Species Management Report and Plan ADF&G/DWC/SMR&P–2020–9

Moose Management Report and Plan, Game Management Unit 26A:

Report Period 1 July 2010–30 June 2015, and

Plan Period 1 July 2015–30 June 2020

Ryan Klimstra and Carmen Daggett

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Alaska Department of Fish and Game Division of Wildlife Conservation

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PREPARED BY:

Ryan Klimstra and Carmen Daggett
Former and present Area Biologists

APPROVED BY:

Tony Gorn
Management Coordinator

REVIEWED BY:

Adam Craig
Biometrician

Lincoln Parrett
Research Coordinator

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

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

This species management report and plan was reviewed and approved for publication by Phillip Perry, Management Coordinator for Region V for the Division of Wildlife Conservation.

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Contents

List of Figures

List of Tables

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Purpose of this Report

This report provides a record of survey and inventory management activities for moose in Unit 26A for the 5 regulatory years 2010–2014 and plans for survey and inventory management activities in the 5 years 2015–2020. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010–30 June 2011). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts but is also provided to the public to inform them of wildlife management activities. In 2016 the Alaska Department of Fish and Game's Division of Wildlife Conservation launched this 5 -year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the moose management report of survey and inventory activities that was previously produced every 2 years.

I. RY10–RY14 Management Report

Management Area

Game management Unit 26A is part of the most northern game management unit (GMU) in Alaska and is located entirely north of the Arctic Circle. It consists of the area from Cape Lisburne to west of the Itkillik River drainage, and west of the east bank of the Colville River between the Itkillik River and the Arctic Ocean, and all Arctic river drainages south to Gates of the Arctic National Park and Anaktuvuk Pass (Fig. 1). Moose are primarily found in riparian corridors in the southeast portion of Unit 26A. During winter and early spring, deep snow in the smaller drainages concentrates moose among willow and alder thickets along the Colville River and associated drainages south of Nuiqsut. In late spring, parturient cows often disperse into smaller drainages of the Colville, Chandler, Itkillik, and Anaktuvuk rivers to calve. During summer months a portion of the moose population may disperse short distances away from the primary river drainages onto the tundra to utilize the beaded streams and shallow lakes.

Summary of Status, Trend, Management Activities, and History of Moose in Unit 26A

Archaeological evidence indicates moose have been present on the North Slope either sporadically or at low densities for many years (Carroll 2012). Since about 1940, moose populations have increased in size and have become well established in Unit 26A (Carroll 2012). Nearly all moose are confined to riparian habitat along river corridors during winter. During summer, moose move into small tributaries and hills surrounding riparian habitat, and some disperse as far as the foothills of the Brooks Range and across the coastal plain. The highest winter densities of moose are found in the inland portions of the Colville River drainage.

Since 1970, late-winter surveys have been conducted annually to assess population status and short yearling recruitment rates. Trend area counts were conducted each spring and complete minimum count surveys of all major drainages in Unit 26A have been completed 11 times between 1970 and 2014 (Fig. 2). Minimum count surveys indicate that abundance increased steadily from a count of 1,219 moose in 1970 to 1,535 in 1991. Subsequently, abundance

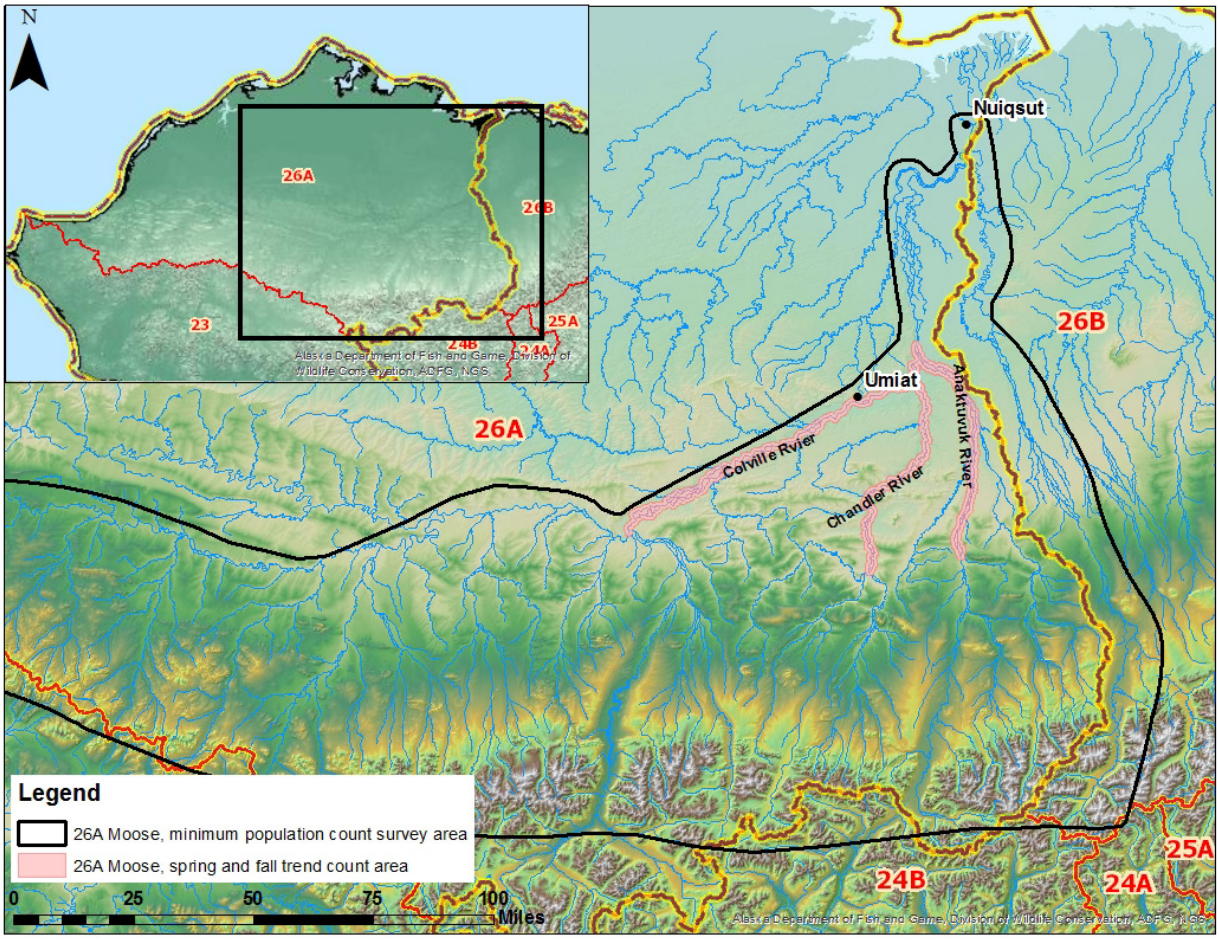

Figure 1. Unit 26A, Alaska, moose survey area boundaries.

declined to 326 by 1999 (79% decline), then increased to 1,180 in 2008, and declined again to 609 moose in 2011 (Trent 1989; Carroll 2012).

