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CHAPTER 12: MOOSE MANAGEMENT REPORT

From: 1 July 2011
To: 30 June 2013[1]

LOCATION

GAME MANAGEMENT UNIT: 13 (23,368 mi^2)

GEOGRAPHIC DESCRIPTION: Nelchina and Upper Susitna River

BACKGROUND

Unit 13 has long been an important area for moose hunting in Alaska. Annual harvests were large during the late 1960s and early 1970s, averaging more than 1,200 bulls and 200 cows. Hunting seasons were long, with both fall and winter hunts. As moose numbers declined, harvests were reduced by eliminating both the cow hunt and winter season in 1972 and reducing fall bull seasons to 20 days in 1975.

In 1980 the bag limit was changed from any bull to bulls with antler spreads of at least 36 inches or 3 brow tines on at least one side. Under this management strategy, the bull harvest dropped 34% from the previous season. Through the 1970s and the 1980s the moose population increased at an average annual rate of 5% until the population peaked. In 1987 a high of 6,892 moose were observed in established trend count areas (TCA), and the harvest peaked 1 year later when 1,259 moose were taken.

The population declined due to severely deep snow (1988–1994) and increased wolf predation. Moose harvest regulations were restricted beginning in regulatory year (RY) 1990, though the population continued to decline. A regulatory year begins 1 July and ends 30 June, e.g., RY90 = 1 July 1990–30 June 1991. During fall 1999 and 2000, unitwide wolf estimates peaked at more than 500 wolves (>12 wolves/1,000 km^2) and were the highest in more than 25 years. Snow depths during winters 1999–2000 and 2000–2001 were considered severe. Moose harvests continued to decline, reaching a low of 468 in RY01. From the peak, the number of moose observed had declined by 47%.

In January 2000 a wolf control implementation plan was initiated in Unit 13 for the benefit of moose. Some increased take of wolves occurred with the use of snowmachines, though land-and-shoot control was not allowed until January 2004. With the Unit 13 wolf population held at or

[1] At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

near objective levels since spring 2010 (Schwanke 2012), the moose population has grown steadily.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population Objectives

- Maintain a combined population of 17,600–21,900 moose in Unit 13:
  - 3,500–4,200 moose in Subunit 13A
  - 5,300–6,300 moose in Subunit 13B
  - 2,600–3,500 moose in Subunit 13C
  - 1,200–1,900 moose in Subunit 13D
  - 5,000–6,000 moose in Subunit 13E

- Maintain minimum fall composition ratios:
  - 25 calves:100 cows in Subunit 13A
  - 30 calves:100 cows in Subunits 13B, 13C, 13D, and 13E
  - 25 bulls:100 cows in all subunits
  - 10 yearling bulls:100 cows in all subunits

Human Use Objective

- Maintain a combined annual harvest of 1,050–2,180 moose in Unit 13:
  - 210–420 moose in Subunit 13A
  - 310–620 moose in Subunit 13B
  - 155–350 moose in Subunit 13C
  - 75–190 moose in Subunit 13D
  - 300–600 moose in Subunit 13E

METHODS

Aerial surveys are conducted during the fall to document sex and age composition and population trends in large count areas distributed throughout Unit 13. These surveys are repeated annually using consistent pilots, timing, and conditions. An established group of 8 TCAs has been surveyed annually, as budget and conditions allow, for more than 40 years (TCAs 3, 5, 6, 10, 13, 14, 15, and 16). These areas cover 3,569 mi^2 of moose habitat and take 3 pilot-observer teams 90–115 hours to complete. With the advent of global positioning system (GPS) units in the 1990s, area coverage and data quality during these surveys have increased.

Additional surveys, using techniques developed by Gasaway et al. (1986) and Ver Hoef (2001), have been conducted periodically in different portions of the unit to obtain precise population estimates.

Surveys were flown during calving season to determine percent twins, and harvests were monitored by requiring permit and harvest ticket reports from all hunters. Modeling of the moose population has been used to help explain past trends as well as predict future trends.

