire Management Plan and worked on plans for a prescribed burn in the Alphabet Hills scheduled for summer 2000 that included completing a moose census in the burn area. The burn was not conducted in 2000 because wet weather conditions did not meet fire prescription.

Progress Meeting Project Objectives: Moose numbers declined by an estimated 21% in Unit 13 between 1988 and 1994. This decline followed a 9-year period (1978–87) when moose numbers increased at an estimated 5% per year. Analysis of composition data indicated this decline occurred in all sex and age classes. Fall composition count data show a 10% decline unitwide in the number of moose counted per hour in 1999. Moose censuses in 13A during 1994, 1998, and 1999 indicate a 31% decline in moose during this period. The bull:cow ratio was relatively stable between 1994 and 1998 and increased in 1999 but is well below both the 25–30 bulls:100 cows observed during the 1980s and the current management objective for bulls. The percentage of calves in the herd and calves:100 cows in 1998 and 1999 were the lowest ever observed in Unit 13. Calf survival to fall has been extremely low in 5 of the last 6 years. Chronic low calf recruitment is a serious problem. The lack of young age classes among cows signifies a higher percentage of cows in older age classes that are more susceptible to overwinter mortality during a severe winter. Low calf recruitment has also resulted in fewer bulls being available for harvest.

Predator prey modeling for moose in Unit 13 supports moose composition count and census results that indicate that moose numbers are declining. Moose numbers were modeled from 1994 forward, and results closely fit historic trend counts for moose and wolf numbers. Modeling predicts continual declines unless there are large changes in predator abundance.

The winter of 1999–2000 was severe in Unit 13, with a unit severity index rating of 36.7, 44% above the historic 1964–99 unit average of 25.6. Western portions of 13A, 13B, and all of 13E experienced extreme snow pack, with many snow stations measuring between 50- and 70-inches of snow. Deep snows arrived in late December. Rain also occurred and crusting of snow made travel conditions for moose very difficult. Moose yarded up wherever they found favorable conditions, and in some instances, stayed in the same area from December until April. Deep snows persisted until May, increasing moose mortality. During a late April survey in Unit 13E, calves composed only 1% of the observed moose.

The 2000 fire season was uneventful. It was a wet summer in Unit 13, and no major fires occurred in the unit. Wildfire or controlled burns are the only feasible means of enhancing moose habitat in most of Unit 13. The BLM controlled burn south of the Alphabet Hills scheduled for the summer of 2000 was not ignited because of run-off from deep snows, a late spring, and a wet summer.

The 1999–2000 bull harvest in the general state harvest ticket hunt declined by 27% from last year's harvest of 939. Preliminary harvest reports indicate that hunting pressure declined; the magnitude of the decline will not be known until we compile final harvest data. The 10-day reduction in the hunting season successfully lowered the harvest and hunting pressure enough to allow a slight increase in the bull:cow ratio. It appears that the spike-fork-50-inch regulation has been unsuccessful in maintaining management objectives for the bull:cow ratio while providing a liberal season length in Unit 13. High harvests coupled with low calf survival have resulted in a lower bull:cow ratio during this 6-year period under the spike-fork-50" regulation. Until calf survival results in increased bull recruitment, harvests should be further lowered. To accomplish this, I recommend 1) shortening the season by 5 days to 1–15 September in 13C and 13D; 2) reducing the bag limit by eliminating fork-horn yearlings and making only spikes and 50-inch or 3 brow-tined bulls legal; and 3) restricting participation on the road system by allowing hunters to hunt in only 1 roadside unit in any year.

Project Location: Unit 14 (6600 mi^2)
Unit 14A
Upper Cook Inlet

Project Objectives

- Maintain a population of 5000–6000 moose with a posthunting sex ratio of no less than 20 bulls:100 cows.
- Achieve and maintain an average annual moose harvest of 750 moose.

Work Accomplished During the Project Segment Period: We completed a fall survey during 2–18 November 1999. The survey was a modification of a "Becker" survey; sample units were those surveyed in past random-stratified surveys. We surveyed 25 sample units, classifying 1317 moose, 296 being calves and 176 being bulls. We calculated a fall population of 5348 ± 13% (80% CI) and a composition of 37 calves and 19 bulls:100 cows or 24% calves. During 8–10 March 2000, we classified 1513 moose between Pt. McKenzie and Kings River. Calves composed 17% of moose observed, and we saw the highest percent calves in the Matanuska Valley Moose Range near Sutton (21%) and the lowest in the Knik River-Wolverine Creek area (13%). Winter conditions approached "severe" because of snow depth and the prolonged period of deep snow. We projected 70% calf survival through March. Higher than normal wolf numbers in 14A are probably influencing overwinter survival.

We monitored hunter harvest that totaled 328 moose. A total of 2871 people reported hunting "spike/fork/50-inch" bulls in the 10–17 August, 20 August–25 September, and 5–15 December

general seasons; 328 hunters (11%) were successful. Sixteen percent (52 moose) of the harvest was taken during the new 21–25 September hunt period, and 27% (87 moose) were taken during the late spike-fork-only hunt. Six moose were reported taken during the early bow season. No antlerless moose permits were issued to hunters this year.

We monitored moose mortality unrelated to hunting. Between May 1999 and April 2000, trains killed a minimum of 34 moose, and between 1 October 1999 and 30 June 2000, automobiles killed a minimum of 181 moose. We believe 25–50 moose were killed illegally in the unit.

We conducted no habitat enhancement.

Progress Meeting Project Objectives: This subpopulation and the bull:cow ratio are at or very near the objective. However, the local advisory committee requested we try to maintain the subpopulation at the higher end of the range (i.e., 6000 moose). Elimination of antlerless moose permits and any-bull permits during fall 2000 should remedy both issues. The human-use objective, a 3-year average annual harvest, was not met, reaching only 555 moose.

Project Location: Unit 14B
Western Talkeetna Mountains

Project Objectives

- Attain a posthunting moose subpopulation of 2500–2800 with a sex ratio of 20–25 bulls:100 cows.
- Achieve and maintain an average (3-year) annual harvest of 200–300 moose.

Work Accomplished During the Project Segment Period: We conducted a fall (Gasaway) survey in the unit during 16–20 November 1999. We surveyed 26 of 88 sample units and classified 669 moose. We generated a subpopulation estimate of 1687 ± 14.5% (80% CI) with 40 bulls (12 yearling and 7 large) and 21 calves:100 cows.

We monitored harvest of moose during the general early and late hunts and the any-bull drawing hunts that totaled 67 bull moose. Examination of general season harvest reports indicates 542 hunters harvested 51 bulls (9% success) during the general season. Eighteen percent (9 moose) of the harvest was taken during the new 21–25 September hunt period, while 22% (11 moose) were taken during the late spike-fork-only hunt. No moose were reported taken during the early bow season. Of the 52 people hunting with any-bull drawing permits, 16 (31%) were successful.

Trains killed at least 76 moose, and automobiles killed a minimum of 20. Unreported/illegal harvest probably reached 10–20 moose.

Progress Meeting Project Objectives: This subpopulation is well below subpopulation size objectives, yet it exceeds composition objectives. We are unlikely to influence the current trend in moose numbers.

The human-use objective was not met. The most recent 3-year-average was 74 moose. Under current subpopulation trends, the minimum harvest objective will probably not be met within the next decade. Predation is high and is not expected to decline.

Project Location: Unit 14C
Anchorage area (1912 mi^2) and Placer and Portage river drainages in Unit 7

Project Objectives: To maintain the existing moose population with a posthunting sex ratio of no less than 25 bulls:100 cows.