The population decline of the 1990s was likely due to a combination of high adult mortality and poor calf survival, although calf production prior to and during the decline were not monitored. Fall composition surveys indicated that the parturition rate and/or summer survival were very low, as only 4%, 2%, and 0% calves were counted in 1993, 1994, and 1995, respectively. The decline appeared to be due to a combination of malnourishment, bacterial diseases, mineral deficiency, predation, weather factors, and competition with snowshoe hares (Carroll 1998). Samples were collected from hunter-killed moose and those that were found dead in 1995 and 1996. Additionally, we captured, examined, collected blood, and radiocollared 45 female and 5 male moose in 1996 and 1997. Analyses indicated that nearly all of the moose tested were marginally deficient in copper (O'Hara et al. 2001). Approximately 17% (8 of 48) of the cows captured in 1996 and 1997 tested positive for antibodies to the bacteria *Brucella suis* and 20% (6 of 30) of the cows tested positive for *Leptospira interrogans serovar pomona* (O'Hara et al. 1998). Both diseases cause abortions and weak calves (O'Hara et al. 1998). Relatively high moose abundance in the 1980s and early 1990s may have led to over browsing. Based on local knowledge, snowshoe hares appear to be a relatively recent arrival, moving into the area

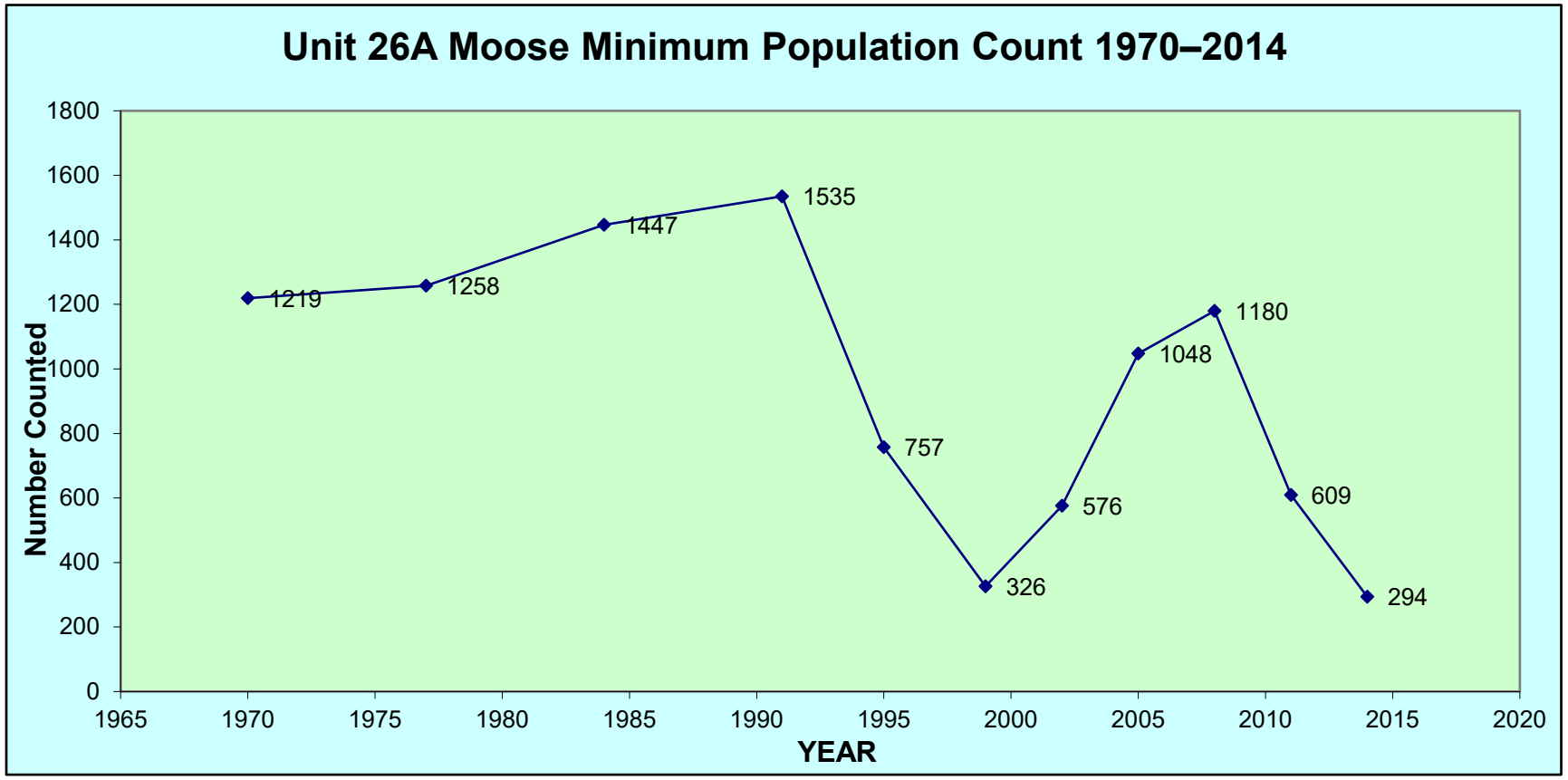

Figure 2. Moose minimum population count survey results, 1970–2014. This survey area in Alaska consists of the Colville River from the head waters east to the Itkillik River and all Arctic river drainages south to Gates of the Arctic National Park and Anaktuvuk Pass.

in the early 1990s and irrupting (Ray Smith, Umiat hunting guide, personal communication), potentially placing further stress on the browse plants. Wolf and grizzly bear numbers were at relatively high levels during the time of the decline (Carroll 1998; Fig 3)

Wolf predation is often a major factor in moose population fluctuations in Unit 26A. Wolf surveys indicated that wolf density declined from 4.1 wolves per 1,000 km^2 (386 mi^2) in 1994 to 1.6 wolves per 1,000 km^2 in 1998 and remained low through most of the period of moose population growth in the early 2000s. More recently, in 2007, during fall moose composition surveys we observed 37 wolves compared to fewer than 10 in previous years. Similar to the decline in the 1990s, in 2008 we observed 4.4 wolves per 1,000 km^2 and a rapid decline in moose during this period of higher wolf density (Gardner and Pamperin 2014; Fig. 3). Bear predation, particularly of calves, is also probably a substantial factor. From observations during surveys for other species and hunter reports, bears appear to be plentiful in the area.

Radiotracking surveys and trend area counts indicated that the population began to recover in 1996, likely due to both increased adult and calf survival rates. The mortality rate among collared adults averaged about 7% per year from 1996 through 2003. Short yearling counts indicated recruitment ranged from 17% to 26% between 1997 and 2007. This resulted in an increase in the trend area count from 149 moose in 1996 to 610 moose in 2007. Recruitment rates declined drastically to 2% in both 2009 and 2010. This recruitment failure was likely accompanied by high adult mortality, resulting in a reduction in the trend area count to 265 moose. Recruitment increased in 2011 and 2012 to 11% and 18% and the number of moose in the trend count area slowly increased to 284 (Carroll 2012).

