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**CHAPTER 29: MOOSE MANAGEMENT REPORT**

From: 1 July 2011

To: 30 June 2013<sup>1</sup>

**LOCATION**

**GAME MANAGEMENT UNIT:** 21C (3,660 mi<sup>2</sup>)

**GEOGRAPHIC DESCRIPTION:** Melozitna River drainage upstream from Grayling Creek, and Dulbi River drainage upstream from and including the Cottonwood Creek drainage

**BACKGROUND**

Terrain in Unit 21C is hilly and mountainous, with peaks as high as 5,000 feet. Corridors along 2 large rivers, the Melozitna and the Dulbi, represent the main summer habitat for moose. Numerous fires have resulted in large expanses of potentially good winter habitat, particularly north of the Melozitna River.

Moose have been present in Unit 21C throughout the recent history of Interior Alaska (S. Huntington, personal communication to Glenn Stout, Alaska Department of Fish and Game [ADF&G], 2000). Moose densities are low presumably due largely to predation by bears and wolves (Gasaway et al. 1992, Boertje et al. 2009), and population trends are unknown. Access into the unit is limited and is mostly by aircraft. Thus, hunter numbers and harvest have been low and probably do not adversely impact the moose population. Because there are no human settlements in this area and hunter numbers and harvest have been low, there has been little need to extensively monitor the moose population in this area. Given this, management activities in Unit 21C are restricted to monitoring reported harvest. A more active management approach in Unit 21C is not likely in the near future given the number of higher priority management activities currently ongoing in other subunits in the Galena management area.

**MANAGEMENT DIRECTION**

**MANAGEMENT GOALS**

- Protect, maintain, and enhance the moose population and its habitat in concert with other components of the ecosystem.
- Provide a sustained opportunity to participate in hunting moose.

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<sup>1</sup> At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

## MANAGEMENT OBJECTIVE

- Maintain  $\geq 20\%$  large bulls (bulls with antlers 60 inches or greater) in the harvest.

## METHODS

### POPULATION STATUS AND TREND

No unitwide population estimates have been conducted in Unit 21C. We surveyed a small portion of Unit 21C in November 2010 as part of a larger survey that included 3,516 mi<sup>2</sup> of eastern Unit 21D (Stout 2012). Using the geospatial population estimator (GSPE) technique (Ver Hoef 2001, 2008; Kellie and DeLong 2006), we surveyed 36 sample units (6 high density and 30 low density; 201 mi<sup>2</sup>) in western Unit 21C (west of 155°25.00') distributed across an area of 700 mi<sup>2</sup> that included Cottonwood Creek and a portion of the upper Dulbi River. Search intensity averaged  $\sim 6$  min/mi<sup>2</sup> in each sample unit. Most of this area was stratified just prior to starting the GSPE survey. Sex and age of moose and size class of bulls were recorded.

### HARVEST

We monitored harvest using mandatory harvest reports submitted by hunters. If we did not receive timely harvest reports, general season hunters received 1 reminder letter. Hunters with registration and drawing permits received 1 or 2 reminder letters and usually an e-mail and telephone calls if we did not receive timely harvest reports. We summarized total harvest, antler size of harvested moose, hunter residency and success rate, harvest chronology, and transportation used to hunt. Each of these parameters were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY11 = 1 July 2011–30 June 2012).

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

#### *Population Size*

During the November 2010 GSPE survey in the 700 mi<sup>2</sup> portion of western Unit 21C, we observed 98 moose, 0.46 moose/mi<sup>2</sup> (38 cows, 45 bulls, 15 calves) in 36 sample units. Analysis of these survey data, as a subset of the larger survey, produced an estimate of 323 observable moose (234–411; 90% CI) (Table 1). Because this survey included a large portion of Unit 21D, the resulting estimate for the Unit 21C portion was influenced by these data and we did not extrapolate to a unitwide Unit 21C population estimate based on the small proportion of Unit 21C (19% of Unit 21C) that was sampled. Portions of Unit 21D that were surveyed, on average, contained higher quality habitat than in the remaining area of Unit 21C; therefore extrapolation would likely produce an overestimate.

#### *Population Composition*

Composition data collected during the November 2010 GSPE survey were reflective of a low-density, lightly harvested moose population. Survey results indicated ratios of 92 bulls:100 cows and 31 calves:100 cows (Table 1). Low hunting pressure is likely a factor in the high bull:cow ratio because the area surveyed is more remote than areas of Unit 21C traditionally accessed by hunters. Of bulls observed in the survey, 59% were classified as large bulls, with antler spreads greater than 50 inches.