Work Accomplished During the Project Segment Period: Herd population size and composition for Unit 14C were determined by aerial surveys flown in late November and early December 1999. We observed 882 moose in Unit 14C. Several drainages were not counted due to a limited budget or low priority. The ratios of bulls and calves per 100 cows were 41 and 26, respectively. Some bulls shed antlers by late November; therefore, the survey included some antlerless bulls as cows, and actual ratios of bulls and calves per 100 cows are slightly higher. Based on poor browse conditions of the winter habitat, the population, currently estimated at 1900 moose, is probably above carrying capacity.

Hunters were required to report their success on either a harvest or a permit report, depending on whether they participated in the general season or a special permit hunt. The reports require information on harvest location, days hunted, sex of the animal taken, method of transportation, hired services, date of harvest, and antler spread when appropriate.

A total of 559 hunters harvested 80 moose during the 1999–2000 season (14% success rate). Cows composed 15% (n = 12) of the harvest. All cows were killed during special permit hunts. Hunters took 68 bulls, 21 of which came from the general season and 47 from special permit hunts. Of bulls taken during the general season hunt, 3 were spike-forks, 10 were >50 inches, and 8 were <50 inches with at least 3 brow tines on 1 side (mean width for all bulls = 45.3 inches, range 21–63 inches). Hunters with drawing permits and general-season harvest tickets (n = 303) were 25% successful. Two hundred fifty-six of 304 Eklutna archery registration permittees hunted, and they harvested 3 moose (1% success rate). Most of the moose (56%) were taken on either Fort Richardson or Elmendorf Air Force Base, with an additional 10% taken in the Twentymile/Portage/Placer hunt area. Bowhunters took 50% and muzzleloaders 11% of the total harvest. Except from 16 November to 14 December, seasons ran continuously in various parts of the unit from 20 August through 15 January.

We documented 150 moose kills by vehicles in the unit between 1 June 1999 and 31 May 2000. One other injured moose was shot, but no moose were shot in defense of life or property. In addition, trains killed 11 moose in Unit 14C between 1 May 1999 and 30 April 2000. Thus, the number of known nonsport, human-caused mortalities (162) exceeded hunting mortality by 200%.

Progress Meeting Project Objectives: Based on aerial surveys during 1999, we reported a ratio of 41 bulls:100 cows, above the project objective of 25 bulls:100 cows.

Project Location: Unit 15 (4900 mi^2)
Subunit 15A
Northern Kenai Peninsula

Project Objectives: To maintain the moose population with a posthunting sex ratio of no less than 15 bulls:100 cows.

Work Accomplished During the Project Segment Period: The winters of 1998–99 and 1999–00 were classified as severe for Kenai Peninsula with snow accumulation up to 40 inches. However, favorable survey conditions did not develop in most count areas until late November, prohibiting complete fall surveys in Unit 15A. The Skilak Loop Wildlife Management Area (SLWMA) area was not counted in 1999 due to lack of snow before December 1, our last day to survey according to the MOU with Kenai National Wildlife Refuge. SLWMA was last counted in 1998 and 164 moose were classified. Six of 13 count areas, including Skilak Loop, in Unit 15A were flown during the 1998 fall sex and age composition surveys, resulting in the following totals and ratios: 1528 moose classified, 27 calves:100 cows, and 31 bulls:100 cows. Calves composed 17% of observed moose. Excluding moose counted in Skilak Loop, the ratios were 27 calves:100 cows and 30 bulls:100 cows; calves composed 17% of the moose observed.

A preliminary total of 1193 hunters reported hunting Unit 15A during the August 10 to 17 archery and August 20 to September 20 general 1999 season, harvesting 93 moose, compared to 271 moose in 1998. The harvest comprised 53 (60%) spike/fork antlered bulls, 36 (40%) bulls with an antler spread of 50 inches or greater, or possessing at least 3 brow tines on 1 antler (n = 89), and 4 unspecified bulls. Fourteen (15%) of these moose were killed during the early archery season.

The department received 1570 applications for 40 permits to hunt antlerless moose in Skilak Loop during the September 15–30, 1999 season. Thirty-five of the hunters who won a permit hunted, harvesting 8 antlerless moose. Nonresidents were not permitted to apply for this hunt. A total of 740 applications were received for the spike/fork bull moose hunt held in SLWMA in 1999. Twelve of the permit hunters hunted and none was successful.

The Board of Game authorized an October 20 to November 20 permit hunt for bull moose with spike/fork or 50-inch antler spread in that portion of Unit 7 west of the Resurrection Creek Trail, north of the Sterling Highway and outside the Resurrection Creek Closed Area, and that portion of 15A east of the Mystery Creek Road and the Pipeline Road and north of the Sterling Highway in 1999. Twenty-five permits were issued and hunters killed 2 bulls. Twenty hunters reported that they hunted unsuccessfully and 3 did not hunt. The successful hunters both used horses to access their hunt area.

Twenty-one federal subsistence registration permits were issued to residents from the 4 rural communities and 16 reported hunting. Subsistence hunters reported harvesting 2 bulls during the August 10–19 federal subsistence hunt in Unit 15B. Subsistence hunters reported that 2 additional bulls were taken during the state season in Unit 15C. Only 1 hunter reported hunting in Unit 15A, and he was unsuccessful.

Progress Meeting Project Objectives: Fall composition surveys were not completed in 1999; however, fall composition surveys from 1998 indicated the mean bull to cow ratio was 30:100 in general hunts. Since the winter of 1999–00 was not as severe as the previous winter, I believe the Selective Harvest Program, enacted in 1987, has allowed the moose population in Unit 15A to exceed the department's objective of 15 bulls:100 cows. Bull to cow ratios observed in 1998 ranged from 13/100 to 73/100, depending on moose density and hunter access. The mean calf to cow ratio for all areas counted in Unit 15A during 1998 was low at 27/100.

The department would like to maintain the population at approximately 3600 moose in 15A. Winter severity, loss of habitat through human development, or deterioration from natural plant succession and predation are the primary factors controlling moose density. On May 11, 1996 wildfire burned approximately 5200 acres in the Hidden Lake area of Skilak Loop Special Management Area. Attempts to enhance areas through prescribed burning by the U.S. Fish and Wildlife Service and the department have been unsuccessful because of restrictions necessary to safely burn on the Kenai Peninsula. No natural or prescribed burns of any significant size occurred during this reporting period.

The winter of 1999–00 was long and severe in Unit 15A. Snow accumulations of 40 inches or greater were recorded over most of the western portions of the unit. We documented mortality due to starvation in 2 cases in 1997–98 in Units 15A and 15B (West), compared with 200 in 1998–99 and 100 in 1999–00. Reported starved moose in 1999–00 comprised 98 calves and 2 aged adult cows. The last severe winter before 1998–99 was in 1994–95, which resulted in the winter mortality of 178 moose in the same area of the peninsula. Last winter in Unit 15A, 81 moose, primarily calves and adult cows, were reported killed by highway vehicles. The moose population in Unit 15A should have declined moderately due to the severe winters in the past two years. The fall population is projected to be between 2000 to 2500 animals.

No change in the general season or bag limit is recommended for fall 2000. The selective harvest program has again gained support during the 1999 season and should protect mid-sized bulls that survived the severe winter of 1999–00.

Since the SLWMA was not counted in 1999, the antlerless and spike/fork bull moose season should not be held in 2000.

Project Location: Unit 15B
Central Kenai Peninsula

Project Objectives: To maintain the existing moose population with a posthunting sex ratio of no less than 15 bulls:100 cows in 15B West and 40 bulls:100 cows in 15B East.

Work Accomplished During the Project Segment Period: Fall composition surveys were not completed in 15B during 1999 because most of the unit is managed by a limited permit drawing and the remainder is hunted under the Selective Harvest Program. The most recent sex and age composition surveys were conducted in 15B East in 1996. A total of 224 moose was classified in 15B West, resulting in the following ratios: 39 calves and 33 bulls per 100 cows. Calves composed 23% of observed moose.

Preliminary harvest reports indicate that 275 hunters reported hunting in 15B West during the 20 August to 20 September 1999 season, harvesting 44 bulls. Hunter success rate was 16%.