Aircraft were used to transport moose hunters, gear, and moose parts in Unit 26A during all or part of the season from the early 1970s (Trent 1989) to 1995. Due to the population decline, more restrictive regulations were instituted in the mid-1990s, including a ban on the use of aircraft to hunt moose between 1996 and 2005. As abundance increased, regulations were liberalized, and in fall 2005 the Board of Game initiated a drawing permit hunt that allowed a limited number of hunters to use aircraft during moose hunts. Most local hunters travel by boat along the Colville River to hunt moose, with a high percentage (75% 1983–2014, 73% 2005–2014) of those hunters flying to Umiat first. The annual mean reported harvest from 1985 to 1993 was 59 moose per year, with a high of 67 in 1991. The harvest decreased to 40 during 1994 through 1995 and 14 during 1995 through 1996 as abundance declined and regulations became more restrictive. Hunters harvested from 0 to 5 moose per year between 1996 and 2001 (Carroll 2002). Hunters harvested from 5 to 13 moose during 2002 through 2010 (Carroll 2012).

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

1976 wildlife management plan (ADF&G 1976). The approach in that plan has been reviewed and modified through public comments, staff recommendations, and Board of Game actions over the years. A record of these changes can be found in the division's management report series. The plan portion of this report contains the current management plan for moose in Unit 26A.

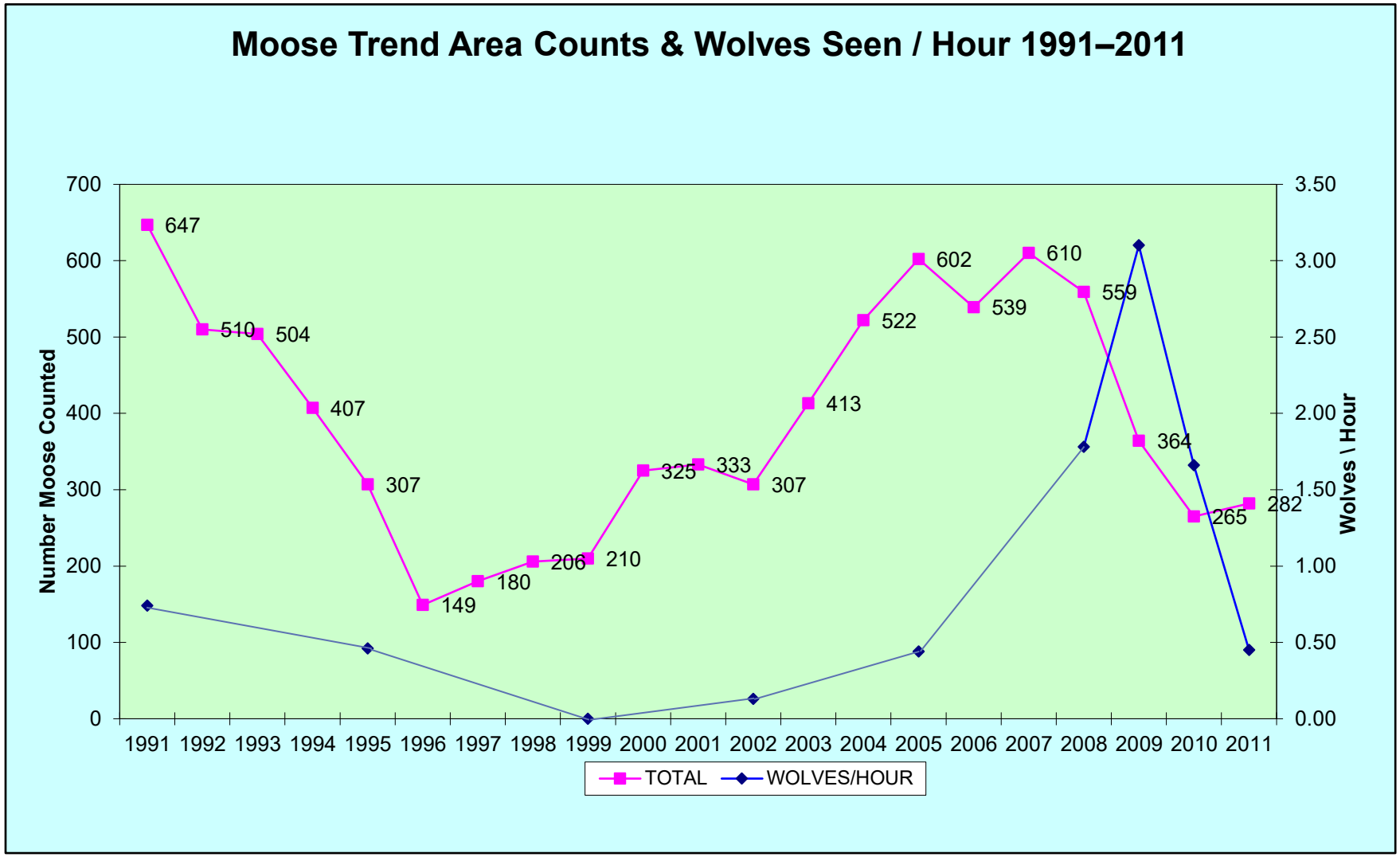

Figure 3. Moose trend count area survey results and wolves seen per hour 1991–2011. This survey area in Alaska consists of the major river corridors from the mouth of the Anaktuvuk River to Table Top Mountain, the mouth of the Chandler River to Sevrugas Bluff, and the mouth of the Colville to the mouth of the Anaktuvuk River.

GOALS

1. Allow for the recovery of the Unit 26A moose population and maintain a population of at least 1,000 moose, with a bull: cow ratio of at least 30:100.

2. Maintain a moose population capable of satisfying subsistence and general hunt needs.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

This moose population of 26A has a positive customary and traditional use finding. The amount necessary for subsistence is 15–30 moose (ANS; [5 AAC] 99.025).

Intensive Management

The 26A moose population is not recognized as an Intensive Management (IM) population.

MANAGEMENT OBJECTIVES

1. Conduct a unit wide spring census every 3–5 years and yearly spring trend area counts to assess population trend and recruitment (Goals 1 and 2).

2. Conduct a yearly fall aerial sex and age composition survey of the Colville River population (Goal 2).

3. Conduct radiotelemetry surveys to examine calf production, survival, distribution, and mortality rates each summer, fall, and spring (Goals 1 and 2).

4. Monitor predator populations and other mortality factors through counts, field observations, and public contacts (Goal 1 and 2).

5. Examine dead moose to look for causes of death, disease, mineral deficiencies, and contaminants (Goal 1).

6. Develop updated population objectives in cooperation with the public and other agencies (Goals 1 and 2).

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Determine population abundance once every 3–5 years in spring (Management Objective 1).

Data Needs

Determining population abundance is necessary to assess trends in the population over time. Without this information we would be unable to efficiently estimate harvestable surplus for subsistence and general hunt needs.

