

# **Moose Management Report and Plan, Game Management Units 26B and 26C:**

Report Period 1 July 2010–30 June 2015, and  
Plan Period 1 July 2015–30 June 2020

**Elizabeth A. Lenart**





## Moose Management Report and Plan, Game Management Units 26B and 26C:

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Plan Period 1 July 2015–30 June 2020

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This species management report and plan was reviewed and approved for publication by Doreen I. Parker McNeill, Management Coordinator for the Division of Wildlife Conservation, Fairbanks.

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## Purpose of this Report

This report provides a record of survey and inventory management activities for moose (*Alces alces*) in Units 26B and 26C for the previous 5 regulatory years (RY; RY10–RY14) and plans for survey and inventory management activities in the 5 years following the end of that period (RY15–RY19). A regulatory year 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 (ADF&G) 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 reports of survey and inventory activities that were previously produced every 2 years and supersedes the 1976 draft Alaska wildlife management plans (ADF&G 1976).

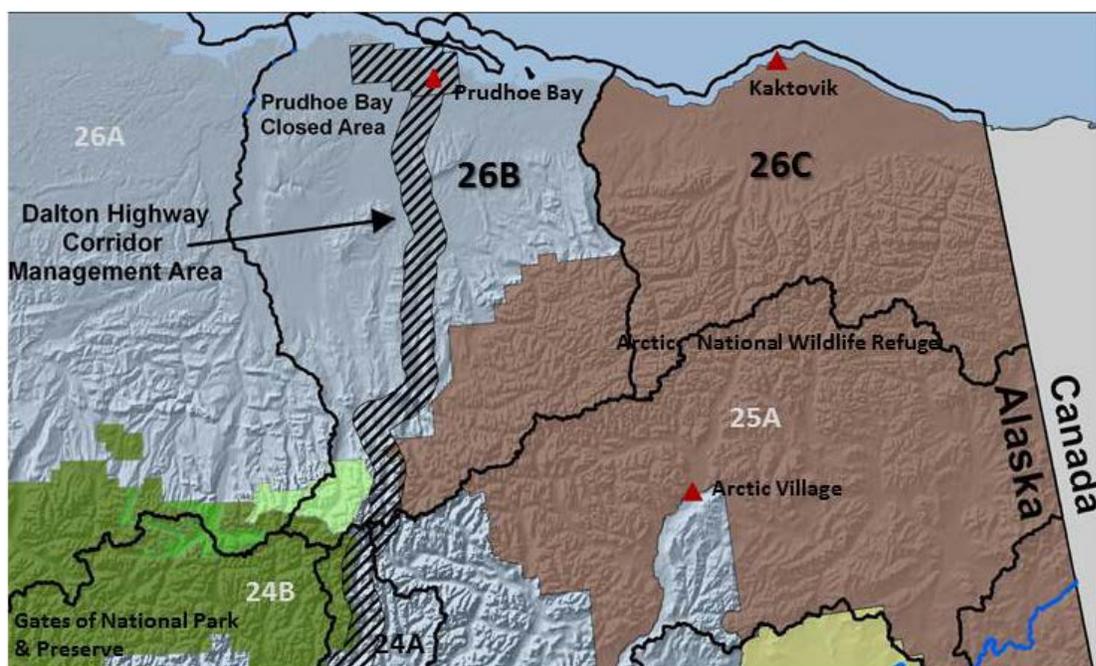
## I. RY10–RY14 MANAGEMENT REPORT

### Management Area

Units 26B and 26C are on the eastern North Slope of Alaska and encompass the Itkillik River drainage east to the Canadian border and north of the Brooks Range (Figure 1). The area is essentially divided into 2 ecoregions: Arctic coastal plain and Brooks Range foothills and mountains. The coastal plain is poorly drained, marshy, and essentially a treeless tundra consisting of permafrost-related surface features, such as pingos, ice-wedge polygons, numerous freshwater shallow lakes, peat ridges, and frost boils. Dominant vegetation includes perennial forbs, grasses, sedges, dwarf shrubs, mosses, and lichens found in communities such as wet sedge tundra, tussock tundra, and sedge *Dryas* tundra. Low and taller willow shrub lands persist along drainages from the coastal plain to the foothills and include *Salix alaxensis*, *S. arbusculoides*, *S. arctic*, *S. glauca*, *S. pulchra*, *S. reticulata*, and *S. rotundifolia*.

The Brooks Range foothills consist of rolling hills and plateaus while the mountains are steep and rugged with broad exposed ridges. Dominant vegetation classes include expanses of mixed shrub-sedge tussock tundra, willow shrub lands along rivers in the foothills, and *Dryas* tundra on ridges. Limited moose habitat begins approximately 30 miles south of the coast, and habitat gradually expands when approaching the foothills. East of the Dalton Highway, moose inhabit the portion of the coastal plain as far north as the willow shrub communities that persist in some intensity along the riparian zones (approx. 70°N) and in the headwaters of the Itkillik River into the mountains. West of the Dalton Highway, moose are less likely to be found on the coastal plain and inhabit the foothills into the headwaters of several drainages into the mountains where habitat continues.

Climate is dry and polar throughout the year in both ecoregions where moose are found. The area moose inhabit is characterized by short, cool, moist summers and long, cold, dry winters (Coady 1980).



**Figure 1. Game Management Units 26B and 26C, Northeast Alaska.**

In winter moose concentrate along the riparian zones (consisting mainly of willow shrub communities) where the preferred browse species (*S. alaxensis*) grows (Mould 1977). In summer, the preferred habitat is also along this riparian zone, but moose also disperse into the surrounding tundra, particularly during calving and insect season where *S. arbusculoides* is important summer browse (Mould 1977).