The bag limit for 15B West was 1 bull with a spike/fork or 50-inch antlers. The 1999 harvest comprised 23 (70%) spike/fork antlered bulls and 10 (30%) bulls with an antler spread of 50-inches or greater or possessing at least 3 brow tines on 1 antler (n = 33). Eleven successful hunters failed to report the antler spread of the bull they harvested.

Hunting for moose in Unit 15B East was allowed by permit only with a bag limit of 1 bull with 50-inch or larger antler spread or at least 3 brow tines on 1 antler. From 1588 applications, staff issued 100 permits, resulting in the harvest of 17 bulls. Hunter success rate was 26%; 34% of the permit winners did not hunt. The average antler spread was 52.8 inches and ranged from 42.25 to 61.13 inches. Successful hunters observed an average of 1 illegal bull and 2 legal bulls. The number of bulls observed by successful hunters ranged from 1 to 7.

Twenty-one federal subsistence registration permits were issued to residents from the 4 rural communities and 16 reported hunting. Subsistence hunters reported harvesting 2 bulls during the August 10 to 19 federal subsistence hunt. Subsistence hunters reported taking 2 additional bulls during the state season in Unit 15C. Only 1 hunter reported hunting in Unit 15A, and he was unsuccessful.

Progress Meeting Project Objectives: The Selective Harvest Program initiated in 1987 was designed, in part, to increase the bull to cow ratio. Since no areas were surveyed during 1999, we cannot determine the unit's moose density and trend. Due to selective harvest, the bull to cow ratio is suspected to be in excess of 15:100 in Unit 15B West and in excess of 50:100 in Unit 15B East. Staff observations and comments from permittees hunting the area suggest that moose are becoming more difficult to find and trophy-sized bulls are less common, compared to 5 years ago. Additionally, commercial transporters are now charging the same price for successful and unsuccessful hunts. This change in costs encourages hunters to take the first legal moose they see to avoid paying the cost of packing without a moose.

Moose habitat in Unit 15B is deteriorating through natural plant succession and human suppression of wildfire. Since recent censuses have not been conducted, an accurate assessment of population trend is not available. However, the 1989–90, 1991–92, 1994–95, 1998–99 and 1999–00 winters were severe, causing higher than normal winter mortality, especially in the calf and older bull age classes. The winters of 1992–93, 1993–94, 1995–96 and 1997–98 were mild or normal, allowing for normal calf and older bull survival.

The winter of 1998–99 and 1999–00 were severe compared with the previous winter in Unit 15B. Snow accumulations of 40 inches or greater were recorded over most of the western portions of the unit. Mortality due to starvation was 2 moose in 1997–98, compared to 200 in Units 15A and 15B West in 1998–99 and 100 in 1999–00. Starved moose comprised 98 calves and 2 mature adult cows. The last severe winter, prior to 1998–99, was in 1994–95 and resulted in the winter mortality of 178 moose in the same area of the peninsula.

In addition to reported harvest and winter-related mortality, highway vehicles killed 46 moose in Unit 15B West.

No change is recommended for Unit 15B for the 2000 season. We should continue the Selective Harvest (15B West) and Permit Drawing (15B East) programs, designed to protect the male segment of the population from overharvest following a severe winter.

Project Location: Unit 15C
Southern Kenai Peninsula

Project Objectives: To maintain the moose population with a posthunting sex ratio of no less than 15 bulls:100 cows. To reduce the subpopulation of moose that winters in the Homer area to sustainable levels.

Work Accomplished During the Project Segment Period: One survey of the Caribou Hills was attempted in Unit 15C (CA21). We counted 578 moose in the alpine portion of this area. Bull:100 cow and calf:100 cow ratios were 27:100 and 18:100, respectively.

The winter of 1999–2000 was variable with deeper snow in the northern portions of this unit and more average snows in the southern portions. Winter mortality included 59 by motor vehicle. There were only 3 moose that reportedly died of starvation in the Homer area this winter in addition to 2 moose that were shot in defense of life or property. Additional winter mortality was reported for the Ninilchik area. The moose population probably remained stable during this reporting period.

Preliminary harvest statistics indicated approximately 1142 people hunted in Unit 15C during the 20 August–20 September season and took 171 moose. These figures represent a 13% decrease in the number of hunters and a 39% decrease in harvest from the previous year. The average success rate also declined from 21.5 to 15%.

Two drawing permit hunts for antlerless moose were established for an area around the city of Homer in 1995. In 1999 only 1 permit hunt with 35 permittees was held. These permittees were chosen from 677 applicants. Residents of the Kenai Peninsula composed 40% of the permittees for DM549. Twenty-seven hunters reported hunting and 7 (26%) were successful.

Progress Meeting Project Objectives: The selective harvest program initiated in 1987 seems to have increased and stabilized the bull:cow ratio throughout much of Unit 15C. Hunter reports and general field observations indicate that bulls are abundant in Unit 15C and regulations are generally well supported by a variety of wildlife users.

The current bull:cow ratio meets the management objective of a minimum of 15:100. Winter weather plays an important role in the harvest and hunter success. The proportion of Spike/Fork moose harvested in any year is directly related to the previous winter's severity and ultimately calf survival. We recommend maintaining the current spike/fork–50-inch restriction to the bag limit. Management changes to the general season in Unit 15C should follow those of Unit 7 and the remainder of Unit 15 to avoid shifts in hunting pressure.

The survey of the Homer area (15C-CA26) in 1998 indicated that the moose population had declined slightly. No survey was completed in 1999; however, we believe the population continued to decline due to winter mortality. The management objective of reducing this local subpopulation is slowly being met. We recommend continuation of the antlerless permit hunts until the postseason population is 365 moose. During the spring 1999 Board of Game meeting, the board combined the hunts and moved the season to coincide with the general season of 20 August–20 September. This regulation became effective during the fall 1999 season, and no problems associated with this hunt were reported.

Increased logging activities in Unit 15C to combat spruce bark beetles (*Dendroctonus rufipennis*) provides increased visibility and access to moose hunters, and habitat quality for moose may be affected when overstory is removed. Postlogging site preparation is crucial to future habitat quality. We need to continue to monitor effects of logging on moose on the Kenai Peninsula and make recommendations to foresters that will improve moose habitat.

Project Location: Unit 16 (12,300 mi^2)
Unit 16A
West side Susitna River valley, Yentna-Kahiltna rivers to Chulitna-Tokositna rivers

Project Objectives: To achieve a fall population of 3500–4000 moose with a posthunt sex ratio of 20–25 bulls:100 cows. The human-use objective is to achieve an average (3-year) annual harvest of at least 300 moose.

Work Accomplished During the Project Segment Period: We did not conduct aerial moose surveys of this subpopulation.

Total harvest was 167 bulls. Examination of harvest reports indicates that 857 hunters harvested 138 bulls (16% success) during the August 20–September 25 and December 5–15 general seasons. Of the 86 individuals hunting with any-bull drawing permits, 29 (34%) were successful.

During the report period a minimum of 16 moose were reported killed in collisions with autos.

Progress Meeting Project Objectives: The subpopulation reached the population objective during 1997, but we believe it fell below the objective during 1998–99. Harvest is well below the objective level, primarily due to the combination of difficult access in many parts of the unit and the spike/fork/50-inch selective harvest strategy.

Project Location: Unit 16B
West side of Cook Inlet

Project Objectives: Maintain a population of 6500–7500 moose with a November sex ratio of 20–25 bulls:100 cows, including no more than 40 moose on Kalgin Island with a minimum bull:cow ratio of 15:100. Human-use objectives are to maintain a minimum annual average harvest of 650 moose in Unit 16B and no less than 5 moose from Kalgin Island.