Methods

Conduct a minimum count survey of the majority of available moose habitat in Unit 26A (Fig. 1) during April as weather and snow conditions allow. This method produces a direct population count because all major riparian corridors and minor tributaries are systematically surveyed from approximately 300–500 ft. above ground level (AGL) using 1 pilot and 1 observer in either a PA18 Super Cub, Bellanca 8GCBC Scout, or in a few instances, a Cessna 182. The pilot and observer visually search the landscape on both sides and in front of the aircraft's flight path in an attempt to locate all the moose in the survey area and the observer records the GPS location and the number of moose. We are confident we are accurately counting nearly 100% of the population because the treeless landscape, windswept tundra, and deep snow in the river drainages concentrate moose in the riparian corridors. Based on previous evaluations, sightability is high in this area (Carroll 2012), compared to other areas where spring surveys are conducted (Gasaway et al. 1985, 1986). In 2011, a radiocollar-based sightability trial was conducted to confirm that sightability remains high in this area (see Carroll 2012). In 2014 a simple double-observer trial was conducted, using 2 pilot observer teams to cover the same section of river to compare locations and number of observed moose to evaluate sightability. The minimum count survey has recently been conducted on a 3-year cycle rather than a 5-year cycle because of a steep decline in the population.

Results and Discussion

During 2010 through 2015, we did not meet our management objective of maintaining a population of at least 1,000 moose. We completed a minimum count during 21–23 April 2011 and counted a total of 609 moose, including 545 adults and 64 short yearlings. This was a 48% decrease from the 2008 minimum count when we counted 1,180 moose. We completed a minimum count during 6–9 April 2014 and counted a total of 294 moose, including 290 adults and 4 short yearlings. This was a 75% decrease from the 2008 survey when 1,180 moose were counted (Fig. 2). This decline is similar to the 79% decline observed between 1991 and 1999 when 1,535 and 326 moose were counted, respectively (Carroll 2012). The population decline of the 1990s was due, in part, to high adult mortality and poor calf survival. Other factors causing the 1990s decline appeared to be a combination of malnourishment, bacterial diseases, mineral deficiency, predation, poor weather, and competition with snowshoe hares (Carroll 1998). These same factors have likely contributed to the recent moose population decline in Unit 26A.

The 2011 sightability trials result confirmed that all of the radiocollared moose had been counted. The 2014 double-observer sightability trial resulted in counts within 2% of one another (Lincoln Parrett, ADF&G wildlife biologist, personal communication). These results provide further evidence that sightability remains high and that the minimum count survey is a sound method for determining the abundance of this population. Because SCF values are 1 (2011) or close to 1 (2014), and for the sake of interannual comparison, minimum count estimates are not adjusted to account for sightability.

Recommendations for Activity 1.1.

Continue current activity schedule. Surveys conducted in the core moose habitat (i.e., trend count surveys) can provide general population trends because most of the moose are found there. Trend count surveys can be used during years when a scheduled full-scale population abundance survey effort is not feasible due to budgetary or time constraints. To evaluate a scaled back effort, we will consult with a biometrician to determine how closely the trend count data reflects the pattern of the overall population. Dispersal into areas outside of the trend count area could confound the relationship between the greater survey area and the trend count area. If the population is increasing, a specific density of moose may be reached within the trend count area whereby the rate of population increase outside of the trend count area is greater due to dispersal, ultimately creating a nonlinear pattern for the 2 survey areas.

ACTIVITY 1.2. Determine short yearling recruitment and assess population trend in the trend count area annually in spring (Management Objective 1).

Data Need

Determining short yearling recruitment and assessing the population trend within the trend count area is necessary for interannual comparisons of the core moose habitat in years a unit wide minimum count is not conducted.

Methods

Conduct an annual trend count and recruitment survey of the core moose habitat during April as weather and snow conditions allow (Fig. 1). Similar to the minimum count of the majority of the unit, this method produces a direct count of the core survey area; however, the survey area contains only the major riparian corridors of the Colville, Chandler, and Anaktuvuk Rivers (Fig. 1). See section 1.1 for observation methods.

Results and Discussion

Recruitment and trend count surveys were flown over several days in April during each of the years from 2010 through 2014. After declining to 265 moose within the trend count area in 2010, the number slowly grew to 308 moose in 2013, but then declined to 165 moose in 2014 and then to 145 moose in 2015. Estimated recruitment in 2010 was 2% and progressively increased to 18% and 16% by 2012 and 2013, respectively. Since then estimated recruitment has dropped down to 1% in 2014. (Following this decline, after the reporting period, the recruitment began to recover in 2015 up to 9% and continued to increase to 25% in 2016). The recruitment rate has reflected the decline in the moose population during this reporting period moving into a potential period of recovery (Fig. 4).

Recommendations for Activity 1.2

Continue current activity schedule.

ACTIVITY 1.3. Determine sex and age composition in the trend count area annually in fall (Management Objectives 2 and 3).