## **Summary of Status, Trend, Management Activities, and History of Moose in Unit 26B**

Moose colonized tundra regions in Arctic Alaska in the late 1800s following riparian shrub habitat expansion (Tape et al. 2016) and growth of moose populations south of the region (Coady 1980). During the 1940s to 1950s populations expanded and became more common, and in some places, even abundant along the limited riparian habitat of major drainages (LeResche et al. 1973). The reduction in wolf (*Canis lupus*) numbers by federal control programs during that time period and the movement of Nunamiut people from inland/foothills to coastal locations (thereby reducing hunting) were likely important in allowing moose populations to increase and become established in most of the riparian shrub habitat on the North Slope (Coady 1980). This area represents the northern limit of moose range in North America, and habitat limits the potential size of moose populations.

The total number of moose in Units 26B and 26C probably peaked during the late 1980s at approximately 1,400 moose (Martin and Garner 1984; Mauer and Akaran 1994; Lenart 2004, 2008). By the early 1990s numbers of moose declined by at least 50% and remained at lower numbers throughout the 1990s (Mauer 1997; Lenart 2008). The decline in moose numbers appeared to be widespread on the North Slope, including Unit 26A (Carroll 1998; Lenart 2006).

Although surveys were not conducted in Unit 26C during the 1990s, we suspected moose numbers were also very low based on anecdotal observations from residents, biologists, and hunters.

During the 2000s the moose population slowly increased in Unit 26B, peaked at 606 moose in the mid-2000s, and stabilized at approximately 500 observable moose by the end of the decade (Table 1; Lenart 2014). The population declined in RY09 by approximately 100 moose (Lenart 2014). Moose numbers and recruitment declined in adjacent Unit 26A beginning in RY08 (Carroll 2012).

Surveys conducted by Arctic National Wildlife Refuge (ANWR) staff in central Unit 26C on the coastal plain during 2000–2010 indicated moose numbers appeared to be stable at 50–60 observable moose. In the Brooks Range in eastern Unit 26C, approximately 200 moose were observed in surveys conducted in the early 2000s (Lenart 2014).

The low numbers of moose observed during the early 1990s resulted in closing the moose hunting seasons in Units 26B and 26C beginning in fall 1996. Prior to the 1996 hunting season closure the reported moose harvest in Unit 26B was relatively stable during the early 1990s, ranging 24–37 moose, except in RY92 when harvest was 45 (Lenart 2006). In fall 2006, 2 moose hunting seasons were reopened in Unit 26B (excluding the Canning River drainage) to resident hunters only by drawing permit for a fall season and by harvest ticket for a late winter season. Unit 26C remained closed to moose hunting.

Kaktovik and Nuiqsut are the only communities within or near the area, and residents took 2–6 moose annually prior to the season closure in 1996. Local harvest was small because moose were scarce near Kaktovik and because most hunting by Nuiqsut residents occurred in the Colville River drainage in adjacent Unit 26A.

## **Management Direction**

### **EXISTING WILDLIFE MANAGEMENT PLANS**

A wildlife management plan for Units 26B and 26C exists in the 2014 moose management survey and inventory report for Units 26B and 26C (Lenart 2014).

### **GOALS**

- G1. Maintain viable populations of moose in their historic range throughout the region.
- G2. Provide a sustained opportunity to harvest moose.
- G3. Provide opportunity for viewing and photographing moose.

**Table 1. Total moose observed in Unit 26B during spring aerial moose surveys, Northeast Alaska, regulatory years<sup>a</sup> 2003–2015.**

Regulatory year <sup>b</sup>	Adults	Short yearlings <sup>c</sup> (%)	Moose observed	Search time (hr:min)
2003 <sup>d</sup>	334	44 (12)	378	13:03
2004 <sup>d</sup>	403	87 (18)	490	13:55
2005 <sup>e</sup>	505	101 (17)	606	18:40
2006 <sup>f</sup>	477	92 (16)	569	16:19
2007 <sup>g</sup>	491	79 (14)	570	25:01
2008 <sup>g</sup>	517	47 (8)	564	18:58
2009 <sup>g</sup>	421	33 (7)	454	23:54
2010 <sup>h</sup>	414	35 (8)	449	20:51
2011 <sup>i</sup>	403	61 (13)	464	23:55
2012 <sup>j</sup>	360	36 (9)	396	20:52
2013 <sup>j</sup>	109	0 (0)	109	20:04
2014 <sup>i</sup>	100	4 (4)	104	16:56
2015 <sup>j</sup>	110	28 (20)	138	21:06

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

<sup>b</sup> The following drainages were surveyed in all years: Accomplishment and Section creeks, Lupine River, Saviukviayak River, Flood Creek, Ivishak River, Gilead Creek, Echooka River, Juniper-Fin Creek, Kavik River, Eagle and Cache creeks and the mainstem of the Canning River between Eagle and Cache Creeks, the Sagavanirktok River between Happy Valley and Sagwon, Toolik and Kuparuk rivers beginning at approximately 68°42'N latitude to the White Hills and the extent of moose habitat, and the Itkillik river drainage. Additional drainages were surveyed in some years and those drainages are noted by year.

<sup>c</sup> Short yearlings are 10-month-old calves.

<sup>d</sup> Only the lower Itkillik River (below Itkillik Lake) was surveyed in RY03 and RY04.

<sup>e</sup> Upper Sagavanirktok and upper Canning rivers surveyed.

<sup>f</sup> Oksrukuyik Creek and a small portion of upper Sagavanirktok surveyed.