Work Accomplished During the Project Segment Period: We conducted a Gasaway type aerial survey in the "middle" subpopulation (north of Beluga River and south of Skwentna-Johnson Rivers) during 22–27 November. Fall composition surveys were completed on 15 and 22 November in the southern portion of the unit, and on 5 January we surveyed Kalgin Island. In the Middle subpopulation, we surveyed 31 of 177 sample units, classified 631 moose, and estimated a subpopulation of 3313 ± 14.8% (80% CI) moose with 28 bulls (2 yearling and 15 large) and 9 calves:100 cows. In 16B south we classified 458 moose, a composition of 38 bulls (4 yearlings and 14 large) and 8 calves:100 cows. We observed 50 moose on Kalgin Island with 15 bulls and 36 calves:100 cows. We estimated the Kalgin Island population at 60–70 moose.

During the general spike/fork/50-inch antlered bull season on the mainland, 730 hunters took 166 bulls for a 23% success rate. On Kalgin Island 266 hunters, able to take any moose, harvested 80 moose (29 males and 51 females) representing 30% success. A total of 175 Tier II permittees reported going afield and harvesting 104 bull moose (60% success). In total, 350 moose were taken from the unit.

Progress Meeting Project Objectives: The total moose population is below the objective range and declining. The bull:cow ratio in the southern portion of the unit was well above the objective. The population on Kalgin Island continues to exceed objectives; the human-use objective for Kalgin Island was exceeded but still failed to bring the population below 40 moose. The harvest for the rest of Unit 16B was far below the objective. Given recent declines in moose numbers, the unlikelihood of predator reduction programs, and spike/fork/50-inch selective harvest strategy, it is unlikely this human-use objective will be reached in the next 20 years. However, local subsistence needs as established by the Board of Game were met.

Project Location: Unit 17 (18,800 mi^2)
Northern Bristol Bay

Project Objectives

- Establish a minimum population of 100 moose in Unit 17A.
- Achieve and maintain a density of 1 moose/mi^2 on habitat considered to be good moose range in Unit 17B.
- Maintain a minimum density of 0.5 moose/mi^2 in areas considered to be moose habitat in Unit 17C.

Work Accomplished During the Project Segment Period: A survey in all drainages in Unit 17A was flown on March 13–26, 2000. A total of 422 moose were observed in 14.0 hours of survey time. No surveys for moose in Units 17B and 17C were completed during this fiscal year.

We monitored fall harvest by personal interviews and by analysis of harvest ticket returns. Preliminary data from harvest tickets returned by June 2000 indicated that 504 hunters killed 146 bulls during the 1999–2000 general season. No general moose hunting season was open in 17A; hunters killed 116 bulls in 17B and 25 in 17C. Five bulls were harvested in unspecified areas of Unit 17. Hunter success was 41% (16/36) for local Unit 17 residents, 22% (26/117) for other Alaska residents, and 30% (99/334) for nonresidents. Seventeen hunters did not report residency and reported harvesting 5 bulls. Aircraft provided the most common mode of transportation (72%). Eighty-four percent of the moose harvested had antlers 50-inches or larger.

Harvest data from registration hunt RM573 indicate that 41 of 57 permittees hunted and reported harvesting 10 bulls during the August 20 through September 15, 1999 hunt in 17A. All but 2 hunters with registration permits for this hunt were Unit 17 residents. All successful hunters used boats as hunting transportation.

Harvest data from registration hunt RM583 indicate that 522 of 638 permittees hunted and harvested 241 bulls during the August 20 through September 15, 1999 season. Hunters reported harvesting 37 bulls in 17B and 154 in 17C. Fifty bulls were harvested in unspecified areas of Unit 17. Hunter success among responding permittees was 46% for local residents (188/405) and 45% for other Alaska residents (53/117). Nonresidents were not eligible to participate in this hunt. Boats were the most common means of transportation (77%). Most moose (116; 60%) were killed in August and 75 (39%) were taken in September. Sixty-seven (28%) of the moose harvested had antlers 50" or larger.

Harvest data from registration hunt RM585 indicate that 49 of 111 permittees hunted and harvested 28 bulls during the December 1–31, 1999 season. Eleven bulls were reported as harvested in 17B and 15 were taken in 17C. Two moose were harvested in unspecified areas of Unit 17. Hunter success among responding permittees was 59% for local residents (23/39) and 50% for other Alaska residents (5/10). Nonresidents were not eligible to participate in this hunt. Snowmachines were the most common means of transportation.

The reported harvest of moose for Unit 17 for all hunts combined was 415 bulls. Unit 17 residents took 227 bulls (55%), other Alaska residents harvested 84 (20%), and nonresidents took 99 (24%).

Progress Meeting Project Objectives: The winter of 1999–2000 had average snowfall in the Bristol Bay region. Moose survival appeared average, with few reports of winter-killed moose. However, increased observations of moose in 17B killed by wolves are being reported. It appeared that moose populations were increasing in 17A, stable to declining in 17B, and stable to increasing in 17C.

We continued work with local advisory committees and staff from the Togiak National Wildlife Refuge on moose management guidelines, resulting in a draft management plan for moose in Unit 17A. It is now our intent to manage the area to maintain a minimum of 300 moose in 17A and allow the population to increase to an estimated carrying capacity of 1100–1750 moose. When the population exceeds 600 moose, proposals to provide greater opportunity for harvest can be submitted to the Alaska Board of Game. Based on the March 2000 survey, the number of moose in Unit 17A may be approaching 500.

We continue efforts to develop moose survey and population estimation protocols that will be effective in 17B and 17C, despite variable weather and unpredictable moose movements.

Segment Period Project Costs

	Personnel	Operating	Total
Planned	236.7	87.4	324.1
Actual	236.7	87.4	324.1
Difference	0.0	0.0	0.0

Submitted by

Michael G. McDonald
Assistant Management Coordinator

Project Title: **Interior Moose Population and Habitat Management**

Project Location: Unit 12 (9978 mi^2)
Upper Tanana and White River drainages

Objective: Maintain a minimum posthunting sex ratio of 40 bulls:100 cows east of the Nabesna River and a minimum ratio of 20 bulls:100 cows in the remainder of the unit.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

Activities Accomplished

1. Worked with the Upper Tanana/Fortymile and Slana Advisory Committees to develop an intensive management proposal for Unit 12 that was presented to the Board of Game in March 2000. The Board tentatively has established the Unit 12 moose population and harvest objectives as 4000–6000 and 250–450, respectively. The board will make a final action on these objectives during their fall 2000 meeting.

2. Conducted aerial sex and age composition surveys in the southern and northwestern portions of the unit during October and November 1999.

3. Completed a population estimation survey in northeastern Unit 12 during November 1999.

4. Continued work with the Division of Forestry to develop a logging/habitat enhancement project and established permanent transects to monitor vegetation responses to logging and different scarification methods and to monitor moose response to those changes.

5. Completed a draft prescribed burn plan for the Robertson River drainage. Planned ignition date is summer 2001.

6. Monitored harvest and hunter distribution by aerial survey, by field hunter contacts, and by review of harvest reports.

7. Completed the Unit 12 moose management report covering 1 July 1997–30 June 1999.

Project Location: Units 19 (36,486 mi^2); 21A and 21E (23,270 mi^2)

All of the drainages into the Kuskokwim River upstream from Lower Kalskag; Yukon River drainage from Paimiut upstream to, but not including, the Blackburn Creek drainage; the entire Innoko River drainage; and the Nowitna River drainage upstream from the confluence of the Little Mud and Nowitna Rivers.

Objectives

1. Annually assess population status, bull:cow ratios, and trend in portions of the area where harvest levels make significant impacts on moose populations.

2. Maintain an annual average antler spread measurement of at least 48 inches in Units 19B, 19C, and 21A.

3. Assess accuracy of harvest reporting in selected portions of the area.

4. Encourage landowners to reduce fire suppression efforts on wildfires that do not threaten human life, property, or valuable resources, so that fire can fulfill its natural role in maintaining young, highly productive, and diverse habitats.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (objectives 1 and 2).