In addition to general habitat projects, staff evaluated and responded to several land-use proposals that could affect moose habitat and hunter access.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population trends for moose in Unit 13 are monitored by observing changes in the number of moose counted in established TCAs each year (Table 1). The number of moose counted in the continuous TCAs declined through the 1990s and reached a low in 2002. When all continuous trend count data were combined, the observed unitwide moose density averaged 1.0 moose/mi^2, with individual count areas ranging 0.5–1.2 moose/mi^2 in 2002. Due to a combination of predation control, mild winters and more conservative hunting regulations, the population began to increase steadily. During this reporting period, the observed unitwide moose density within continuous count areas reached 1.6 moose/mi^2 in 2011, though dropped slightly to 1.5 moose/mi^2 in 2012 (Table 1).

Within the core of the predator control program area, increases in moose numbers through 2011 have been clearly evident. From the Alphabet Hills north through the upper Tangle Lakes and Gulkana River (TCA 5), the number of moose observed increased from 1,051 to 1,783 (70%) between 2002 and 2012. For the foothills of the eastern Talkeetna Mountains in Subunit 13A (TCAs 13 and 14), the number of moose observed increased from 917 to 1,580 (72%) during the same period. While these data are from trend counts, and some movement is captured annually, the increases were relatively consistent through time.

While the Unit 13 intensive management predator control program has expanded since inception (Schwanke 2012), the area still excludes peripheral areas such as Subunit 13D and western Subunit 13E within Denali National Park and Preserve. The Subunit 13D count area (TCA 15) has consistently been a low density moose area for nearly 30 years (average = 0.5 moose/mi^2; range = 0.2–0.7 moose/mi^2). The western portion of Subunit 13E from Windy Creek south to the West Fork Chulitna River (Cantwell federal count area) has also had a consistently low moose density in recent years. Owen and Meier (2009) with the National Park Service reported an average of 0.65 moose/mi^2; range = 0.62–0.67 moose/mi^2 for the 2003, 2005, and 2008 survey periods.

Population Size

Estimated moose population sizes were calculated using conservative estimates of sightability (1.10 correction factor) and extrapolation of trend count data based on information about moose movements, habitat, and terrain features. Moose population estimates in 2012 by subunit were: 3,650 in Subunit 13A, 5,350 in Subunit 13B, 1,680 in Subunit 13C, 1,950 in Subunit 13D, and 5,630 in Subunit 13E. The unitwide estimate was 18,260 moose. With the exception of Subunit 13C all appear to be within population objectives.

Population Composition

Composition data collected during fall trend counts are presented in Table 1, with data by subunit presented in Table 2 for 2012. The Unit 13 bull ratio for all continuous count areas increased steadily from 23 bulls:100 cows in 2001 to 35 bulls:100 cows in 2008, and has

remained at or above 30 bulls:100 cows since. While lowest in areas near roads and trail systems, the bull ratio now meets management goals for each subunit.

An analysis of the bull ratio by size class indicates an average of 10 yearling bulls:100 cows were observed in 2011 and 7 yearling bulls:100 cows in 2012 (Table 1). Subunit 13D has moderate to high densities of black and brown bears, likely the cause of lower calf survival in this area (Table 2). High rates of predation are also suspected in portions of Subunit 13E, though good hunter access in surveyed portions of this subunit may also be partially responsible for lower yearling bull ratios.

An average of 1,163 bulls were observed annually 2011–2012 in continuous count areas. An average of 25% of bulls were classified as yearlings (spike, fork, or paddle bulls), while the 30- to 39-inch class accounted for 34%. Bulls in this size class are typically 2–4 years of age. Bulls in the 40- to 49-inch class accounted for 24%, and are typically 3–5 years of age. The >50-inch class accounted for the remaining 17%.

Of the bulls observed, very few had 4 or more brow tines (6%). In the 30- to 39-inch class, less than 1% had 4 or more brow tines. The majority had 2 brow tines. Within the 40- to 49-inch class, an average of 5% had 4 or more brow tines. Of this class, 58% had 2 brow tines, and 35% had 3 brow tines. Of the bulls with antlers >50 inches, 28%, 45%, and 27% had 2, 3, and 4 brow tines respectively. Of all the bulls observed, an average of 25% had 3 or more brow tines.