<sup>g</sup> Upper Sagavanirktok River, and Oksrukuyik Creek surveyed. Search time was higher in RY07 because snow cover was low.

<sup>h</sup> Upper Sagavanirktok River, Oksrukuyik Creek, and Ribdon River surveyed.

<sup>i</sup> Upper Sagavanirktok River, Oksrukuyik Creek, Ribdon and upper Canning rivers surveyed.

<sup>j</sup> Upper Sagavanirktok River, Oksrukuyik Creek, Ribdon River, upper Canning and Shaviovik rivers surveyed.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

- C1. Unit 26 has a customary and traditional use finding for moose with amounts reasonably necessary for opportunity for subsistence uses (ANS) of 21–48 moose, including 15–30 moose in Unit 26A.

### Intensive Management

None.

## **MANAGEMENT OBJECTIVES**

- M1. In Unit 26B maintain a population of  $\geq 300$  moose with a 3-year mean proportion of  $\geq 15\%$  short yearlings in the population.
- M2. In Unit 26C maintain a population of  $\geq 150$  moose with a 3-year mean proportion of  $\geq 15\%$  short yearlings in the population.
- M3. Maintain a bull:cow ratio of  $\geq 35:100$  when hunting seasons are open.

## **MANAGEMENT ACTIVITIES**

### 1. Population Status and Trend

ACTIVITY 1.1. In Unit 26B conduct annual aerial surveys during April. (G1, C1, M1, M3)

#### *Data Needs*

We need to determine population size and proportion of short yearlings (10-month-old calves) for moose in Unit 26B during April surveys. This activity is conducted annually and is associated with the management objective to maintain a population  $\geq 300$  moose with a 3-year mean proportion of  $\geq 15\%$  short yearlings in the population. This will help to assess whether goal G1, to maintain viable populations of moose in their historic range throughout the region is accomplished. Harvestable surplus is estimated from the population estimate and is used to determine if the ANS objective (C1) is met. In addition, the number of drawing permits to be issued for the fall hunt is determined from the harvestable surplus (G2).

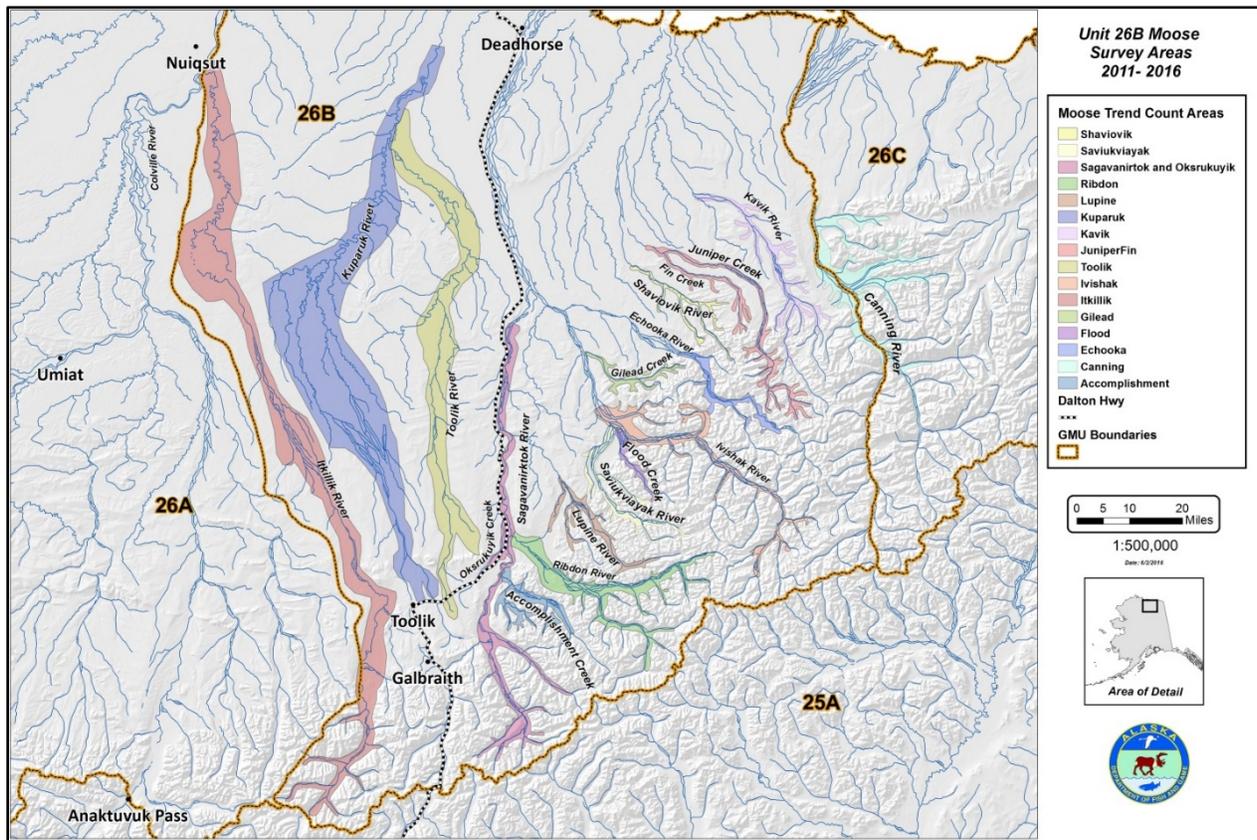
#### *Methods*

A total count in riparian count areas, rather than random sampling, is the most effective population survey method on the North Slope due to the limited and relatively open nature of winter moose habitat with its sparse, low vegetation. Moose are limited almost entirely to riparian shrub habitat during late winter and spring.