3. Operate a hunter checkstation on the Hoholitna River (objective 3).

Activities Accomplished

1. Completed the management report and reviewed and revised management objectives (all objectives).

2. Completed a population estimate in a portion of Unit 21E during February 2000 and short late winter survey in Unit 19A on the Hoholitna River (objective 1).

3. Conducted a roving checkstation on the Kuskokwim River between Aniak and McGrath (objectives 2 and 3). A check was not conducted on the Hoholitna River.

4. Completed spring calf surveys in Units 21E, 19A, and 19D, and examined bone marrow samples from winter killed moose (objective 1).

Project Location: Unit 20A (6796 mi^2)
Tanana Flats, Central Alaska Range

Objectives

1. Manage for a November population of between 10,000 and 12,000 adult (i.e., excluding calves) moose.
2. Manage for at least 30 bulls:100 cows overall and at least 20 bulls:100 cows in the Tanana Flats, Western Foothills, and Eastern Foothills areas.
3. Allow harvest of cow moose when the population is above the population objective of 10,000 adult moose.
4. Document uses of moose in Unit 20A.

Activities Planned

1. Write management report and review and revise management objectives (all objectives).
2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (all objectives).

Activities Accomplished

1. Completed 1 July 1997–30 June 1999 moose management report (all objectives).
2. Conducted fall moose population estimation surveys (objectives 1–3).
3. Conducted moose twinning rate surveys (objective 1).
4. Analyzed harvest report information (objectives 1, 2, and 4).

Project Location: Unit 20B (9114 mi^2)
Drainages into the north bank of the Tanana River between Delta Creek and Manley Hot Springs

Objectives

Manage for a minimum bull:cow ratio of 20:100 in each count area and a Unit 20B bull:cow ratio of at least 30:100.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

Activities Accomplished

1. Completed 1 July 1997–30 June 1999 moose management report.
2. Conducted fall moose population estimation and stratification surveys.
3. Conducted moose twinning rate surveys.
4. Analyzed harvest report information.

Project Location: Units 20C (11,902 mi^2), 20F (6267 mi^2), and 25C (5149 mi^2)

Unit 20C includes drainages into the west bank of the Nenana River, and into the south bank of the Tanana River west of the Nenana River. Most of Denali National Park and Preserve (DNPP) is within Unit 20C.

Unit 20F includes drainages into the north bank of the Tanana River west of Manley, and into the Yukon River approximately between the village of Tanana and the Dalton Highway bridge.

Unit 25C includes drainages into the south bank of the Yukon River upstream from Circle to, but not including, the Charley River drainage. The subunit also includes the Birch Creek drainage upstream from the Steese Highway bridge, the Preacher Creek drainage upstream from and including the Rock Creek drainage, and the Beaver Creek drainage upstream from and including the Moose Creek drainage.

Objectives

1. Provide for a sustained yield harvest of these low-density populations.
2. Estimate hunting mortality and document nonhunting mortality when possible.
3. Promote moose habitat enhancement by allowing natural fires to alter vegetation.

Activities Planned

1. Write management report and review and revise management objectives (all objectives).
2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (objectives 1–4).

Activities Accomplished

1. Wrote management report, reviewed management objectives, and summarized harvest data (all objectives).

2. Started stratification efforts in 20C (objective 3).

Project Location: Unit 20D (5637 mi^2)
Central Tanana Valley near Delta Junction

Objective: Increase the fall moose population to 8000–10,000 moose with an annual reported sustainable harvest of 240 to 500 moose per year by the year 2002.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

Activities Accomplished

1. Wrote management report and reviewed management objectives.

2. Conducted aerial surveys to determine population size and trend and contacted hunters in the field.

3. Conducted browse surveys and collected fecal samples to determine habitat condition in a portion of the area.

4. Conducted aerial surveys of moose calves in a portion of the area to determine twinning rates.

Project Location: Unit 20E (10,681 mi^2)
Charley, Fortymile, and Ladue River drainages

Objective: Maintain a posthunting ratio of at least 40 bulls:100 cows in all survey areas.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

Activities Accomplished

1. Worked with the Upper Tanana/Fortymile and Slana Advisory Committees to develop the moose intensive management proposal for Unit 20E that was presented to the Board of Game in March 2000. The Board tentatively established the moose population and harvest objectives for that portion of Unit 20E within the Fortymile River drainages as 8000–10,000 and 500–1000, respectively.

2. Completed a population estimation survey in the southern half of Unit 20E during October and November 1999.

3. Completed a 31,000-acre prescribed burn in the Ketchumstuk Creek area.

4. Monitored harvest and hunter distribution by aerial surveys, hunter contacts in the field, and review of harvest reports.

5. Administered 2 drawing permit hunts.

6. Completed the Unit 20E moose management report covering 1 July 1997–30 June 1999.

Project Location: Unit 21B (4871 mi^2)
Lower Nowitna River, Yukon River between
Melozitna and Tozitna Rivers

Objectives

Floodplain of the Yukon and Nowitna Rivers

1. Conduct annual trend area surveys.

2. Maintain an average annual harvest of 40 moose from the desired population of 1000–1600 moose.

3. Monitor harvest with harvest reports and checkstations.

Remainder of the Nowitna drainage

4. Conduct annual trend area surveys.

5. Maintain an average annual harvest of 20 moose from the desired population of 1100–1300 moose.

6. Monitor harvest with harvest reports and checkstations.

Remainder of Unit 21B

7. Conduct annual trend area surveys.

8. Maintain a minimum annual harvest of 30 moose from the desired population of 1600–1700 moose.

9. Monitor harvest with harvest reports.

Activities Planned

1. Write management report and review and revise management objectives (all objectives).

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (all objectives).

3. Operate a hunter checkstation on the Nowitna River (objectives 2, 3, 5 and 6).

Activities Accomplished

1. In conjunction with FWS, conducted aerial trend count survey at mouth of Nowitna River and at Nowitna Sulatna confluence (objectives 1 and 4).

2. Completed the moose management report for 1 July 1997–30 June 1999 (all objectives).

3. Revised population management objectives (all objectives).

4. Operated Nowitna River checkstation with the FWS (objectives 2, 3, 5 and 6).

5. Monitored harvest using Nowitna checkstation and statewide harvest reports (objectives 2, 3, 5, 6, 8 and 9).

6. Maintained harvest opportunity within objective parameters (objectives 2, 5 and 8).

Project Location: Unit 21C (3671 mi^2)
Dulbi River above Cottonwood Creek and
Melozitna River above Grayling Creek

Objectives: Objectives are being formulated this reporting period.

Activities Planned

1. Write management report and review and revise management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

3. Conduct a hunter checkstation on the Koyukuk River.

Activities Accomplished

1. Completed management report for 1 July 1997–30 June 1999.
2. Revised population management objectives.
3. Conducted moose aerial stratification survey in April 2000.
4. Monitored harvest through statewide reporting system and Koyukuk River checkstation.

Project Location: Unit 21D (12,113 mi^2)
Yukon River from Blackburn to Ruby and Koyukuk River drainage below Dulbi Slough

Objectives: Objectives are being formulated this reporting period.

Activities Planned

1. Write management report and review and revise management objectives.
2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.
3. Operate a hunter checkstation on the Koyukuk River.

Activities Accomplished

1. In conjunction with FWS, conducted aerial trend count surveys at Pilot Mountain Slough, Squirrel Creek, Koyukuk River Mouth, Kaiyuh Slough, Dulbi River Mouth, and Three Day Slough.
2. Completed the area management report for 1 July 1997–30 June 1999.
3. Conducted Koyukuk River Moose Management Planning effort that resulted in revised population management goals and objectives.
4. Operated Koyukuk River checkstation.
5. Monitored harvest using Koyukuk River checkstation and statewide harvest reports.