## **MORTALITY**

### *Harvest*

#### Seasons and Bag Limits during RY11–RY12.

*Unit 21C, the Dulbi River drainage* — The hunting season was 5–25 September. Resident bag limit was 1 bull for registration permit RM834 (trophy value of antlers must be destroyed) or drawing permit DM812 (no trophy destruction required). Nonresidents were allowed 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side, by permit DM812.

*Remainder of Unit 21C* — Residents and nonresidents hunted under general harvest ticket during 5–25 September. Resident bag limit was 1 bull and nonresident bag limit was 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side.

Alaska Board of Game Actions and Emergency Orders. No regulation changes were adopted during RY11–RY12.

Harvest by Hunters. Harvest in Unit 21C averaged 17 moose/year during RY11–RY12 compared to the long-term average of 21.3 moose/year  $\pm 2.13$  ( $\bar{x} \pm SE$ ) during RY96–RY12 (Table 2). The average number of hunters during RY11–RY12 (43.5 hunters/year) was similar to the long-term average (44.1 hunters/year, RY96–RY12).

Thirty-three moose have been reported harvested on drawing hunt permit DM812 since RY04 (Table 3). During RY04–RY12, only 3 moose were reported harvested in Unit 21C by hunters using registration hunt permit RM834, presumably in part because of the stipulation to destroy the antler trophy value.

Harvest data suggest no substantial change in the trend of the average antler widths of all harvested bulls during RY95–RY12 (Fig. 1), however the percentage of large bulls (>60 inches) in the harvest has been below 20% (0–18%) during RY09–RY12. Since there is a lack of survey data from the portions of Unit 21C where most hunting pressure occurs, it is difficult to determine whether the apparent decrease of large bulls in the harvest is due to real declines in the population, a change in harvest, or simply coincidental given the small number of bulls harvested.

Hunter Residency and Success. Alaska residents composed 48% of the 87 hunters who hunted moose in Unit 21C during RY11–RY12 (Table 2). On average, 7.5 residents per year were successful during this period, whereas 8.8 resident hunters per year successfully harvested moose during RY96–RY10. Success for all hunters was 49% during RY96–RY10 and averaged 39% during RY11–RY12. Overall, success rates were typical for Interior Alaska and probably due to relatively low hunter numbers and concentrations of moose along the river corridors in September.

Harvest Chronology. Moose were harvested throughout the season, and most harvest consistently occurred during the second half of September (Table 4).

Transport Methods. While boats were used by moose hunters in Unit 21C, hunters mainly used aircraft for transport (Table 5). A waterfall and series of rock piles near the mouth of the

Melozitna River restricts travel up the river and extensive sandbars often impede boat access into the upper Dulbi River at low water levels common in the fall.

#### *Other Mortality*

Wolves and grizzly and black bears live throughout Unit 21C. Predation has probably influenced moose population status in the past (Gasaway et al. 1992) and is likely still a factor in maintaining low moose densities. Wolf and bear harvests were low (<5 annually) because hunter access is limited.

## **CONCLUSIONS AND RECOMMENDATIONS**

Human use of moose has remained low, and recent harvest levels can likely be sustained.

We achieved our first management goal: to protect, maintain, and enhance the moose population by monitoring moose harvest pressure and by monitoring bear and wolf harvest. Unit 21C is largely within the limited option for fire management, allowing natural disturbance to maintain browse abundance on upland sites. We achieved our second goal, to provide a sustained opportunity to participate in hunting moose, by maintaining long hunting seasons. Although harvest has remained low, we recommend obtaining a unitwide population estimate to serve as reference point for future analyses of harvest and population status.

During RY11 and RY12, the management objective to maintain  $\geq 20\%$  large bulls (bulls with antlers 60 inches wide or greater) in the harvest was not met. Because access to Unit 21C is difficult and expensive, and most hunters who use the area are nonlocal residents or nonresidents, we believe that those who hunted in Unit 21C were primarily interested in harvesting large-antlered ( $\geq 60$  inches) bulls.

Management goals and objective are not consistent with the level of management focus that Unit 21C receives, given current priorities in the Galena management area. Therefore, the management goal and objective for the next reporting period will be adjusted to the following.

#### **MANAGEMENT GOAL**

- Provide a sustained opportunity to participate in hunting moose.

#### **MANAGEMENT OBJECTIVE**

- Maintain a 5-year running average harvest of  $\geq 15$  bulls/year.