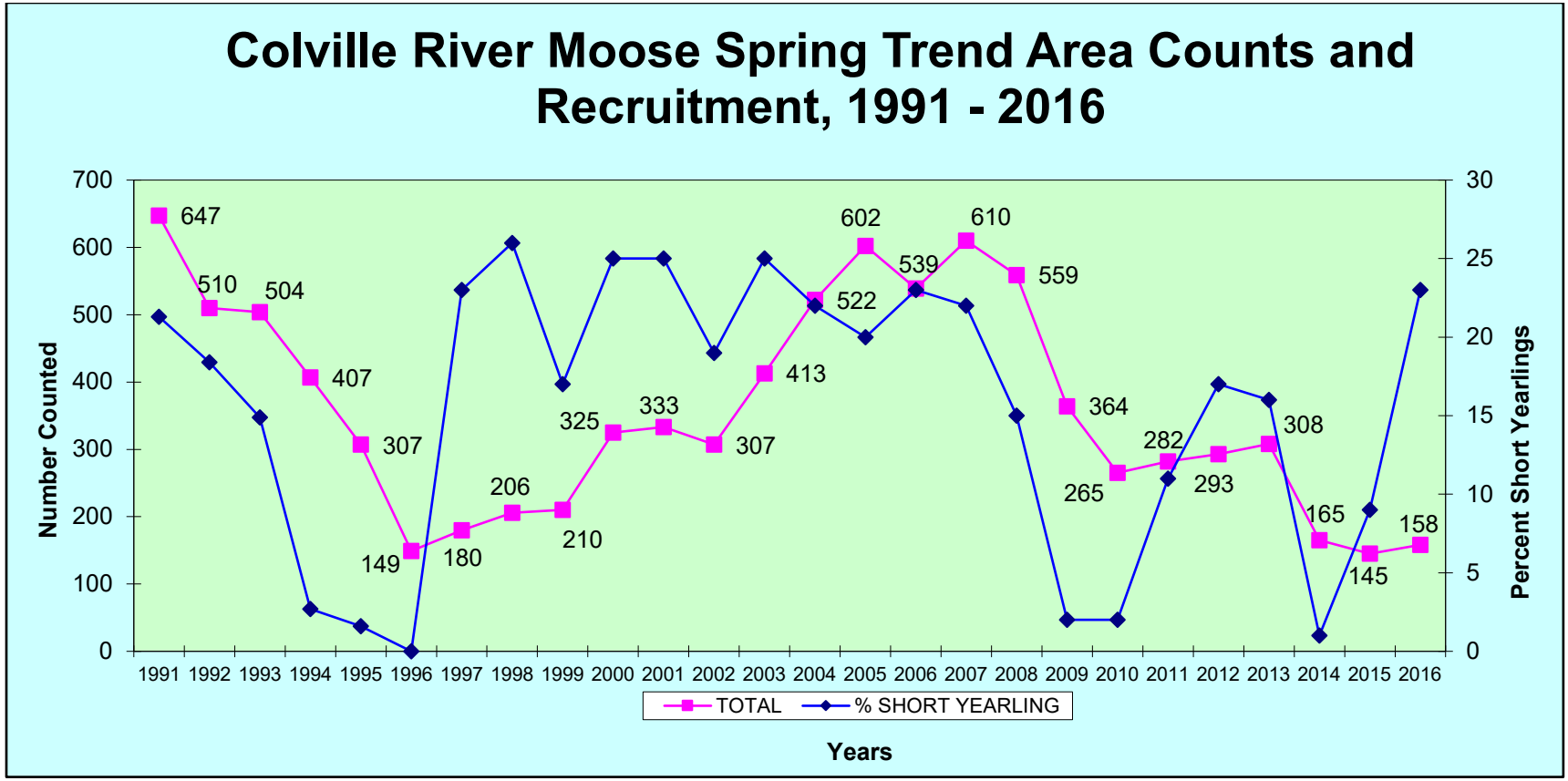

Figure 4. Unit 26A, Alaska spring trend area counts and percent short yearlings 1991–2016. The survey area consists of the major river corridors from the mouth of the Anaktuvuk River to Table Top Mountain, the mouth of the Chandler River to Sivugak Bluff, and the mouth of the Colville River to the mouth of the Anaktuvuk River.

Data Need

Sex and age composition surveys in the trend count area are necessary for determining bull: cow ratios, calf: cow ratios, and the percentage of calves. These data are important for understanding moose production and harvestable surplus.

Methods

Conduct a composition survey of the core moose habitat during November as weather and snow conditions allow (Fig. 1). Similar to the minimum direct count, this method produces a direct count of the core survey area; however, the survey area contains only the major riparian corridors of the Colville, Chandler, and Anaktuvuk Rivers (Fig. 1). The pilot and observer visually search the landscape on both sides and in front of the aircraft's flight path in an attempt to locate all the moose in the trend count survey area and the observer records the GPS location, number of adult male and female moose, and number of calves. We are confident we are accurately counting a high proportion of the moose within the trend count area because sightability is thought to be comparable to spring surveys in the same area. However, the lack of deep snow in the river drainages failed to concentrate moose in the riparian corridors. On average, the number of moose observed during fall composition surveys is approximately 56% of what is observed in spring surveys conducted 5 months later.

Results and Discussion

Fall composition and trend count surveys were flown late October and early November 2010–2014. From 2010 through 2014 estimated bull-to-cow ratios ranged from 42:100 to 97:100 and the estimated proportion of calves ranged from 7% to 18%. These survey results are consistent with the decline observed during the minimum count population surveys conducted in 2011 and 2014; however, bull:cow ratios appear to be at acceptable levels. In addition to poor weather during the fall of 2013, there was very little snow cover and many moose had not moved into the river bottoms. As a result, the 2013 survey results may be unrepresentative. However, snow conditions were normal during the fall of 2014 and those results showed the continued decline of adult moose, poor calf survival, and/or low calving rates.

Recommendations for Activity 1.3

Continue conducting this survey but at a reduced frequency. Surveys should be conducted every 2 to 3 years unless fall bull:cow and calf:cow ratios approach the threshold for the management objectives (i.e., as defined in section II. Project Review and Plan of this document).

2. Mortality–Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor mortality and harvest (Management Objectives 1–4).

Data Needs

Although this moose population is currently in a state of reduced abundance, harvest is very low and likely does not significantly influence abundance. Historically, hunters have been a mix of nonresidents (i.e., out-of-state), nonlocal residents (i.e., state residents residing outside of GMU 26A), and GMU 26A residents who are generally well-educated regarding reporting requirements. Nonresidents and nonlocal residents are more accustomed to reporting requirements because there is a widespread expectation of compliance in other regions of the

state and out of state. Local resident reporting compliance has been successful, in part, because the GMU 26A area biologist visited the community of Nuiqsut (i.e., primary harvesters of this population for approximately the past 10 years) to help community members fill out Tier II applications for a muskox hunt and distribute moose harvest tickets. This helped establish the importance of harvest reporting in the community, resulting in high levels of local hunters reporting moose harvest. Although harvest reporting is high, unreported harvest likely occurs on occasion but at an insignificant level.

Methods

To estimate harvestable surplus, we apply a 3% harvest rate to the minimum count area population abundance estimate and we currently restrict harvest to bulls only except for the area west of longitude 156° 00′ W (excluding the Colville River). Moose rarely venture west of longitude 156° 00′ W, and the very few moose harvested (i.e., 1 cow during reporting period) in this area are biologically insignificant to the population (i.e., <0.01% of adult cows). Similarly, interior moose populations that are predator limited yield a harvest of 2–5% of pre-hunt populations if harvest is restricted primarily to male moose ≥ 1 year old (Gasaway et al. 1992). The moose population in Unit 26A is limited by predators (i.e., grizzly bears and wolves) and available habitat. However, bull:100 cow ratios are usually high (>50 bulls:100 cows) in North Slope moose populations (Carroll 2012, Lenart 2006). Because this moose population exists at the periphery of moose range in Alaska and has predator and habitat limitations, we determined that applying a 3% harvest rate was reasonable. We have monitored mortality in conjunction with spring and fall trend count surveys and radiocollar tracking surveys during the 1990s and early 2000s. We monitored resident harvest through harvest tickets (RY10–RY14) and nonresident and resident harvest through drawing permit reporting for select portions of 26A (RY10–RY13).

Results and Discussion

In 2011, the moose population minimum count was 609; applying a 3% harvestable surplus rate suggests 18 moose was the harvestable surplus. There was a sharp decline during this time period and in 2014 the moose population was 294; with a 3% harvest rate 8 moose would be the harvestable surplus. Therefore, a range of 8–18 moose harvested per year throughout the reporting period would be appropriate with an average of 13 moose annually.

During the reporting period there were 47 registered hunters, of which 35 reported harvesting a moose (Table 1). The average annual success rate was 76% with hunters harvesting 13 bulls in RY10, 6 bulls in RY11, 8 bulls and 1 cow in RY12, 5 bulls in RY13, and 1 bull and 1 cow in RY14 (Table 1). Success rate for the reporting period was relatively high compared with the average annual success of 41% during the previous 20 years. More recently, fewer moose have been harvested, likely due to a combination of factors including a population decline beginning in 2008, a reduction in the number of drawing permit areas from 3 to 2 in 2009, and a reduction in the number of drawing permits issued from 25 to 10 in 2011. In 2014, the department issued an Emergency Order (EO) that, beginning 1 July 2014, closed the drawing permit hunts, all nonresident hunts, and the winter hunt. It also shortened the fall harvest ticket hunts on the Colville and Ikpikpuk river drainages to 1 August through 14 September. We anticipate these closures and shortening of seasons will contribute to an overall lower moose harvest in the coming years.

Table 1. Moose hunter residency and success, Unit 26A, Alaska regulatory years[a] 1990–2014.