We used a Piper PA-18 flown at 70–90 mph and a Cessna 182 flown at 85–100 mph at altitudes of 300–700 feet above ground level (AGL). Moose were surveyed in established riparian count

areas and to the extent of moose habitat if habitat was outside the riparian count area (e.g., shrub habitat extending further north). We classified moose as “adults” and “short yearlings” (10-month-old calves). Moose were classified as short yearlings based on smaller body size and shorter noses compared to adults. A total count of moose observed in the riparian count areas was used as the population estimate.

The riparian count areas include riparian shrub habitat along the major drainages. The following drainages were surveyed east of the Dalton Highway: Sagavanirktok River upstream from Happy Valley to headwaters of the Sagavanirktok River, Accomplishment and Section creeks, Ribdon River, Lupine River, Saviukviayak River, Flood Creek, Ivishak River, Gilead Creek, Echooka River, Shaviovik River, Juniper–Fin Creek, Kavik River, and Eagle and Cache creeks, and the Canning River upstream from Eagle Creek to approximately 68°42'N latitude (Figure 2). Drainages west of the Dalton Highway included: Oksrukuyik Creek, Toolik and Kuparuk rivers beginning at approximately 68°42'N latitude to the White Hills and the extent of moose habitat, and the Itkillik river drainage (Figure 2).



**Figure 2. Unit 26B moose survey drainages, Northeast Alaska, 2011–2016.**

## *Results and Discussion*

During RY10 and RY11, 449 and 464 moose were observed during April surveys, and the 3-year mean proportion of short yearlings observed was <15% during RY08–RY11 (Table 1). In RY12 only 396 moose (9% short yearlings) were observed indicating that recruitment likely was not exceeding or keeping up with mortality. By RY13 the number of moose declined to 109 moose, and no short yearlings were observed during April surveys. The severe decline from 2013 to 2014 was likely a result of poor nutrition related to a very late spring in 2013, resulting in high adult mortality and little or no recruitment. In RY14, 104 moose were observed, including 5 short yearlings. In RY15, 138 moose were observed including 28 short yearlings.

### *Recommendations for Activity 1.1*

Continue annual aerial surveys of riparian zones in Unit 26B to obtain a minimum count.

ACTIVITY 1.2. Conduct aerial surveys every 2–3 years in central Unit 26C during April and occasional aerial surveys in eastern Unit 26C in early winter. (G1, C1, M2, M3)