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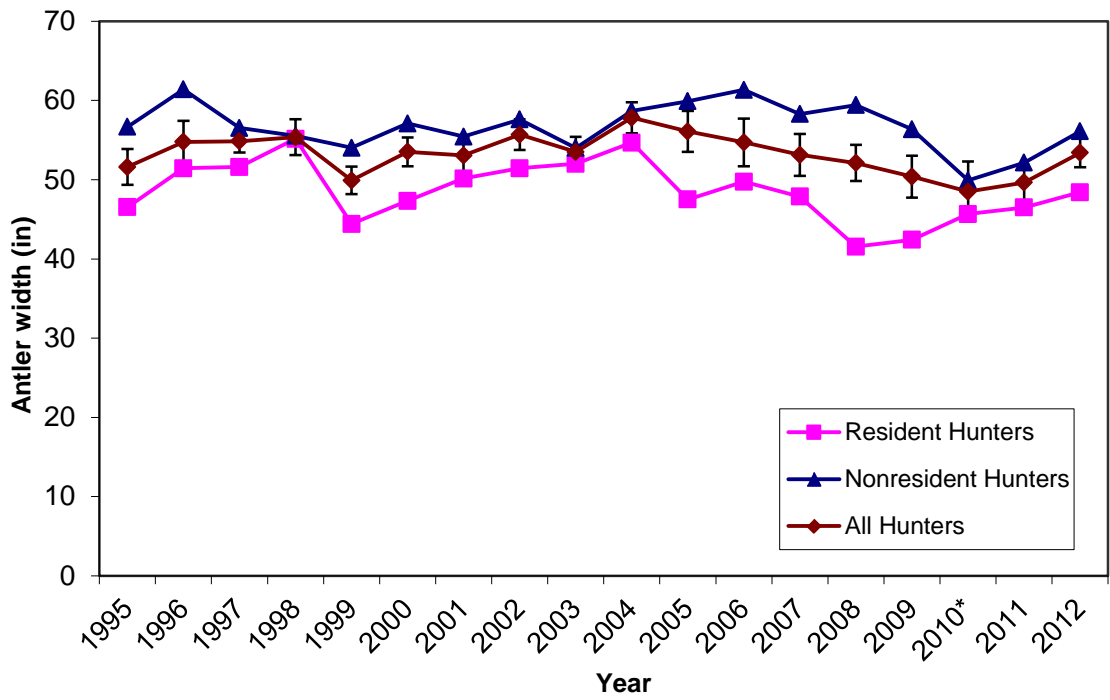


Figure 1. Average bull moose antler spread by hunter residency, Unit 21C, Alaska, fall 1995–fall 2012. Error bars represent  $\pm$  one standard error.

\* = Sublegal bull included in nonresident harvest.

Table 1. Unit 21C, Cottonwood Creek and Dulbi River portion, moose population estimate, Alaska, regulatory year<sup>a</sup> 2010.

Unit/Regulatory year	Area mi <sup>2</sup>	Bulls:100 Cows	Calves:100 Cows	Yearling bulls:100 Cows	Percent calves	Adults	Population estimate (90% CI <sup>b</sup> )	Density (moose/mi <sup>2</sup> )
<i>Unit 21C – partial area</i>								
2010 <sup>c</sup>	700	92	31	13	13	277	323 (±27%)	0.46

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory 2010 = 1 July 2010–30 June 2011).

<sup>b</sup> Confidence interval (% ±).

<sup>c</sup> Geospatial population estimator analysis without sightability correction factor (observable moose).

Table 2. Unit 21C moose hunter residency and success, Alaska, regulatory years<sup>a</sup> 1996–2012.

Regulatory year	Successful					Unsuccessful					Total hunters
	Local resident <sup>b</sup>	Nonlocal resident	Nonresident	Unk	Total (%)	Local resident <sup>b</sup>	Nonlocal resident	Nonresident	Unk	Total	
1996	0	10	5	0	15 (56)	0	9	3	0	12	27
1997	1	14	26	0	41 (76)	0	10	3	0	13	54
1998	1	8	12	0	21 (58)	0	9	6	0	15	36
1999	0	15	16	0	31 (63)	0	13	5	0	18	49
2000	0	11	20	0	31 (61)	0	13	7	0	20	51
2001	0	13	17	0	30 (53)	0	16	11	0	27	57
2002	0	10	20	1	31 (51)	0	18	11	1	30	61
2003	0	5	16	0	21 (46)	0	19	6	0	25	46
2004	0	3	11	1	15 (41)	0	15	7	0	22	37
2005	1	4	11	0	16 (37)	0	12	15	0	27	43
2006	0	6	3	0	9 (32)	2	10	7	0	19	28
2007	0	9	6	0	15 (39)	3	15	5	0	23	38
2008	1	10	14	0	25 (43)	1	19	13	0	33	58
2009	0	7	8	0	15 (36)	0	20	7	0	27	42
2010	0	3	9	0	12 (33)	0	16	8	0	24	36
2011	0	7	7	0	14 (37)	0	15	7	2	24	38
2012	1	7	12	0	20 (41)	0	12	17	0	29	49

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 1996 = 1 July 1996–30 June 1997).