	Successful hunters						Total hunters				
Regulatory year	Local resident[b]	Nonlocal resident[c]	Non-resident[d]	Unknown	Total	(%)	Local resident[b]	Non-local resident[c]	Non-resident[d]	Unknown	Total
RY90	8	19	35	2	64	65	13	40	43	3	99
RY91	9	37	29	1	76	75	13	51	37	1	102
RY92	12	16	29	3	60	57	25	35	41	4	105
RY93	7	22	29	3	61	79	11	30	32	4	77
RY94	8	7	24	1	40	74	11	14	29	0	54
RY95	4	3	6	1	14	33	13	12	15	3	43
RY96	0	0	0	0	0	0	4	2	0	0	6
RY97	2	0	0	0	2	10	20	0	0	0	20
RY98	5	0	0	0	5	25	18	2	0	0	20
RY99	2	0	0	0	2	14	12	2	0	0	14
RY00	0	0	0	0	0	0	UN[e]	UN	UN	UN	UN
RY01	4	0	0	0	4	UN	UN	UN	UN	UN	UN
RY02	8	2	0	0	10	53	11	8	0	0	19
RY03	4	1	0	0	5	56	6	3	0	0	9
RY04	5	0	0	0	5	38	9	4	0	0	13
RY05	9	2	0	0	11	79	11	3	0	0	14
RY06	8	3	0	0	11	69	10	5	1	0	16
RY07	4	7	0	1	12	57	5	15	0	1	21
RY08	4	4	3	0	11	65	4	10	3	0	17
RY09	2	5	3	0	10	67	2	10	3	0	15
RY10	4	8	1	0	13	72	6	10	2	0	18
RY11	2	3	1	0	6	100	2	3	1	0	6
RY12	4	5	0	0	9	90	4	6	0	0	10
RY13	2	2	1	0	5	50	6	3	1	0	10
RY14	1	0	0	1	2	66	2	0	0	1	3

[a] A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.
[b] Local resident hunters are residents of the North Slope Borough.
[c] Nonlocal resident hunters are residents of the State of Alaska, but not residing in the North Slope Borough.
[c] Nonresident hunters.
[e] Unknown number of total hunters. Moose population was low and the hunt was restricted.

Season and Bag Limit

Regulatory year RY10 through RY13	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 26A: that portion west of 156° 00′ W. longitude and excluding the Colville River drainage.		
1 moose; a person may not take a calf, or a cow accompanied by a calf	1 Jul–14 Sep (harvest ticket hunt)	No open season
Unit 26A: that portion in the Colville River drainage upstream from and including the Anaktuvuk River drainage.		
1 bull	1 Aug–14 Sep (harvest ticket hunt)	No open season
Or 1 bull by drawing permit (excludes Anaktuvuk Pass Controlled Use Area)	1 Sep–14 Sep (Permit Hunt DM980–981)	1 Sep–14 Sep (Permit Hunt DM980–981)
Or 1 moose; a person may not take a calf or a cow accompanied by a calf	15 Feb–15 Apr (harvest ticket hunt)	No open season
Remainder of Unit 26A.	1 Aug–14 Sep (harvest ticket hunt)	No open season

Moose hunters may not use aircraft to transport hunters, hunting equipment, or parts of moose except for permit holders under DM980–981. Aircraft cannot be used to hunt moose in the Anaktuvuk Pass Controlled Use Area.

Regulatory year RY14 and RY15	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 26A: that portion west of 156° 00′ W. longitude and excluding the Colville River drainage.		
1 moose; a person may not take a calf, or a cow accompanied by a calf	1 Jul–14 Sep (harvest ticket hunt)	No open season
Unit 26A: that portion in the Colville River drainage upstream from and including the Anaktuvuk River drainage.		
1 bull	1 Aug–14 Sep (harvest ticket hunt)	No open season
Unit 26A: remainder		
1 bull	1 Aug–14 Sep (harvest ticket hunt)	No open season

Moose hunters may not use aircraft to transport hunters, hunting equipment, or parts of moose in the Anaktuvuk Pass Controlled Use Area except between publicly owned airports.

Harvest by Hunters–Trappers

Permit Hunts

RY10. Twelve DM980 permits were issued, 4 people hunted, and 3 bull moose were harvested. Thirteen DM981 permits were issued, 7 people hunted, and 6 bull moose were harvested.

RY11. Five DM980 permits were issued but no people hunted. Five DM981 permits were issued, 4 people hunted, and 4 bull moose were harvested.

RY12. Five DM980 permits were issued, 3 people hunted, and 2 bull moose were harvested and for DM981 5 permits were issued, 3 people hunted, and 3 bull moose were harvested.

RY13. Five DM980 permits were issued but no people hunted. Five DM981 5 permits were issued, 4 people hunted, and 3 bull moose were harvested.

RY14. No permits were issued.

Hunter Residency and Success

General Unit 26A moose harvest is presented in Table 1. During the reporting period 2 cows and 33 bulls were harvested. Antler spread measurements are available for only 17 of the 33 bulls. Of those, 43% had average antler widths over 50 inches and 38% had antler widths less than 50 inches with the largest spread being 69.5 inches and the smallest 25 inches. The remaining 20% had unknown antler spreads. ADF&G subsistence household surveys were conducted in Nuiqsut and Utqiaġvik (Barrow) in 2014 and suggest 6 moose were harvested by residents of Nuiqsut and 12 were harvested by Utqiaġvik residents. There was also a subsistence household survey conducted in Point Lay in 2012 and no moose were reported harvested by that survey. Detailed analysis of specific hunt type (general season, registration, and drawing) harvest history, transportation methods used, and seasonality of harvest is not presented in this report but is available to the public for hunt planning on the ADF&G website: https://secure.wildlife.alaska.gov/index.cfm?adfg=harvest.main.

Alaska Board of Game Actions and Emergency Orders

In January 2014 the Board of Game lengthened the season for the harvest ticket hunt in the Colville River drainage upstream from and including the Anaktuvuk River drainage and in the Remainder (the rest of the Colville River Drainage and Ikpikpuk River drainage) from 1 August through 14 September to 1 August through September 30. They also changed the wording for the drawing permit hunts so that 20% of permits would go to nonresident hunters rather than up to 20% going to nonresidents. The department issued an EO that, beginning 1 July 2014, closed the drawing permit hunts, all nonresident hunts, and the winter hunt. It also shortened the fall harvest ticket hunts on the Colville and Ikpikpuk River drainages to 1 August through 14 September.

Recommendations for Activity 2.1

Continue current activity schedule.

3. Habitat Assessment–Enhancement

ACTIVITY 3.1. Evaluate quantity and quality of moose browse in portions of Unit 26A (Management Objectives 1, 3, and 4).

Data Needs

Determining the quantity and quality of moose browse are important factors for understanding the moose health and how competition with snowshoe hares for browse may affect moose. Additionally, in times of a fluctuating population, quantifying moose browse metrics may provide context for other factors contributing to mortality or growth (e.g., predator populations).