Project Location: Unit 24 (26,055 mi^2)
Koyukuk River drainage above Dulbi River

Objectives: Objectives are being formulated this reporting period.

Activities Planned

1. Review and revise population management objectives.

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors.

Activities Accomplished

1. In conjunction with FWS, conducted aerial trend count surveys at Dulbi Slough, Treat Island, Mathews Slough, and Batza Slough.

2. In conjunction with FWS, conducted moose population estimation survey for 8600-mi^2 portion of Unit 24.

3. Completed management report for 1 July 1997–30 June 1999.

4. Conducted Koyukuk River Moose Management Planning effort that resulted in revised population management goals and objectives.

5. Operated Koyukuk River checkstation.

6. Monitored harvest using Koyukuk River checkstation and statewide harvest reports.

Project Location: Units 25A, 25B, and 25D (47,968 mi^2)
Upper Yukon River Valley

Objectives

1. Continue efforts to communicate with and educate local residents about moose management and the importance of not taking cow moose.

2. In cooperation with US Fish and Wildlife Service (FWS), monitor moose population status as funding permits.

Activities Planned

1. Write management report and review and revise management objectives (all objectives).

2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (all objectives).

Activities Accomplished

1. Completed moose population survey in Unit 25D East during 24–29 October 1999 and assisted FWS in completing population survey in Unit 25D West during same period (objective 2).

2. Compiled harvest data, prepared management report, reviewed and revised management objectives, discussed options for moose management, and prepared and distributed information on effects of shooting cow moose (objective 1).

Project Location: Units 26B and 26C (25,788 mi^2)
North Slope of the Brooks Range and Arctic Coastal Plain east of the Itkillik River

Objectives

1. Determine moose population distribution, composition, density, and trends.
2. Determine moose movements and habitat use in heavily harvested drainages.
3. Maintain an annual posthunting sex ratio of at least 50 bulls:100 cows
4. Determine subsistence needs and harvest levels.

Activities Planned

1. Write management report and review and revise management objectives (all objectives).
2. Conduct aerial surveys, evaluate harvest reports, contact hunters, and make field observations to determine population status, trend, and mortality factors (all objectives).

Activities Accomplished

1. Wrote management report and revised management objectives (all objectives).
2. In April 2000, conducted an aerial survey to estimate numbers of moose and survival of calves to spring; we conducted this survey with FWS. The hunting season has been closed since fall 1996; thus, planned activities with hunters or hunting were not accomplished (objective 1).

Segment Period Costs

	Personnel	Operating	Total
Planned	235.9	103.0	338.9
Actual	270.3	137.7	408.0
Difference	-34.4	-34.7	-69.1

Explanation of costs: Extra operating and personnel funds were needed to complete large-scale moose estimation surveys in Units 21E, 24, and 26B. We also conducted surveys in Units 20A, B, & D.

Submitted by

Roy Nowlin, Regional Management Assistant David James, Management Coordinator

Project Title: **Western Alaska Moose Population Management**

Project Location: Unit 18 (42,000 mi^2)
Yukon-Kuskokwim Delta

Project Objectives

1. Allow the Yukon River moose population to increase above its current size of 3000 moose. Allow the Kuskokwim River moose population to increase to at least 2000 moose. Achieve and maintain a ratio of 30 bulls:100 cows for both populations.

   a. Conduct fall sex and age composition surveys along the Yukon River.

   b. Conduct winter population censuses and recruitment surveys along the Yukon and Kuskokwim Rivers in alternating years.

2. Improve harvest reporting and compliance with hunting regulations.

3. Begin discussions with the Lower Kuskokwim Advisory Committee and other agencies to develop a strategy to increase the moose population along the Lower Kuskokwim.

4. Minimize conflicts among user groups interested in moose in and around Unit 18.

Work Accomplished During the Project Segment Period: A moose population census was completed in March 2000 along the Lower Kuskokwim River in Unit 18. We estimated that 84 moose ± 29.7% at 95% CI are within the survey area. This is the same area where our population goal is at least 2000 animals.

The Yukon River moose hunter checkstation at Paimiut was operated during the fall hunting season. We checked 37 moose from 23 successful parties who voluntarily stopped at the check-station. This checkstation remains the most important in-season point of contact for moose hunters from Unit 18. The Kuskokwim River checkstation was not operated this year.

An emergency order (EO) was used to open a 10-day moose season from 27 December 1999–5 January 2000. We selected these dates after discussing the season with villages and federal refuge staff.

A proposal was submitted by a member of the public to the Federal Subsistence Board (FSB) to extend the winter moose season in Unit 18. In response, department and Yukon Delta National Wildlife Refuge (YDNWR) staff conducted a survey of the Kuskokwim River moose habitat where hunting pressure could be heavy if the season were extended. We compared this to moose numbers in similar habitat along the Yukon River where the moose population is considered healthy. Along the Yukon River we counted an average of 229 moose per hour, and along the Kuskokwim River we counted an average of only 9.9 moose per hour. The FSB used these data to reject the proposal.

We monitored moose harvests by harvest reports. Because hunters do not always return their harvest reports, information derived from them must be considered harvest minimums. At least 697 hunters harvested 203 moose in Unit 18 in 1998–1999. The harvest figures for 1999–2000 are not yet finalized.

Progress Meeting Project Objectives: Improved harvest reporting and compliance with regulations is being achieved through hunter contacts at the Paimiut hunter checkstation on the Yukon River, radio and newspaper announcements, law enforcement activities, and community meetings. A prize drawing was initiated as an incentive to encourage Unit 18 hunters to return their harvest reports. The effectiveness of this incentive will be evaluated in 2 or 3 years.

Surveys reveal that although the Yukon River moose population is below its potential, it is growing, but the moose population on the Kuskokwim River is not growing. Illegal harvests are holding the Kuskokwim population well below its potential. This has been the topic of concern for the department and was addressed by the Lower Kuskokwim Advisory Committee (LKAC). The LKAC voted unanimously to face this issue, and they made plans to work with the department and the YDNWR to develop a strategy to increase moose numbers in the area.

Project Location: Unit 22 (25,230 mi^2)
Seward Peninsula and eastern Norton Sound

Project Objectives: The management goal for Unit 22 is to maintain a minimum population size of 5700–7300 moose. In Unit 22A our goal is to increase population size from the current estimate of 600–800 moose to a minimum of 1000 moose. In Units 22B and 22D the goal is to stabilize the population size at 1500–2500 and 2500–3000 moose, respectively, with a minimum bull:cow ratio of 30:100. In Unit 22C the goal is to maintain a population of approximately 480 animals with a minimum bull:cow ratio of 20:100. In Unit 22E the goal is to maintain the existing population of 250–350 moose. These objectives will be accomplished through the following management activities:

1. Estimate abundance, sex and age composition, and recruitment to yearling age and determine trends in population size and composition.

    a. Conduct aerial surveys throughout the unit during late fall and early spring to provide an index of population status and trends, sex and age composition, and yearling recruitment.

    b. Conduct moose censuses in each of the 5 units (by yearly rotation) to estimate abundance.

2. Monitor human and natural mortality factors affecting the population.

    a. Evaluate hunting mortality by analyzing harvest ticket data and results of village harvest surveys.

    b. Improve harvest reporting through public contacts and improved communication.

3. Develop updated moose management objectives, with special emphasis on areas adjacent to the Nome road system.

Work Accomplished During the Project Segment Period

Harvest Monitoring

The total reported harvest from Unit 22 was 246 moose (235 males, 6 females and 5 unknown). The reported harvest for each portion of the unit was: Unit 22A – 37; Unit 22B – 67; Unit 22C – 38; Unit 22D – 90; and Unit 22E – 14. Of the 563 individuals who reported hunting in Unit 22, 491 (87%) were residents of Alaska, 400 (71%) were residents of Unit 22, 58 (10%) were nonresidents, and 14 (3%) were of unknown residency. Hunter success rate was 44%. Staff collected incisors from 50 hunter-killed moose to determine age and to examine the teeth. Seward Peninsula moose have an unusually high incidence of tooth breakage.