<sup>b</sup> Local resident resides in Units 21C or 21B.

Table 3. Unit 21C, outside Koyukuk controlled use area, moose harvest by permit hunt, Alaska, regulatory years<sup>a</sup> 2004–2012.

Hunt	Regulatory year	Permits issued	Percent successful hunters	Percent unsuccessful hunters	Percent did not hunt	Bulls (%)	Cows (%)	Unk	Total harvest
DM812	2004	20	67	33	70	4 (100)	0 (0)	0	4
	2005	20	50	50	80	2 (100)	0 (0)	0	2
	2006	20	0	100	95	0 (0)	0 (0)	0	0
	2007	29	0	100	97	0 (0)	0 (0)	0	0
	2008	31	60	40	68	6 (100)	0 (0)	0	6
	2009	26	60	40	62	6 (100)	0 (0)	0	6
	2010	28	100	0	86	4 (100)	0 (0)	0	4
	2011	25	33	67	60	3 (100)	0 (0)	0	3
	2012	44	67	33	73	8 (100)	0 (0)	0	8
RM834	2004	4	0	100	0	0 (0)	0 (0)	0	0
	2005	0							
	2006	2	0	100	0	0 (0)	0 (0)	0	0
	2007	4	25	75	0	1 (100)	0 (0)	0	1
	2008	3	33	67	0	1 (100)	0 (0)	0	1
	2009	2	0	100	0	0 (0)	0 (0)	0	0
	2010	0							
	2011	0							
	2012	1	100	0	0	1 (100)	0 (0)	0	1

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2004 = 1 July 2004–30 June 2005).



Table 4. Unit 21C moose harvest chronology percent by month/day, Alaska, regulatory years<sup>a</sup> 1995–2012.

Regulatory year	Harvest chronology percent by month/day				<i>n</i>
	9/5–9/10	9/11–9/15	9/16–9/20	9/21–9/25	
1995	29	33	25	12	24
1996	7	33	40	20	15
1997	12	36	34	17	41
1998	25	35	30	10	20
1999	20	30	27	23	30
2000	21	25	50	4	24
2001	15	22	30	33	27
2002	7	21	43	29	28
2003	19	14	43	24	21
2004	33	7	40	20	15
2005	27	27	33	13	15
2006	0	33	67	0	9
2007	33	33	20	13	15
2008	13	38	38	13	24
2009	0	53	33	13	15
2010	0	17	33	50	12
2011	36	29	21	14	14
2012	20	30	35	15	20

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 1995 = 1 July 1995–30 June 1996).

Table 5. Unit 21C moose harvest percent by transport method, Alaska, regulatory years<sup>a</sup> 1995–2012.

Regulatory year	Harvest percent by transport method							<i>n</i>
	Airplane	Horse	Boat <sup>b</sup>	3- or 4-wheeler	Snowmachine	ORV	Unknown	
1995	84	0	4	0	0	0	12	25
1996	93	7	0	0	0	0	0	15
1997	85	0	10	0	0	0	5	41
1998	90	0	10	0	0	0	0	21
1999	74	0	23	3	0	0	0	31
2000	60	0	40	0	0	0	0	25
2001	60	0	37	0	0	3	0	30
2002	71	0	29	0	0	0	0	31
2003	76	0	14	0	0	0	10	21
2004	67	0	33	0	0	0	0	15
2005	81	0	19	0	0	0	0	16
2006	100	0	0	0	0	0	0	9
2007	71	0	29	0	0	0	0	14
2008	80	0	20	0	0	0	0	25
2009	93	0	7	0	0	0	0	15
2010	67	0	33	0	0	0	0	12
2011	57	0	43	0	0	0	0	14
2012	70	0	25	0	0	5	0	20

<sup>a</sup> Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 1995 = 1 July 1995–30 June 1996).

<sup>b</sup> Includes airboats.