An average of 40% of the bulls observed during surveys were estimated to be legal under existing state general season antler restrictions. The vast majority of these bulls were observed in remote portions of the unit where bull ratios were relatively high. The average bull in Unit 13 post-hunting season is estimated to be 2–4 years of age based on aerial observations, representative of the age classes protected during hunting season.

For purposes of estimating recruitment, fall calf ratios are monitored. During the last population peak in the late 1980s, the unitwide calf ratios were the highest ever observed in this area, topping 31 calves:100 cows. These highs were followed by a steep decline throughout the 1990s. Despite early increases observed following initiation of the intensive management program in the early 2000s, unitwide calf ratios have been consistent since 2004, averaging 19 calves:100 cows. During this reporting period the calf ratio also averaged 19 calves:100 cows.

Distribution and Movements

Moose continue to be most abundant along the southern slopes of the Alaska Range in Subunits 13B and 13C and in the eastern Talkeetna Mountains in western Subunit 13A. The Denali National Park portion of western Subunit 13E, the Lake Louise Flats in eastern Subunit 13A, and Subunit 13D have the lowest densities unitwide. Historically, moose numbers in Subunits 13B, 13C, and western 13A have fluctuated more than the lower density areas of Subunits 13D and eastern 13A.

Fall rutting and post-rutting concentrations are in subalpine habitats throughout Unit 13. The distribution of wintering moose depends largely on snow depth and to a lesser degree, wolf distribution. Moose generally move down to lower elevations as snow depth increases. Known wintering concentration areas include the southern Alphabet Hills, the upper Susitna River, the

eastern foothills of the Talkeetna Mountains, the Tolsona Creek burn, and the Copper River floodplain.

MORTALITY

Harvest

Seasons and Bag Limits. Season dates were 1–20 September for the general season moose hunt under state regulations for this reporting period. The bag limit was 1 bull with a spike-fork antler on one side, or 4 or more brow tines on one side, or a spread of 50 inches or more.

In RY09, 5 remote drawing hunt areas were offered (DM330–DM334) for any bull. The hunts were limited to Alaska residents. Two hunt areas were offered in Subunit 13A, 2 in Subunit 13B, and 1 in Subunit 13C. Along subunit boundaries, 5 nonresident hunt areas were also offered (DM335–DM339), with a bag limit of 1 bull with 4 or more brow tines on one side, or a spread of 50 inches or more. In RY12 a resident antlerless moose hunt (DM325) was offered in Subunit 13A, with a bag limit of 1 antlerless moose. Ten DM325 permits were issued.

Also new in RY09 was the Ahtna community subsistence harvest (CSH) hunt for Alaska residents. The CSH area covered all of Unit 13, Unit 11, and a portion of Unit 12 (south of the Tok River). For the CSH hunt, up to 100 bulls not meeting general season antler restrictions could be taken 10 August–20 September (additional spike-fork 50-inch bulls could also be taken, not to exceed the total number of hunt participants).

A federal subsistence registration hunt has also been in place in Unit 13 since RY90 for residents of Units 12, 13, and 20, with a bag limit of any bull and season dates of 1 August–20 September within federal subsistence areas.

Alaska Board of Game Actions and Emergency Orders. In March 2011, the board adopted a new version of the CSH hunt using previously established boundaries. For RY11, any community or group of Alaskan hunters numbering 25 or more could apply for the hunt. The season dates were 10 August–20 September. Up to 70 bulls not meeting general season antler restrictions could be taken (additional spike-fork 50-inch bulls could also be taken).

Total Harvest. The total Unit 13 reported bull harvest has increased from a low of 468 in 2001. Over this reporting period harvests were 953 in RY11 to 704 in RY12 (Table 3).

General Hunt. The Unit 13 general hunt has had increasing participation since RY02, when the moose population started to rebound. During this reporting period there was an average of 4,031 general season hunters. The 4,254 general season hunters in Unit 13 during RY12 was the highest reported since RY99 (Table 4).