The village-based big game harvest assessment program, initiated in 1999 by the department and Kawerak, Inc., was continued during the reporting period. In April 2000 household surveys were conducted in Elim, Shaktoolik, and White Mountain. Shaktoolik residents reported harvesting 14 moose, and 68% of households in which residents reported hunting moose were successful. Only 14% (2 moose) of moose taken by Shaktoolik residents were reported through our traditional harvest reporting system. Elim residents reported harvesting 14 moose, and 42% of households in which residents reported hunting moose were successful. None of the harvest was reported with harvest tickets. White Mountain hunters reported a harvest of 17 moose. The success rate in White Mountain was 55%. Ninety-four percent of the White Mountain harvest (16 moose) was reported with harvest tickets.

Population Monitoring

An aerial census of Unit 22A scheduled for March 2000 was canceled due to poor flying weather. Lack of snow prevented fall composition counts during this reporting period. In spring 2000 we surveyed moose in riparian habitat along selected drainages in Units 22A, 22B, 22C and 22D to obtain recruitment estimates. In late March 2000 in Unit 22A, recruitment surveys were flown in the Unalakleet, North River, Egavik, Tagoominik, Shaktoolik and Ungalik drainages. Of the 174 moose seen, 8% were short yearlings. In March 2000 a recruitment survey of the Koyuk River drainage in eastern Unit 22B found 242 moose of which 8% (19) were short yearlings. An April 2000 survey along the Niukluk River in western Unit 22B found 90 moose with 10% (9) short yearlings. In April 2000 Unit 22D surveys of the Kuzitrin, above and below the bridge, and along the Noxapaga found 505 moose and 31 (6%) short yearlings. Along the lower Kougarok River, we found 184 moose and 16 (9%) short yearlings. Low recruitment rates throughout 22A, 22B, and 22D indicate that poor calf survival is a widespread problem in the unit.

In April 2000, we found 119 moose in the Snake River drainage of which 21 (18%) were yearlings. The large number of moose wintering in the Snake River drainage in recent years, the routinely high recruitment, and the depletion of browse create concern that the population in Unit 22C may be approaching the carrying capacity of the winter range.

Public Interactions

Staff attended Fish and Game Advisory Committee meetings, Federal Regional Advisory Council meetings, and public meetings in various Unit 22 villages to discuss wildlife issues and regulations with the public. Staff and contracted surveyors from the villages went door to door in Elim, Shaktoolik and White Mountain, conducting big game harvest surveys. The harvest assessment project was well received in the villages, and many residents were glad to have a personal opportunity to express their views and concerns about wildlife issues. In light of declining moose numbers in Unit 22B, the public was generally supportive of reduced seasons for residents and nonresidents and closure of antlerless moose hunting in all of Unit 22B. There was also support for a cow hunt in Unit 22C where moose productivity and recruitment are high. Staff devoted considerable time answering questions from the public, writing articles, mailing information and regulatory materials, and assisting license vendors.

Progress Meeting Project Objectives: As shown by village harvest surveys in Elim and Shaktoolik, the unreported harvest of moose in Unit 22 is considerable. Much of this harvest is attributable to hunters who do not purchase licenses or pick up harvest tickets rather than to those who ignore seasons and bag limits. Efforts to inform the public of the importance of wildlife conservation and the need for regulations are having an effect in some communities because the number of individuals using licenses and harvest tickets has increased. However, additional contact with local residents is necessary if we are to achieve better compliance with current moose regulations. We plan to continue and extend the use of household surveys to better document big game harvest in Unit 22 villages.

In response to the continuing moose population decline in Unit 22B, the Board of Game eliminated the antlerless moose season throughout Unit 22B and shortened the resident and nonresident seasons. The board also eliminated the resident brown tag requirement in Unit 22 and increased the number of nonresident brown bear permits to encourage higher bear harvests to reduce moose calf mortality. The board established a permit hunt for 20 cow moose in Unit 22C where productivity and recruitment are high. By limiting population growth, we hope to extend carrying capacity of moose habitat and avoid overbrowsing that could lead to major losses during years with severe winters.

We are continuing efforts to develop updated management objectives with the public and other agencies.

Project Location: Unit 23 (43,000 mi^2)
Kotzebue Sound and Western Brooks Range

Project Objectives

- Maintain moose density at or above 1 moose/mi^2.
- Maintain a minimum bull:cow ratio of 40:100.

Project Activities

1. Census moose in established census areas to monitor population composition and density.

2. Monitor harvest through harvest ticket and community-based systems.

3. Collect recruitment information in the Noatak River drainage.

4. Conclude the cooperative Noatak moose telemetry project conducted with NPS.

Work Accomplished During the Project Segment Period

Population Monitoring

Selawik Moose Census: During November 1999, the department and FWS surveyed 512 mi^2 of a 1046 mi^2 census area to estimate population size and composition in the upper Selawik River drainage using the Gasaway technique. The estimate of moose was 648 moose for a density of 0.54 moose/ mi^2. The bull:cow ratio was 68:100.

Noatak Moose Census

During May 2000, the department and NPS surveyed 427 mi^2 of a 2387 mi^2 census area to estimate abundance and recruitment using the spatial census technique. The estimate was 779 moose for a density of 0.33 moose/mi^2. The estimate is substantially lower than that of 1999. Although opportunistic observations by agency staff and reports from local residents and commercial operators indicate the Noatak moose population is declining, the rate of decline is probably lower than the 1999 and 2000 censuses indicate. The 2000 calf:adult ratio was 8:100 based on a sample of 364 moose.

Harvest Monitoring

Three hundred fifty one hunters harvested 138 moose during the 1999–2000 season for a 39% success rate. The statewide harvest reporting system indicates that 57 residents of Unit 23, 128 nonlocal Alaskan residents, and 160 nonresidents hunted moose in Unit 23. For the second consecutive year, moose harvests in selected villages were estimated using a community-based technique. However, we have no unitwide estimate of moose harvested by local residents.

Radiotelemetry Studies

The department and FWS Selawik Refuge staff removed all collars in state frequency band from moose in the Tagagawik River drainage. Only 14 collars in the state frequency band remain on moose in the Noatak River drainage, and we conducted only minimal tracking during this reporting period.

Progress Meeting Project Objectives: We think moose populations are stable at relatively low (0.50–1.00 moose/mi^2) densities throughout Unit 23. However, we lack sufficient census data to confirm this. The exception to this is the Noatak drainage where the moose population appears to be declining. We think this decline is attributable to high predation on calves, especially by brown bears, but this is speculation based on opportunistic observations by agency staff and

reports from hunters and commercial operators. Bull:cow ratios appear to be at or above the minimum management objective of 40:100 throughout the unit.

Project Location: Unit 26A (53,000 mi^2)
Western North Slope

Project Objectives

1. Monitor the moose population in Unit 26A.

   a. Conduct late winter trend counts annually to monitor population trends and short yearling recruitment. A unitwide census will take place every 4 years.

   b. Conduct fall surveys to monitor sex and age composition trends and summer calf survival.

2. Study the factors that caused the population to decline.

   a. Examine and collect samples from captured and dead moose to test for pregnancy status, disease, mineral deficiencies, and contaminants.

   b. Conduct radiotelemetry surveys to examine calf production and survival, distribution, and mortality rates.

   c. Continue monitoring predator populations.

   d. Continue the moose browse study.