Methods

There were no browse studies conducted during the reporting period. A survey was conducted to determine the quantity of browse available to moose during winter in the riparian area in April 2008. We used the same basic methods developed by Paragi et al. (2015); however, we did slightly modify the methods because we do not use the GeoSpatial Population Estimator (GSPE) method to quantify this moose population. In a collaborative effort, another department

employee collected browse samples in Unit 26A and is assessing their quality. Samples were collected from areas where moose were browsing in late winter, at green-up, at peak growth, and at senescence of the plants. These samples are being analyzed for leaf nitrogen, digestible proteins, and tannin-protein precipitation capacity. For more detailed methods see Paragi et al. (2015).

Results and Discussion

Results of the study indicated a 10.0% ± 2.1% (95% CL) browse removal rate, which is similar to other areas in the state with moderate browsing and twinning rates (Boertje et al. 2007). It would appear that the quantity of browse was adequate and is not the reason for starvation in some of the moose. Analysis of browse quality is still in progress but preliminary results indicate that the digestible protein quality of *Salix alaxensis* gathered during the winters of 2009 and 2010 along the Colville River was very low compared to other areas of the state (Bill Collins, ADF&G wildlife physiologist, personal communication, 2014). One factor that could affect browse plants is that there are a large number of snowshoe hares in the area, which also consume willows. Hares often eat bark as well as branch ends from the willows, which may stress the plants causing them to produce more tannins (Bryant et al. 1985) or other substances that may make them difficult to digest and less nourishing for moose (Robbins et al. 1987).

Malnourishment appeared to be a factor in the most recent decline during 2008–2010. In 2008, we captured 22 short yearling females and most of them were small and appeared to be malnourished. The weights of the short yearlings ranged 252–400 pounds and averaged 322 pounds. The short yearlings were the lightest recorded in the state when compared with other areas (Boertje et al. 2007).

Recommendations for Activity 3.1.

We recommend conducting another moose browse removal study, modeled after the Paragi et al. 2015 study, when the moose population reaches the abundance objective. Additionally, personal communications with an Umiat based hunting guide suggest that high snowshoe hare abundance and browsing competition have previously been referenced in an attempt to help explain moose population fluctuations. In order to quantify the ecological effects of moose–hare–browse interactions within the Colville Survey Area we recommend conducting a broader ecological study focused on the relationship between high snowshoe hare abundance and browse competition with moose.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

There were no nonregulatory management needs during the reporting period.

Data Recording and Archiving

- All digitized survey data are stored on the Utqiaġvik Area Biologist's computer and on an external, backup hard drive.

- Field data sheets are stored in filing cabinets in the Utqiaġvik Area Biologist office.

Agreements

"Alaska Department of Fish & Game and University of Alaska Fairbanks data sharing agreement for moose locations" (Appendix A).

Permitting

There are currently no permitting requirements.

Conclusions and Management Recommendations

It is recommended that nonresident hunting, cow harvest, winter hunts, and drawing permits be reserved until this population recovers to the management objective of 600–800 moose. The 22-year average for the moose population is 641 (1995–2017). It seems more appropriate for the management objective to be somewhere between 600 and 800 as opposed to the previous objective of 1,000 moose which seems well out of the recent abundance range for this population. The moose population numbers currently seem to be rebounding after a sharp decline and wolf numbers seem to be relatively low. It is yet to be seen if these trends will continue. Because this population has a positive customary and traditional use finding, hunting for state residents should remain open under the current regulations to allow North Slope residents, the harvest of the amount necessary for subsistence, 15–30 moose (ANS; [5 AAC] 99.025). Additionally, the Unit 26A Controlled Use Area (CUA) should remain closed to the use of aircraft for moose hunting except between publicly owned airports and under the terms of drawing permits. The CUA largely eliminates state residents from fly-in hunting this population and we believe this will further aid in the recovery of moose in Unit 26A. Upon recovery of this population above management objectives, additional hunting opportunities (i.e., drawing permits, nonresident hunts, etc.) will be reevaluated. A continuing growth trend and population increase to 600-800 moose would need to occur for these conditions could be made.

In addition to the above regulatory actions there are a suite of research-based actions that should be considered. The first of these is to continue to research the relationship between snowshoe hares and moose focusing on inter specific competition for shared browse and the consequences of plant toxicity on population dynamics. The second is to monitor the predator abundance dynamics by continuing to conduct wolf surveys on the Colville and make wolf observations during muskox and caribou surveys. Also, it is prudent to seek better methods for tracking brown bear abundance through time to explore any potential impacts brown bear abundance may have on the Colville moose population.

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II. Project Review and RY15–RY19 Plan

Planned continuation or changes to RY10–RY14 management direction and activities during the next period of RY15–RY19 are detailed below.

Review of Management Direction

MANAGEMENT DIRECTION

ADF&G moose management in Unit 26A will further incorporate some or all of the following research efforts, as time, staffing, and funding allow, in an effort to better inform management decisions and provide context to population fluctuations:

- Understanding summer mortality in terms of composition
- Browse interactions between snowshoe hare and moose
- Short yearling and calf weights in relation to habitat quality
- Measure moose production directly via radiocollared cows

GOALS

Goals remain the same as for RY10–RY14.

CODIFIED OBJECTIVES

Codified objectives are expected to remain the same for RY15–RY19

Amount Reasonably Necessary for Subsistence Uses

The ANS is expected to remain the same for RY15–RY19.

Intensive Management

At this time, it is not anticipated that this population will be identified as a population for intensive management because intensive management objectives are only established for populations when the harvest exceeds 100 moose per year, which is not the case for this herd.

MANAGEMENT OBJECTIVES

We recommend changing the objectives as follows:

1. Manage for a population of 600–800 moose (Goals 1–3).
2. Manage for a fall bull:cow ratio of ≥ 30:100 (Goals 1 and 2).
3. Manage for a fall calf:cow ratio of ≥ 30:100 (Goals 1 and 2).

4. Manage for ≥ 20% short yearlings in spring (Goal 1 and 2).

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Determine population abundance once every 3–5 years in spring (Management Objective 1).

Data Needs

Determining population abundance is necessary to assess trends in the population over time. Without this information we would be unable to efficiently manage this population for subsistence and general hunt needs.

Methods

Methods used during RY10–RY14 will be used RY15–RY20 (see report section, 1.1 Methods). . A sight ability survey will be conducted periodically, preferably about every 5 years, to confirm the presumed accuracy of moose counts, particularly in the event that a change in survey pilots occurs. We have been fortunate enough to contract the same highly skilled survey pilots for many years.

ACTIVITY 1.2. Determine short yearling recruitment and assess population trend in the trend count area annually in spring (Management Objective 1).

Data Need – Determining short yearling recruitment and assessing the population trend within the trend count area is necessary for interannual comparisons of the core moose habitat in years a minimum count is not conducted.

Methods

See report section 1.2 *Methods*).

ACTIVITY 1.3. Determine sex and age composition in the trend count area every 2 years in the fall (Management Objectives 2 and 3). We suggested reducing the frequency of this survey from the current annual schedule because there is a significant amount of data that indicates the composition of this herd does not change drastically even in times of significant population decline. However, if a spring trend count area population decline is observed for 3 years or more a sex and age composition survey will be conducted, if possible, during the fall following the onset of observed decline.

Data Need – Sex and age composition surveys in the trend count area are necessary for determining bull:cow ratios, calf:cow ratios, and the percentage of calves. These data in conjunction with over summer mortality rates are important for understanding moose production.