During this reporting period the general season moose harvest averaged 614 (Table 4). Somewhat less than the 756 moose harvested in RY10.

Permit Hunts. Five any bull resident drawing hunts (DM330–334) were offered, with a total of 225 permits issued for RY11. Permit numbers decreased to 104 for RY12. Permit success was relatively high despite the remote location of the hunt areas. In RY11, a total of 118 permittees

reported hunting (53%), taking 49 bulls (42% hunt success). In RY12, 104 permittees reported hunting (53%), taking 33 bulls (60% hunt success).

In RY12 a resident drawing antlerless hunt (DM325) was held, the first antlerless hunt in Unit 13 since RY94. A total of 10 permits were issued, and 10 permittees reported hunting (100%). The harvest was 4 cows (40% hunt success).

During this reporting period 5 nonresident drawing hunts (DM335–339) were offered. A total of 65 nonresident permits were issued for RY11, resulting in a harvest of 16 bulls. Permit numbers were increased to 105 for RY12, in which a total of 9 bulls were harvested.

A total of 753 hunters participated in the CSH moose hunt in RY11. Of those, 310 reported hunting (some utilized designated hunters). A total of 86 bulls were taken, with 64 qualifying as "any bulls" (Table 5). Of the 961 participating CSH hunters in RY12, 357 reported hunting. Of the 98 bulls harvested, 76 were classified as "any bulls."

Illegal Harvests. Unreported, accidental, and illegal harvest estimates are presented in Table 3.

Hunter Residency and Effort. Local residents (residents of Unit 13) harvested 7% of the moose under the general season this reporting period (Table 4). The success rate for general season moose hunters has been stable over time, averaging 17% from RY94 through RY10. Success decreased to 15% during this reporting period as a result of the below average success rate in RY12 (12%). Successful hunters spent an average of 7.2 days in the field during this reporting period, an increase from the 6.8 days during the previous reporting period. Unsuccessful hunter effort also increased to 8.4 days per hunter compared to 7.4 days in the previous period.

Resident any-bull drawing hunters on average spent 6.3 days in the field per successful hunter for the 5 hunts during this reporting period, and unsuccessful drawing hunters 5.6 days in the field. Successful resident community hunters spent an average of 4.6 days in the field during this reporting period, while unsuccessful hunters spent an average 8.0 days in the field. Nonresident drawing hunters on average spent 5.7 days to take a bull, while unsuccessful nonresidents spent 7.9 days in the field.

Harvest Chronology. Chronology data for the general hunt are presented in Table 6. Moose become increasingly vulnerable throughout September, and harvest typically increases as the season progresses. Leaf fall starts occurring, bull movements increase, and onset of the rut increases the effectiveness of calling.

For the resident any-bull drawing hunts, the majority of the harvest (72%) occurred during the first 14 days of the season. The nonresident drawing hunters harvested bulls throughout the season.

Because the CSH hunt began 10 August during this reporting period, 22 days prior to the other moose hunts in the unit, the harvest chronology is somewhat different. Most (56%) of the harvest occurred before 1 September.

Transport Methods. The most important method of transportation for moose hunters in Unit 13 has been 4-wheelers since RY93 (Table 7). Hunters using 4-wheelers and off-road vehicles took 70% of the total moose harvest during this reporting period.

Resident any-bull drawing hunters generally utilized the same transportation methods as general season hunters. The only other common transportation methods were airplane in the DM332 hunt (eastern Alphabet Hills). Nonresident drawing hunters primarily used 4-wheelers, off-road vehicles, and highway vehicles. Hunters participating in DM338 (Subunit 13D) primarily used aircraft.

Other Mortality

Brown bears are abundant in Unit 13 and are important predators of neonatal moose calves. Research in the 1970s indicated brown bears kill up to 50% of the calves within the first 6 weeks of life (Ballard et al. 1981). Although brown bears kill adult moose, the rate is much lower than for calves. A substantial reduction in bear numbers (1,979 bears removed from the upper Susitna) had shown increased calf survival significantly in this unit (Ballard et al. 1987). Based on this research, liberalized hunting regulations have been in effect for brown bears in Unit 13 since the mid-1990s to reduce the population and increase calf survival unitwide. However, even though bear harvests have doubled under the more liberal regulations, calf recruitment has not increased.