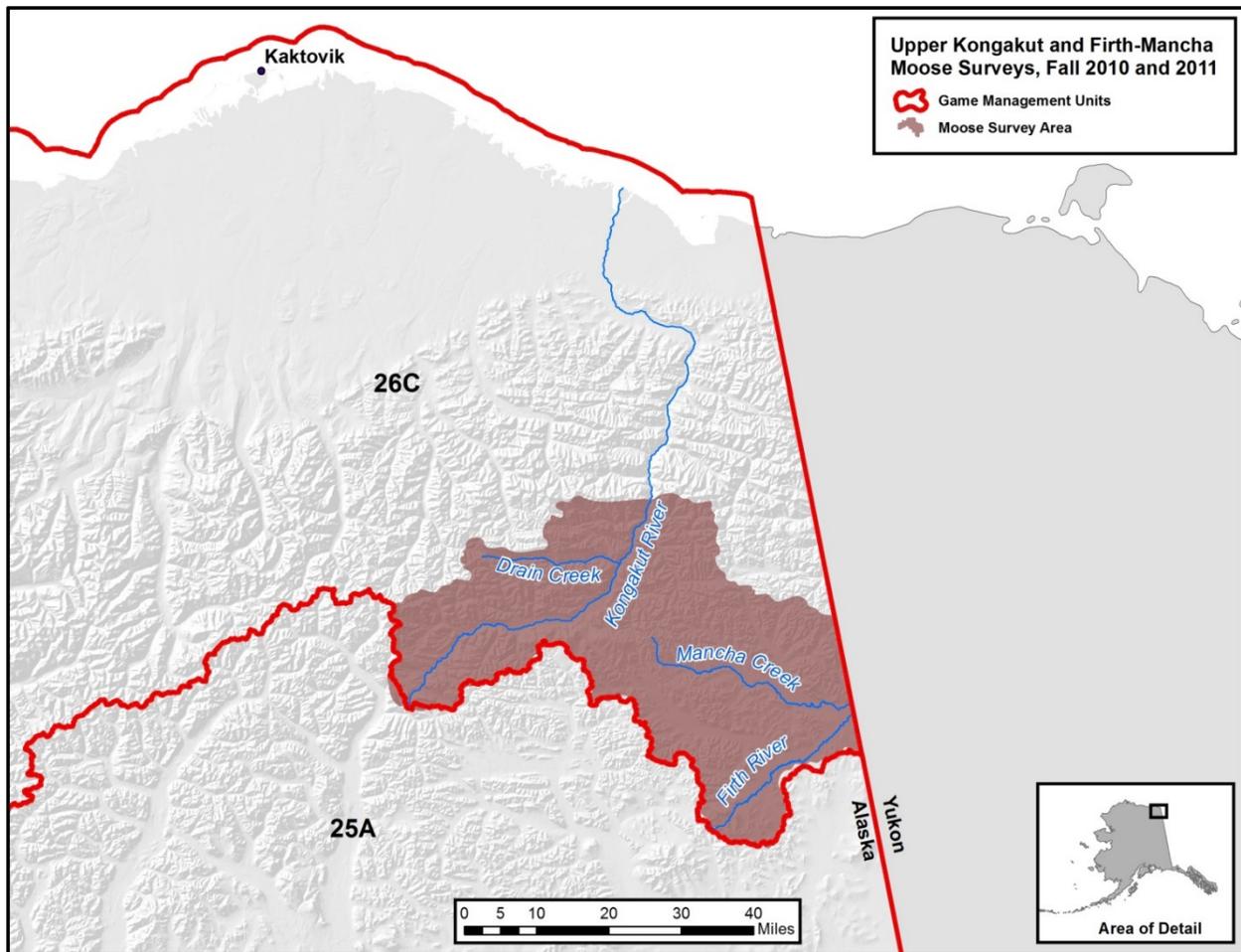
### *Data Needs*

We need to determine population size and proportion of short yearlings (10-month-old calves) every 2–3 years. In eastern Unit 26C, surveys are conducted occasionally in early winter to determine population size and estimate bull:cow ratios. These activities are associated with the management objective to maintain a population  $\geq 150$  moose with a 3-year mean proportion of  $\geq 15\%$  short yearlings in the population (objective M2). Harvestable surplus is determined from the population estimate and is used to determine if ANS (objective C1) is met.

### *Methods*

In central Unit 26C on the coastal plain, staff from ANWR conducted aerial surveys during April in RY10 and RY13 using a Cessna 185 or Cessna 206 flown at 95–120 mph at altitudes of 300–700 feet AGL (Lenart 2014). Moose were surveyed in established riparian count areas: Sadlerochit, Hulahula, Jago, Okpilak, Aichilik, Egasksrak, Kongakut, and Ekaluakut. Moose were not classified. A total count of moose observed in the riparian count areas was used as the population estimate.

In eastern Unit 26C in the Brooks Range, ADF&G staff conducted aerial surveys during early winter in RY10 and RY13 using a Cessna 182 flown at 85–100 mph at altitudes of 300–700 feet AGL. Moose were surveyed in the upper drainages of the Kongakut River (upstream of and including Drain Creek), and Firth River-Mancha Creek drainages were surveyed (Figure 3). Moose were classified as adult cow, adult bull, yearling bull, and calf.



**Figure 3. Eastern Unit 26C, upper Kongakut River and Firth-Mancha Creek moose survey, Northeast Alaska, 2011.**

*Results and Discussion*

In central Unit 26C ANWR staff reported observing a total of 48 moose in RY10 and 23 moose in RY13.

In eastern Unit 26C, moose were surveyed in RY10 and RY11. In RY10, we surveyed only a portion of the Firth River–Mancha Creek drainages in early winter 2010 to determine if moose numbers increased since the 2002 survey (227 moose). In RY10, a total of 109 moose were observed including 43 bulls (2 yearling bulls), 53 cows, and 13 calves, and survey time was 3 hours 25 minutes. Results of this partial survey indicated there were likely more moose in the eastern Unit 26C in RY10 compared to the early 2000s (Table 2; Lenart 2014). A complete survey was warranted in RY11 because of a public proposal to the Alaska Board of Game (BOG). In RY11, a total of 339 moose were observed in eastern Unit 26C during an early winter survey in the upper Kongakut River (upstream of and including Drain Creek) and Firth River–Mancha Creek drainages, indicating that the numbers of moose increased during the 2000s. Composition of the 339 moose observed in 2011 included 118 bulls (15 yearling bulls), 169 cows, and 52 calves (Table 2). In the upper Kongakut River search time was 2 hours 17 minutes,

and 127 moose were observed in 27 groups composed of 50 bulls, 56 cows, and 21 calves. In the Firth River–Mancha Creek drainages search time was 7 hours 55 minutes, and 212 moose were observed in 69 groups composed of 68 bulls, 113 cows, and 31 calves. Telemetry studies show that some of the moose that winter in the upper Kongakut River migrate south and east to summer on the Old Crow Flats in Yukon, Canada (Mauer 1998).

### *Recommendations for Activity 1.2*

We recommend discontinuing this activity until the Federal Subsistence Board (FSB) removes the closure to moose hunting for non-federally qualified users. Since 2000 the surveys in central Unit 26C have been conducted by ANWR staff. FSB did not lift the closure when ADF&G presented data that indicated there was a harvestable surplus of moose available for additional users in a portion of eastern Unit 26C in the Brooks Range. We do not anticipate any change in the state's authority to regulate moose hunting in Unit 26C for the next 5 years; therefore, funds for moose surveys should be spent elsewhere in the region.

## 2. Mortality–Harvest Monitoring and Regulations

ACTIVITY 2.1. Maintain an open moose season when the objective to maintain a population of  $\geq 300$  moose in Unit 26B and a population of  $\geq 150$  moose in Unit 26C is met. (G2, C1, M1, M2, M3)

### *Data Needs*

We need to provide a sustained opportunity to harvest moose (goal 2) and determine if we can meet the legal objective of ANS harvest (objective C1).

### *Methods*

We applied a 3% harvest rate to the minimum population estimate to determine harvestable surplus and restrict harvest to bulls only. Gasaway et al. (1992) determined harvest rates for Interior moose populations that are predator-limited result in small yields of 2–5% of prehunt populations when restricting harvest primarily to male moose  $\geq 1$ -year old. Similar to other ecosystems in Alaska, moose in Unit 26B are limited by both grizzly bear and wolf predation and by habitat (LeResche et al. 1973; Coady 1980; Gasaway et al. 1992; Tape et al. 2016). Fall bull:100 cow ratios are usually high ( $>50$ :bulls:100 cows) in North Slope moose populations (Lenart 2006; Carroll 2012). We determined that applying a 3% harvest rate was reasonable for this area. The number of drawing permits issued was determined based on our professional judgement of the number of permits to issue that would result in a harvest of moose that was less than or equal to the harvestable surplus. Seasons and bag limits for Units 26B and 26C are established in 5 AAC 85.045(24).