Methods

See report section 1.3 *Methods.*

2. Mortality–Harvest Monitoring

ACTIVITY 2.1. Monitor mortality and harvest (Management Objectives 1–4).

Data Needs

Although harvest reporting is high, unreported harvest likely occurs and it is unknown to what degree. Additionally, harvestable surplus should be estimated for this population after each unit wide minimum count survey every 3–5 years. When this population recovers, harvestable surplus will be an integral component necessary for managing the potential increase in hunting opportunity through nonresident and resident permits.

Methods

See report section 2.1 *Methods.*

3. Habitat Assessment–Enhancement

ACTIVITY 3.1. Evaluate the quantity and quality of moose browse in portions of Unit 26A (Management Objectives 1, 3, and 4).

Data Needs

Determining the quantity and quality of moose browse are important factors for understanding the moose health and how competition with snowshoe hares may affect moose. Additionally, in times of a fluctuating population, quantifying moose browse quality and metrics may provide context for other factors contributing to mortality or growth (e.g., predator populations).

Methods

See report section 3.1. *Methods*.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- All moose survey data will be digitized and stored on a computer hard drive in the Utqiaġvik Area Biologist's office.
- All digitized data will be backed up on an external hard drive stored in the Utqiaġvik Area Biologist's home. Additionally, digitized data will be emailed to the Nome office to be stored on an internal Division of Wildlife Conservation database housed on a server (http://winfonet.alaska.gov/index.cfm).
- Field data sheets will be stored in file folders located in the Barrow Area Biologist's office and digitized copies will be stored on the Barrow Area Biologist's office computer and emailed to the Nome office to be stored on an internal database housed on a server (http://winfonet.alaska.gov/index.cfm).
- Efforts will be made to scan historical (1970–2014) survey notes and data sheets to provide for more secure archiving of data.

Agreements

"Alaska Department of Fish & Game and University of Alaska Fairbanks data sharing agreement for moose locations" (Appendix A).

Permitting

It is not anticipated that any permits will be needed to perform moose management work in Unit 26A RY15–RY20.

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Appendix

AGREEMENT FOR USE OF MOOSE LOCATION DATA

BETWEEN THE

ALASKA DEPARTMENT OF FISH & GAME

AND

UNIVERSITY OF ALASKA FAIRBANKS

Data sharing agreement: Moose location data for the Colville River Drainage (CRD) in Game Management Unit 26A, 1970-2015.

Agreement period: 1 Jan 2015 – Dec 31 2017

This document serves as a Letter of Agreement for data sharing between the Alaska Dept. of Fish & Game (ADFG; Mr. Geoff Carroll and Mr. Steve Machida) and the University of Alaska Fairbanks (UAF; Mr Jiake Zhou, Mr. Gary Kofinas, Ms. Laura Prugh (co-advisor), and Mr. Ken Tape (committee member))

Background

The ADFG has conducted moose surveys along the CRD since 1970 to determine abundance, composition, and distribution. During these surveys moose locations have been recorded as a spot on a map 1970-1996 or recorded as a latitude and longitude, using a handheld GPS after 1996. Geoff Carroll is the Unit 26A area biologist and has collected the moose data since 1989 and Steve Machida is the Regional Supervisor for Region 5, Division of Wildlife Conservation.

Mr. Jiake Zhou and his advisor, Mr. Gary Kofinas would like to use the ADFG moose abundance and location data as part of his masters graduate thesis project. In his thesis project, Mr. Zhou plans to identify relationships between spatial distribution and abundance of moose and shrubs on the North Slope, assess future distribution of potential moose habitat on the North Slope, define and describe Colville moose population dynamics (controlling factors for moose population) under climate change, and describe habitat selection by moose on the North Slope. Mr. Zhou wants to study how moose are responding to and interact with changes in vegetation, and how the interaction shapes the ecological processes under the changing climate and its implication to local community.

ADFG will provide Mr. Zhou paper data sheets that contain raw moose location data as determined by GPS and map locations during moose surveys. Mr. Zhou will use our data sheets to digitize the locations and use these locations in his analysis of moose utilization of Colville River habitat.

ADFG has made a major investment of time and funds in collecting moose population and location data. ADFG recognizes that it will be beneficial for Mr. Zhou and ADFG to digitize our hand written data sheets and analyze moose locations in relation to changes in habitat.

Moose data collection is an ongoing process and Mr. Zhou will use recent and past location data.

State of Alaska Fish and Game statutory code (16.05.815) instructs the ADFG to "keep confidential…specific locations of…wildlife species", unless requesting parties, "have been authorized by ADFG to perform specific activities and agrees to use the records and information only for purposes as provided under a contract or agreement with ADFG".

Recognizing Alaska statutes with respect to wildlife location data, this memorandum describes the conditions under which ADFG satisfies statutory requirements while also enabling Mr. Zhou to analyze and publish results from those data.

Agreement Specifications

Mr. Geoff Carroll and Mr. Steve Machida (ADFG) shall:

1. Collect and archive location data for moose in Unit 26A 1970-2015.
2. Approve the use by Mr. Zhou of map and GPS locations for moose on the Colville River drainage 1970 – 2015.
3. Convey copies of moose survey data sheets to Mr. Zhou.
4. Provide assistance in interpreting data.
5. Review and comment on any manuscripts concerning habitat selection by moose from this study.

Mr. Jiake Zhou (UAF) agrees to:

1. Digitize information from data sheets and make this available to ADFG.
2. Use location information for moose on the CRD to define correlations between spatial distribution and abundance of moose and shrubs.
3. Provide documentation and interpretation of any findings to ADFG before publishing them.
4. Acknowledge contributions of ADFG in all publications that include CRD moose locations.
5. Share moose location data with other members of his graduate committee and researchers collaborating with him on dissertation research. The data will not be available to others working independently without first being granted permission by ADFG.

These data and any data resulting from the analysis of CRD moose locations can be used for publication. Examples of 'publications' include but are not limited to peer-reviewed journals, popular articles in books or magazines, or anything which is covered by a copyright. It is acknowledged that Department authorship on any publications that use these data is not implied or expected, however participation in any manuscripts may warrant co-authorship.

Department authorship implies that an internal review has been conducted, and submission for publication has been approved.

Nothing in this provision shall prohibit ADFG research and management staff from analyzing and publishing results from CRD moose data.

This document may be amended at any time depending on the circumstances and agreement among the participants.

If Mr. Zhou withdraws from UAF, this data sharing agreement becomes null and void.

STATE OF ALASKA

DEPARTMENT OF FISH & GAME

DIVISION OF WILDLIFE CONSERVATION

_____SOF_____ Date _____

Geoff Carroll

Area Wildlife Biologist, Game Management Unit 26A

___SOF_____ Date _____

Steve Machida, Regional Supervisor. Region 5

UNIVERSITY OF ALASKA FAIRBANKS

FAIRBANKS, ALASKA

By:_SOF_____ Date _____

Jiake Zhou, Graduate Student

By:SOF_____ Date _____

Gary Kofinas, Advisor


ALASKA
DEPARTMENT OF FISH AND GAME