Wolf numbers in Unit 13 peaked in fall 1999 and 2000, with unitwide estimates exceeding 500 wolves (>12 wolves/1,000 km^2). Snow depths during winters 1999–2000 and 2000–2001 were severe. Based on unitwide wolf population and moose estimates, the fall 2000 moose:wolf ratio was estimated at about 31:1. Considering that wolves in Unit 13 continue to prey on moose, even when caribou are present (Ballard et al. 1987), this low ratio was expected to keep the moose population in a steady decline. Following implementation of a wolf control plan in 2000, the wolf take started increasing and the wolf population declined. During this reporting period, fall wolf estimates averaged 293 wolves and spring estimates averaged 191 wolves. This was an increase over the average of 254 and 166 during the previous reporting period.

Winter snow conditions are monitored by measuring snow depths at 17 established snow courses throughout the area. A winter severity index is then developed for the unit. Observations of winter mortality over the years have led to the conclusion that moose mortality due to deep snow conditions has not been density dependent. Instead, there appears to be a threshold effect triggering increased calf mortality once snow accumulation is about 30 inches (Coady 1974). Reduced wolf densities may increase this threshold above 30 inches. As the snowpack increases, yearlings, then adult bulls, and finally adult cows die, regardless of densities. Increased snowpack often helps wolves pursue and take prey. Deep snow also influences survival of neonatal calves the following spring. If cows are in poor condition at parturition, neonatal survival declines, resulting in lower calf:cow ratios the following fall. During RY11 the winter severity index for Unit 13 was classified as severe, with a unitwide average of 34.1 inches of snow. In RY12 the unitwide snow depth average was 27.6 inches, and the winter was classified as moderate.

HABITAT

Assessment

Unit 13 has several areas where habitat improvement could produce more favorable browse conditions for moose. Due to the size and remoteness of much of the unit, fire is considered the only option for extensive habitat improvement. Wildfires occurred throughout much of Unit 13 before 1950, when fire suppression activities began. Since then, negligible acreage has burned. Current fire suppression policies in the *Copper Basin Fire Management Plan* set aside large portions of the unit as limited suppression (let-burn) areas where wildfires will not be suppressed. However, some wildfires have been suppressed, even if they occurred in an area designated as limited suppression. The current level of fire suppression has resulted in fewer fires and reduced seral habitat available as moose browse. This has likely reduced the moose carrying capacity over extensive portions of Unit 13. Because of the lack of fire-created seral plant communities, climax upland and riparian willow communities are the most important habitat types for moose in the unit.

Research throughout the 1990s in western Subunit 13A suggested that browse utilization rates were sustainable (Collins 2002). There are indications that browse quality in Subunit 13A may not be as good as in other portions of the state. Bill Collins (Wildlife Physiologist, ADF&G, Palmer, personal communication) has found higher levels of tannins and lower nitrogen in Subunit 13A browse than in nearby study areas in Denali National Park.

The use of prescribed fires to replace wildfire as a method of improving moose habitat has had limited application in Unit 13. The climate typically prevents the use of prescribed fire, except in the driest years. Also, scattered cabins and private landownership have increased over the years and increase the liability associated with the use of prescribed fire. In spite of problems associated with controlled burns, work with the Bureau of Land Management and Alaska Department of Natural Resources has been ongoing, and a prescribed fire was completed in 2004. The Alphabet Hills controlled burn was ignited in August 2004 and approximately 41,000 acres burned around Kelly Lake on the south slopes of the Alphabet Hills in Subunit 13B. The burn plan remains active, and future ignition will be attempted if the fire prescription is met.

The number of moose counted within the 65 mi^2 burn count area was stable through 2007, averaging 64 moose. Numbers began increasing in 2008, with 209 moose observed in 2009. Since then the number has declined, with 186 observed in 2010, 109 in 2011, and 136 in 2012.