**Table 2. Eastern Unit 26C, Kongakut (upstream of and including Drain Creek; 199 mi<sup>2</sup>) and Firth River and Mancha Creek (372 mi<sup>2</sup>) early winter aerial moose composition, Northeast Alaska, regulatory years<sup>a</sup> 1991–2011.**

Regulatory year	Date <sup>b</sup>	Bulls:100		Yearling		Calves:100		Percent calves	Adults	Moose observed	Search time (hr:min)
		Cows (bulls)		bulls:100	cows	Cows (cows)	Calves				
1991 <sup>c</sup>	26–27 Oct	105 (176)		21 (36)		38 (167)	63	15	343	406	
2000 <sup>c</sup>		118 (73)		26 (16)		35 (62)	22	14	135	157	
2002 <sup>c</sup>	21–23 Oct	113 (108)		21 (20)		24 (96)	23	10	204	227	
2011	27 Oct, 7 Nov	70 (118)		11 (15)		31 (169)	52	15	287	339	10:12

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 1991 = 1 July 1991–30 June 1992).

<sup>b</sup> First date represents the survey for Firth River–Mancha Creek drainages; second date represents survey for upper Kongakut River.

<sup>c</sup> Data Source: Compiled from U.S. Fish and Wildlife Service data.

*Results and Discussion*

In Unit 26B harvestable surplus during RY10–RY13 ranged 12–14 bull moose. During RY10–RY13, in Unit 26B, excluding the Canning River drainage, the seasons and bag limits for resident hunters was 1 bull by drawing permit (DM996) during 1–14 September or 1 bull during a season up to 14 days long during 15 February–15 April. During RY10–RY13 the season was closed for nonresident hunters. The season was closed for both resident and nonresident hunters in RY14 by not opening a season by emergency order during 15 February–15 April and issuing zero drawing permits for the September drawing hunt.

In Unit 26C the harvestable surplus was 0 moose in central Unit 26C during RY10–RY14 and 10 bull moose in eastern Unit 26C for RY12–RY14. The season was closed for both resident and nonresident hunters in all of Unit 26C during RY10–RY14. However, a season and bag limit were established in eastern Unit 26C in the drainages of the upper Kongakut River (upstream of and including Drain Creek) and the Firth River–Mancha Creek drainages beginning in RY12. BOG authorized a drawing permit hunt of up to 30 permits for residents and nonresidents. The bag limit was 1 bull for residents and 1 bull with 50-inch antlers or antlers with 4 or more brow tines on one side for nonresidents. The season for both residents and nonresidents was 1–25 September. However, this area is on federal land and was closed to non-federally qualified hunters. The department requested a federal closure review by FSB for the upper Kongakut River and Firth River–Mancha Creek drainages due to new biological information. FSB did not lift the closure during their review in 2013. Unit 26B and Unit 26C state regulations remain in place under 5 AAC 85.045(24).

Harvest by Hunters

In Unit 26B moose were reported harvested or hunted under the harvest ticket hunting season during RY10–RY13 which was open in April. However, most of the reported hunting on the harvest ticket was illegal because it took place in September when there was not a harvest ticket moose hunting season (Table 3). In RY10 the first legal moose was reported harvested under the harvest ticket season in April since the season was opened in RY06 (Lenart 2014). The season was not opened in RY14 and RY15.

**Table 3. Unit 26B reported harvest ticket season moose harvest, Northeast Alaska, regulatory years<sup>a</sup> 2006–2012.**

Regulatory year	Reported harvest				Total	Hunters		Illegal hunters	
	M (%)	F (%)	Unk	Total		(% success)	(harvest)		
2006	0 (0)	0 (0)	0	0	0	0 (0)	1	0	
2007	0 (0)	0 (0)	0	0	0	0 (0)	2	1	
2008	0 (0)	0 (0)	0	0	0	2 (0)	6	0	
2009	0 (0)	0 (0)	0	0	0	0 (0)	1	0	
2010	1 (100)	0 (0)	0	1	1	1 (100)	4	0	
2011	0 (0)	0 (0)	0	0	0	3 (0)	3	0	
2012	0 (0)	0 (0)	0	0	0	4 (0)	2	0	

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2006 = 1 July 2006–30 June 2007).

In Unit 26C no harvest was reported under the state season because the state season was closed during RY10–RY15.

### Permit Hunts

In Unit 26B harvest in drawing permit hunt DM996 (Unit 26B, excluding the Canning River drainage) during RY10–RY13 ranged 2–11 moose harvested by 4–20 hunters (Table 4). During RY10–RY13, 10–25 permits were issued (Table 4). No drawing permits were issued for RY14 and RY15.

### *Alaska Board of Game Actions and Emergency Orders*

Emergency orders to open the harvest ticket moose season in Unit 26B were issued during RY10–RY13. The 14-day season during RY10–RY13 ranged 1–15 April.

No BOG actions regarding Unit 26B occurred during RY10–RY14.

During the board meeting in March 2012, BOG authorized a drawing permit hunt for up to 30 permits for residents and nonresidents in eastern Unit 26C in the drainages of the upper Kongakut River (upstream of and including Drain Creek) and the Firth River–Mancha Creek drainages. The bag limit is 1 bull for residents and 1 bull with 50-inch antlers or antlers with 4 or more brow tines on one side for nonresidents. The season for both residents and nonresidents is 1–25 September. As mentioned previously, this area is on federal land and was closed to non-federally qualified hunters through the end of the report period. The department requested a federal closure review by FSB for the upper Kongakut River and Firth River–Mancha Creek drainages due to new biological information. FSB did not remove the closure during their review in 2013.