3. Minimize hunting mortality.

Work Accomplished During the Project Segment Period: We conducted fall sex and age composition surveys in trend count areas in the Colville, Anaktuvuk, and Chandler river drainages 6–9 November 1999. During these surveys we observed 209 moose: 51 bulls (49 bulls: 100 cows), 104 cows, and 54 short yearlings (26%). The estimated antler sizes of the bulls are listed:

Inches	<30	0–39	0–49	0–59	60+
Percent	18%	18%	12%	27%	25%

We surveyed all drainages in Unit 26A containing moose habitat to conduct a census and short yearling recruitment count during April 1995. A total of 757 moose (746 adults and 11 calves) were counted, yielding a short yearling recruitment rate of 1%. This represented a 51% decline since the 1991 census when we counted 1535 moose. Trend counts indicated the population continued to decline through 1996 to about 25% of its 1991 number.

We conducted a trend area count of Unit 26A during 4–6 April 2000. A total of 325 moose (245 adults and 80 calves) were counted within the trend area, yielding a short yearling recruitment rate of 25%. This indicated a substantial increase from 1999 when 210 moose were counted. The short yearling count of 25% was greater than the 1998 rate of 17%, and was much greater than the survival rates in 1994, 1995, and 1996 when 3%, 2%, and <1% short yearlings were counted, respectively.

We conducted radiotelemetry surveys during spring calving season, fall, and late winter. From 8–10 June 1999 we located 40 collared cows with 37 calves (93 calves per 100 cows), including 13 sets of twins and 11 single calves. Before this spring, the most sets of twins we had seen during a spring survey was 5. During our fall survey, flown 6–10 November 1999, we located 42 collared cows and counted 24 calves (67 calves per 100 cows), including 3 sets of twins. During 5–7 April 2000 we located 37 collared cows with 19 short yearlings (54 calves per 100 cows) and 2 sets of twins. Although the number of twins was initially quite high, the number surviving the year was similar to other years.

During calving surveys from 9–11 June 2000, we located 35 collared cows with 24 calves (69 calves:100 cows), including 8 sets of twins. Since 1996 and 1997, when we attached the radio collars, adult mortality has been very low, and only 3 collared moose have died. During 1999–2000, 6 collared moose died, a mortality rate of 15%.

Very restrictive hunting regulations were established when the moose population declined, and there was 1 moose reported harvested in 1999–2000.

Progress Meeting Project Objectives: The spring population survey in 1999–2000 indicated fairly high short yearling recruitment (25%) and a substantial population increase. This is a continuation of the growth trend since 1996. This growth period follows a 75% population decline between 1992 and 1996.

Our fall composition count indicated that oversummer calf survival in 1999 (26%) was higher than in 1998 and was similar to rates of 1996 and 1997. We observed a good cross-section of bull antler sizes in 1998 and 1999, whereas in 1994–1996 nearly all bulls observed were over 3 years old.

Radiotelemetry surveys indicate high productivity in 1999 (93 calves:100 cows) with a high incidence of twins, but the number of calves surviving the year was similar to past years (54 calves:100 cows). Calving surveys in 2000 indicated 69 calves:100 cows. Adult mortality was considerably higher among collared moose in 1999–2000 than in past years (15%).

We did not collect samples from live moose in 1999–2000. However, from past studies we have learned that moose in Unit 26A have had a fairly high pregnancy rate, a high incidence of exposure to the diseases brucellosis and leptospirosis, and have been marginally deficient in copper.

Wolf numbers continue to be low and bear numbers are high in the area surrounding the Colville River. Low wolf density probably contributed to the reduced moose mortality in recent years.

There will be very little hunting mortality because the Board of Game closed nearly the entire North Slope to moose hunting. Only a section of the lower Colville River will be open for harvest of bull moose during August when airplanes are not permitted for hunting.

Segment Period Project Costs:

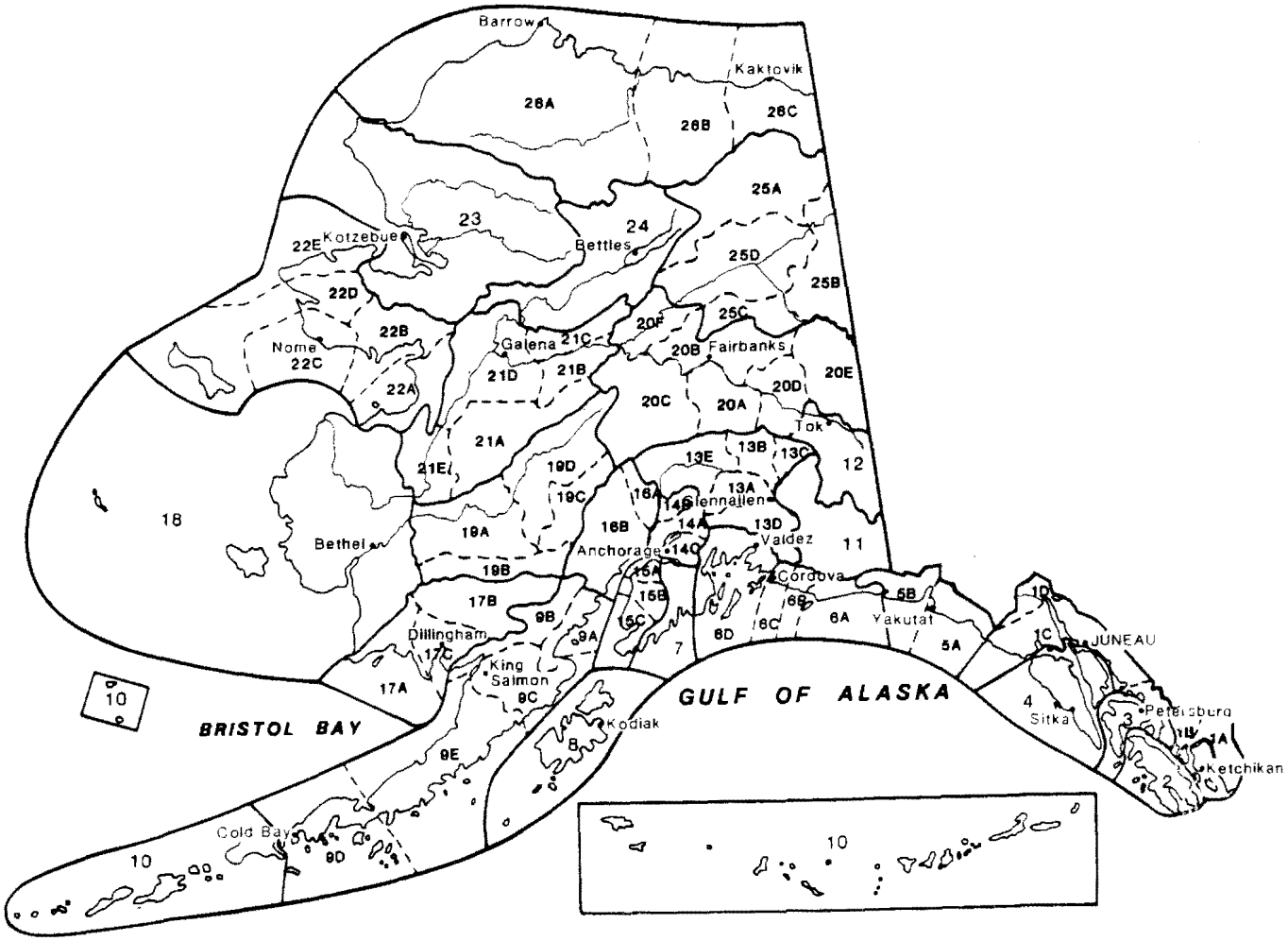
	Personnel	Operating	Total
Planned	84.7	103.0	187.7
Actual	62.0	35.6	97.6
Difference	22.7	67.4	90.1

Explanation of costs: Staff vacancy in Unit 23 contributed to excess personnel costs. Operating costs were lower than planned because moose censuses were not completed in Units 22 and 23.

Submitted by

Peter Bente
Survey-Inventory Coordinator

Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.

Whitten