Habitat improvement by mechanical methods, such as crushing, is an alternative to burning. To be effective, mechanical treatment have focused on riparian habitats where moose concentrate during critical winter months. However, mechanical treatment is expensive, and the cost limits its use to small but important concentration areas near the road system, where access for heavy equipment is available.

CONCLUSIONS AND RECOMMENDATIONS

Moose numbers have increased significantly in Unit 13 over the past decade. A comparison of the number of moose counted indicates there has been an increase in all sex and age categories of moose. Overall, observed numbers of moose are up significantly since the last low in 2002, with the largest increases in Subunits 13A, 13B, and 13C.

The increase in moose observed is attributed primarily to increased winter survival due to reduced predation. Active wolf management that brought the wolf population down from record highs was the single most important factor. Also contributing to the increased survival was the occurrence of relatively mild winters since 2000. Mild winters also help increase productivity, as cows in better physical condition have higher calving rates.

Calf ratios during this reporting period are well above those observed in the late 1990s, when moose were rapidly declining, but are still below management objectives across the unit. Neonatal calf mortality due to brown bear predation continues to be significant. Liberalized hunting regulations since 1994 have resulted in an increase in brown bear harvests, but no effect on neonatal calf mortality has been detected. A multi-year brown bear study was recently conducted to evaluate the impact of increased bear harvests on the bear population, and should provide insights as to why high calf mortality is still a major factor in Unit 13.

Harvests and hunting pressure in Unit 13 continued to increase during this reporting period; however, both harvests and hunting effort remain well below the level observed in the late 1980s. Whether Unit 13 can meet harvest objectives for moose is yet to be determined. Habitat issues may influence harvest rates once we approach higher levels. The lack of substantial fires over the past 50 years has resulted in lower browse quality.

We recommend continuing to increase moose harvests in those portions of Unit 13 where moose numbers have increased the most. Specifically, bull harvests should continue to be liberalized in Subunits 13A, 13B and 13C as long as the bull ratio remains above objectives. Also, limited cow harvests should be utilized to provide additional opportunity in specific areas given public support. Given the controversial nature of antlerless hunts, a limited number of permits should be made available for clearly identified hunt areas where moose are abundant, and the permit hunts should be limited by conservative harvest objectives for each area.

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Table 1. Unit 13 fall composition estimates for moose in trend count areas 3, 5, 6, 10, 13, 14, 15, and 16, Alaska, calendar years 2008–2012.

Year	Bulls:100 cows	Yearling bulls:100 cows	Calves:100 cows	Calves %	Adults observed	Total moose observed	Moose/hour	Density moose/mi^2 (observed range)
2008[a]	35	12	19	13	3,918	4,481	54	1.3 (0.5–2.0)
2009	34	9	23	15	4,326	5,061	50	1.4 (0.5–2.0)
2010[a]	30	10	21	14	4,558	5,313	53	1.5 (0.6–2.2)
2011	33	10	23	15	4,777	5,604	53	1.6 (0.5–2.2)
2012	32	7	16	11	4,821	5,404	50	1.5 (0.5–2.2)

[a] Trend count area 15 was not flown, data were estimated.

Table 2. Unit 13 fall composition estimates by subunit for moose in trend count areas 3, 5, 6, 10, 13, 14, 15, and 16, Alaska, calendar year 2012.

Subunit	Bulls:100 cows	Yearling bulls:100 cows	Calves:100 cows	Calves %	Total moose observed	Moose/hour	Density moose /mi^2
13A	26	7	15	11	1,580	58	1.6
13B	34	7	18	12	2,685	49	1.8
13C	30	6	12	9	506	50	1.7
13D	67	2	14	8	174	26	0.5
13E	31	9	24	10	1,525	42	1.2

Table 3. Unit 13 moose harvest[a] and accidental death, Alaska, regulatory years[b] 2008–2012.