### *Recommendations for Activity 2.1*

Continue this activity to maintain an open season in Unit 26B when the moose population objective is met, and in Unit 26C when the moose population is met if and when the federal closure is removed. We recommend continuing to apply a 2–5% harvest rate on the minimum population estimate to determine harvestable surplus.

**Table 4. Unit 26B DM996 permit moose harvest, Northeast Alaska, regulatory years<sup>a</sup> 2006–2013.**

Regulatory year	No. permits	DM996 harvest				No. hunters (% success)
		M (%)	F (%)	Unk	Total	
2006	15	7 (100)	0 (0)	0	7	13 (54)
2007	15	3 (100)	0 (0)	0	3	11 (27)
2008	20	6 (100)	0 (0)	0	6	12 (50)
2009	20	3 (100)	0 (0)	0	3	12 (25)
2010	25	8 (100)	0 (0)	0	8	20 (40)
2011	10	4 (100)	0 (0)	0	4	7 (57)
2012	20	11 (100)	0 (0)	0	11	12 (92)
2013	12	2 (100)	0 (0)	0	2	4 (50)

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2006 = 1 July 2006–30 June 2007).

### 3. Habitat Assessment–Enhancement

None.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### Data Recording and Archiving

Raw data sheets for aerial surveys can be found in room 110 in a file drawer cabinet (Unit 26B Moose) and electronic data entry in Elizabeth A. Lenart's computer E:/MOOSE/Unit 26B\_26C/Surveys. In addition, a complete project documentation and data archive are available in WinfoNet/Data Archive/(Unit 26B moose) (<https://winfonet.alaska.gov/index.cfm>).

Harvest information for both harvest tickets and drawing permits can be found in WinfoNet/Harvest information/ (<https://winfonet.alaska.gov/index.cfm>).

### Agreements

None.

### Permitting

None.

## **CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS**

Moose on the eastern North Slope in Unit 26B and central Unit 26C experienced a severe population decline in spring 2014. The population declined approximately 75% during 2013–2014 in Unit 26B with no short yearlings observed in spring 2014. Similarly, the moose population in central Unit 26C declined approximately 50% with no short yearlings observed. Moose numbers in eastern Unit 26A also experienced a severe decline in RY13 (G. Carroll, Wildlife Biologist, ADF&G, personal communication, 2014). Similarly, Central Arctic caribou (*Rangifer tarandus*) and eastern Brooks Range sheep (*Ovis dalli*) experienced high mortality following the late spring in 2013 (Lenart 2015; J. Caikoski, Wildlife Biologist, ADF&G, Central Brooks Range Sheep Survey, 2014, memorandum 8 August 2014). The severe decline from 2013 to 2014 may have been a result of poor nutrition related to a very late spring in 2013, resulting in high adult mortality and little or no recruitment. Predation by wolves on weakened moose may have also contributed, as few alternate prey inhabit Unit 26B and central Unit 26C during winter. Some Teshekpuk caribou winter in eastern Unit 26A and western Unit 26B but most of the Central Arctic caribou herd winters south of the Brooks Range. Moose in Units 26B and 26C inhabit the most northern extent of their range in Alaska, potentially making them more vulnerable to climatic or nutritional stresses. The population began to decline in spring 2010 in both population size and recruitment, indicating that either some nutritional, disease, or climatic factor had initiated a decline. A substantial population decline had occurred previously during the mid- to late 1990s (Lenart 2008) but not as markedly as this most recent decline.

## MEETING GOALS AND OBJECTIVES

During RY10–RY14 we met goal G1 to maintain viable populations of moose in their historic range throughout the region, although populations were very low in RY13 and RY14. We met goal G2 by continuing to provide an opportunity to harvest moose, except in RY14 when the season was closed. Moose were also available for viewing and photographing during RY10–RY14 (goal G3).

We met a portion of objective M1 in Unit 26B during RY10–RY12, as the population remained  $\geq 300$  moose. In RY13 and RY14 the population was only 109 and 104 moose, respectively. We did not meet the second portion of objective M1, to maintain the 3-year mean proportion of short yearlings in the Unit 26B population at  $\geq 15\%$ . The 3-year mean proportion of short yearlings ranged 4–9% during RY10–RY14 (Table 1).

We likely met the portion of objective M2 in Unit 26C to maintain a population of  $\geq 150$  moose. In RY10 we observed only 48 moose in spring 2011 but observed 339 moose in eastern Unit 26C in early winter 2011, indicating that the population was likely  $\geq 150$  moose during RY10–RY14. We do not know if we met the 3-year mean proportion of  $\geq 15\%$  short yearlings in the population because moose were not classified in central and eastern Unit 26C. We classified moose in early winter 2011 and estimated 15% of the moose observed were 5-month-old calves.

Objective M3, to maintain a posthunting sex ratio of 35 bulls:100 cows when hunting seasons are open, was likely met during RY10–RY13. Based on the high bull:cow ratios observed in early May 2002 (57 bulls:100 cows) and high bull:cow ratios observed in adjacent Unit 26A (Carroll 2012) and little hunting pressure during RY06–RY13, we believe our bull:cow ratios exceeded 35:100 in Units 26B.

## II. PROJECT REVIEW AND RY15–RY19 PLAN

### Review of Management Direction

#### MANAGEMENT DIRECTION

The goals below are applicable and will be retained.