Regulatory	Reported				Estimated			Accidental			Grand
year	M	F	Unk	Total[c]	Unreported	Illegal	Total	Road	Train[d]	Total	total
2008	730	1	4	735	25	25	50	40	42	82	867
2009	859	1	2	862	25	25	50	15	11	26	938
2010	937	1	0	938	25	25	50	50	63	113	1,101
2011	953	1	0	954	25	25	50	36	32	68	1,072
2012	704	5	2	711	25	25	50	27	27	54	815

[a] Includes permit hunt harvest, harvest tickets, and federal subsistence hunts.
[b] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2008 = 1 July 2008–30 June 2009.
[c] Includes unknown sex.
[d] Subunit 13E – the Alaska Railroad.

Table 4. Unit 13 moose hunter residency and success for general harvest ticket hunt only, Alaska, regulatory years[a] 2008–2012.

	Successful				Unsuccessful				
Regulatory	Local[b]	Nonlocal			Local[b]	Nonlocal			Total
year	resident	resident	Nonresident	Total[c]	resident	resident	Nonresident	Total[c]	hunters
2008	51	560	1	616	363	2,592	3	2,970	3,586
2009	38	584	0	627	277	2,383	11	2,690	3,317
2010	67	677	0	756	428	2,858	16	3,332	4,088
2011	49	669	4	724	249	2,808	9	3,084	3,808
2012	39	465	0	505	282	3,442	17	3,749	4,254

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2008 = 1 July 2008–30 June 2009.
[b] Residents of Unit 13
[c] Includes unspecified residency.

Table 5. Unit 13 moose harvest data for state permit hunts, Alaska, regulatory years[a] 2008–2012.

Hunt number	Regulatory year	Permits[b] issued	Percent did not hunt	Percent unsuccessful hunters	Percent successful hunters	Bulls	Cows	Unknown	Harvest
Tier II TM300	2008	150	11	53	47	62	0	0	62
Resident	2009	160	29	42	58	64	0	0	64
Any bull	2010	325	39	54	46	92	0	0	92
DM330–334	2011	225	47	59	42	49	0	0	49
	2012	104	47	40	60	33	0	0	33
Resident Antlerless DM325	2012	10	0	60	40	0	4	0	4
Nonresident	2009	50	34	64	36	12	0	0	12
Antler restricted	2010	115	43	78	22	13	0	0	13
DM335–339	2011	65	46	54	46	16	0	0	16
	2012	105	44	84	16	9	0	0	9
Community	2009	377	23	66	34	100	0	0	100
Subsistence	2010	No hunt							
Harvest Hunt	2011	753	58	72	28	86	0	0	86
CM300	2012	961	62	73	27	98	0	0	98

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2008 = 1 July 2008–30 June 2009.
[b] One permit was issued to the Community Subsistence Harvest hunt coordinator; community hunt harvest tickets were issued to individual hunters.

Table 6. Unit 13 moose harvest (%) chronology by seasonal weeks for general state harvest ticket hunt only, Alaska, regulatory years[a] 2008–2012.

Regulatory year	Season dates	Week of harvest[b]			
		1st	2nd	3rd	4th
2008	1–20 Sep	9	25	36	30
2009	1–20 Sep	8	31	34	27
2010[c]	1–20 Sep	3	22	32	24
2011	1–20 Sep	7	32	35	27
2012	1–20 Sep	8	33	39	21

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2008 = 1 July 2008–30 June 2009.
[b] For the conventional moose season, weeks end 1 September, 8 September, 15 September, and 22 September.
[c] An additional 20% (146 moose) were harvested during an early August hunt period 15 August–25 August.

Table 7. Unit 13 successful moose hunter transport methods (%) for general state harvest ticket hunt only, Alaska, regulatory years[a] 2008–2012.

Regulatory year	Transport method (%)							
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV[b]	Highway vehicle	Airboat
2008	6	1	4	57	0	19	12	1
2009	6	1	7	59	0	16	10	1
2010	6	1	4	58	0	17	13	1
2011	7	1	5	59	0	17	10	1
2012	5	1	4	55	0	22	12	1

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2008 = 1 July 2008–30 June 2009.
[b] ORV = off-road vehicles.