#### GOALS

- G1. Maintain viable populations of moose in their historic range throughout the region.
- G2. Provide a sustained opportunity to harvest moose.
- G3. Provide opportunity for viewing and photographing moose.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

- C1. Unit 26 has a customary and traditional use finding for moose with amounts reasonably necessary for opportunity for subsistence uses (ANS) of 21–48 moose, including 15–30 moose in Unit 26A.

### Intensive Management

None.

## **REVIEW OF MANAGEMENT OBJECTIVES**

- M1. In Unit 26B maintain a population of  $\geq 200$  moose, but we recommend eliminating the 3-year mean proportion of  $\geq 15\%$  short yearlings because harvestable surplus still existed when we were below the 15%.
- M2. In Unit 26C maintain a population of  $\geq 150$  moose, but we recommend eliminating a 3-year mean proportion of  $\geq 15\%$  short yearlings because harvestable surplus still existed when we were below the 15%.
- M3. Maintain a bull:cow ratio of  $\geq 35:100$  when hunting seasons are open.

We recommend eliminating objective M3 because we will not be conducting surveys in early winter. Historically bull:cow ratios remain high for North Slope moose populations even when population numbers are low. In addition, a harvest rate of 2–5% with a bag limit of 1 bull results in a low number of moose harvested in low density moose populations.

Therefore, for the next 5-year period, objectives will be as follows:

- M1. In Unit 26B, maintain a population of  $\geq 200$  moose.
- M2. In Unit 26C, maintain a population of  $\geq 150$  moose.

## **REVIEW OF MANAGEMENT ACTIVITIES**

### 1. Population Status and Trend

ACTIVITY 1.1. In Unit 26B conduct annual aerial surveys during April. (G1, C1, M1)

#### *Data Needs*

To determine population size and proportion of short yearlings (10-month-old calves) for moose in Unit 26B during April surveys. This activity is conducted annually and is associated with the management objective to maintain a population  $\geq 200$  moose. Tracking 3-year mean proportion of short yearlings in the population will provide some information on population trend. Harvestable surplus is determined from the population estimate and the number of drawing permits to be issued for the fall hunt is determined from the harvestable surplus.

### *Methods*

A total count in riparian count areas, rather than random sampling, is the most effective population survey method on the North Slope due to the limited and relatively open nature of winter moose habitat with its sparse, low vegetation (see “I. RY10–RY14 Management Report | 1. Population Status and Trend | Methods” this document).

ACTIVITY 1.2. In Unit 26C conduct annual aerial surveys in central Unit 26C during April and occasional surveys in eastern Unit 26C in fall. (G1, M1, M2).

This activity is modified to the following:

In Unit 26C conduct annual aerial surveys in central Unit 26C during April and occasional surveys in eastern 26C in fall when FSB removes the moose closure in Unit 26C to non-federally qualified users. (G1, G2, G3, C1, M2)

### *Data Needs*

To determine population size and proportion of short yearlings (10-month-old calves) for moose in central Unit 26C during April surveys and population size and bull:cow ratios in eastern Unit 26C during early winter. This activity is associated with the management objective to maintain a population of  $\geq 150$  moose. Tracking 3-year mean proportion of short yearlings in the population will provide some information on population trend. Harvestable surplus is determined from the population estimate and the number of drawing permits to be issued for the fall hunt in eastern Unit 26C is determined from the harvestable surplus. Determining bull:cow ratios will aid in determining harvestable surplus. However, this activity for both portions of Unit 26C need only be conducted when FSB removes the moose closure in Unit 26C to non-federally qualified users.

### *Methods*

See above in report section for activity 1.2.

## 2. Mortality–Harvest Monitoring

ACTIVITY 2.1. Maintain an open hunting season for moose when the objective to maintain a population of  $\geq 300$  moose in Unit 26B and a population of  $\geq 150$  moose in Unit 26C are met. (G2, C1, M1, M2)

This activity is changed to the following:

Maintain an open moose season in Unit 26B when the objective to maintain a population of  $\geq 200$  moose is met. (G2, G3, C1, M1)

### *Data Needs*

Provide a sustained opportunity to harvest moose (goal 2) and determine if we can meet the codified objective of ANS harvest (objective C1).

### *Methods*

See above in report section for activity 2.1.

ACTIVITY 2.2. Maintain an open moose season in Unit 26C when the objective to maintain a population of  $\geq 150$  moose is met and when FSB removes the moose closure in Unit 26C to non-federally qualified users. (G2, G3, C1, M2)

### *Data Needs*

Provide a sustained opportunity to harvest moose (goal 2) and determine if we can meet the codified objective of ANS harvest (objective C1).

### *Methods*

See above in report section for activity 2.2 for the eastern portion of Unit 26C. Opening a season in central Unit 26C would depend on trend in that portion of the population and observing at least 80 moose. A 2–5% harvest rate would be applied.

### 3. Habitat Assessment–Enhancement

None.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

### Data Recording and Archiving

Raw data sheets for aerial surveys can be found in room 110 in a file drawer cabinet (Unit 26B Moose) and electronic data entry in Elizabeth A. Lenart's computer E:/MOOSE/Unit 26B\_26C/Surveys. In addition, a complete project documentation and data archive are available in the internal Wildlife Information Network (WinfoNet) server (<https://winfonet.alaska.gov/index.cfm>) WinfoNet/Data Archive/Unit 26B moose.

Harvest information for both harvest tickets and drawing permits can be found in WinfoNet under "Harvest Information."

### Agreements

None.

### Permitting

None.

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