**Alaska Department of Fish and Game**
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# CHAPTER 11: MOOSE MANAGEMENT REPORT

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

## LOCATION

**GAME MANAGEMENT UNIT**: 12 (10,000 mi$^2$)

**GEOGRAPHIC DESCRIPTION:** Upper Tanana and White River drainages

## BACKGROUND

Following federal predator control, the Unit 12 moose population irrupted during the 1950s through the mid-1960s. Moose numbers declined rapidly during the late 1960s and early 1970s, similar to populations in adjacent road-accessible areas. Several severe winters, high wolf and grizzly bear predation, and high localized cow moose harvests all contributed to the population decline. Between the mid-1970s and early 1980s, the Unit 12 moose density was estimated at 0.2–0.4 moose/mi$^2$ (Gardner 1998).

In response to the declining moose populations, antlerless seasons were closed beginning in 1975 and wolf control programs were conducted in adjacent Unit 20D (1980), Unit 20E (1981–1983), and in northern Unit 12 (1981–1983). Beginning in regulatory year (RY) 1982 (RY = 1 July through 30 June; e.g., RY82 = 1 July 1982–30 June 1983), attempts were made to reduce the grizzly bear population by liberalizing grizzly bear hunting regulations. Bulldozer crushing of willow and some poplar occurred on about 1,600 acres primarily in the floodplain of the Tok River during 1982–1989 to enhance browse production. Between 1982 and 1989 the moose population in Unit 12 increased, probably due to a combination of these management programs and favorable weather conditions that prevailed during this period. However, the population remained at low density (0.4–0.6 moose/mi$^2$; Kelleyhouse 1989).

Based on data collected during October–November aerial composition surveys and area-specific population estimation surveys from 1989 through 2010, the moose population in Unit 12 remained relatively stable from 1989 to 1993; grew slightly during 1994–1997, possibly due to increased calf survival; and remained stable during 1998–2010. During the growth phase of 1994–1997, the most apparent increase occurred in northwestern Unit 12 within the area affected by the 1990 Tok wildfire (155 mi$^2$). Population estimates indicate this area supported 0.19 moose/mi$^2$ in 1989 (Kelleyhouse 1990), 0.6 moose/mi$^2$ by 1994 (Gardner 1996), and about 1.0 moose/mi$^2$ in 1997 (Gardner 1998).

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

Unit 12 has traditionally been an important moose hunting area for local residents, hunters from Southcentral Alaska, and guided nonresidents. It is also an important wildlife viewing area for tourists driving the Alaska Highway. During the 1960s when the Unit 12 moose population was high, hunting seasons and bag limits were liberal, and hunter participation and success were high. As moose numbers declined in the early 1970s, season length was shortened, cow seasons were eliminated by 1975, and the Nabesna Road moose season was closed entirely from 1975 through 1981. Between 1986 and 1991, the Little Tok River drainage was closed to moose hunting because of low recruitment and a declining bull:cow ratio. With the exception of portions of southeastern Unit 12 where a 30-day season has been in place for over 25 years, restrictive season length and bag limits have continued since 1991, including antler restrictions within the Tok River drainage since 2006.

## MANAGEMENT DIRECTION

### MANAGEMENT GOALS

- Protect, maintain, and enhance the moose population in concert with other components of the ecosystem.
- Continue sustained opportunities for subsistence use of moose.
- Maximize sustained opportunities to participate in hunting moose.
- Maximize opportunities for the nonconsumptive use of moose.

### MANAGEMENT OBJECTIVE

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

### INTENSIVE MANAGEMENT OBJECTIVES

- Population: 4,000–6,000 moose.
- Harvest: 250–450 moose annually.

## METHODS

### POPULATION ESTIMATION AND COMPOSITION SURVEYS

In 2011 we developed a 1,602 $mi^2$ moose survey area in the portions of Units 11 and 12 accessible from the Nabesna Road and adjacent trail system. We estimated moose population size and composition in the survey area using the geospatial population estimator (GSPE) method (Ver Hoef 2001, 2008; Kellie and DeLong 2006). To determine the survey area, we used moose distribution and movement patterns between the rut in October and survey season in late November from 22 adult moose (11 cows and 11 bulls) collared in the Nabesna Road area in October 2011. We surveyed 81 (50 high density and 31 low density; 499 $mi^2$) of 260 survey units in cooperation with the National Park Service in November 2011 with a search intensity of 7.0 to 8.0 min/$mi^2$. Snow cover was complete in all areas, and survey conditions were good in most survey units (T. Bentzen, Wildlife Biologist, ADF&G, memorandum 17 January 2012, Tok).

During November 2012 we conducted a GSPE moose survey in the northern portion of Unit 12, including the Tetlin National Wildlife Refuge (Tetlin NWR) and northwestern Unit 12 but excluding Wrangell–St. Elias National Park and Preserve. We surveyed 160 (94 high density and 66 low density; 973 $mi^2$) of 915 survey units and survey conditions were good to excellent on each day that surveys were conducted. U.S. Fish and Wildlife Service (FWS), Tetlin NWR staff collected survey data on federal and private lands in eastern and southern Unit 12, and ADF&G staff collected survey data on state and private lands in northwestern Unit 12 (T. Bentzen, memorandum 13 December 2012, Tok).

We have not obtained a sightability correction factor (SCF) specific to Unit 12 GSPE surveys. Based on studies conducted in Units 20A and 19D during 2003–2006, we applied an SCF of 1.25 to the Unit 12 GSPE estimates of observable moose during 2000–2006 (search intensity of 4.0 to 5.0 min/$mi^2$). Because average search intensity was higher during the 2008 and 2012 moose surveys (search intensity of 7.0 to 8.5 min/$mi^2$) we applied an SCF of 1.2 to the estimate of observable moose for these years.

Data collected during the 2011 and 2012 GSPE surveys were also used to determine moose population trends and sex and age composition within the survey areas, and to infer composition within Unit 12. During GSPE surveys, moose were classified as large bulls (antlers ≥50 inches); medium bulls (antlers larger than yearlings but <50 inches); yearling bulls (spike, forked or small palmate antlers without brow separation); cows without calves; cows with 1 calf; cows with 2 calves; lone calves; or unidentifiable moose.

In November 2013 we surveyed a trend count area in portions of Units 12 and 20D within the Robertson River drainage upstream of the confluence of the east and west fork. We surveyed all 24 of the high density GSPE sample units within the survey area and a random sample of the low density sample units (4 of 22), and survey conditions were fair to excellent in all survey units (J. Wells, Wildlife Biologist, ADF&G, memorandum 20 December 2013, Tok). Data collected during the survey was used to estimate sex and age composition within the survey area, and surveying a proportion of the low density sample units as opposed to only high density units allowed for more accurate and precise estimates.

### HARVEST

Harvest was estimated using mandatory harvest report cards. To increase the reporting rate, reminder letters were sent to hunters who did not initially report. Data obtained from the reports were used to determine total harvest, hunter residency, success rates, harvest chronology, and transportation used. Harvest data were summarized by regulatory year. Estimates of moose legally harvested outside the hunting season for ceremonial potlatches were obtained from potlatch harvest reports and by interviewing residents and public safety officers of villages where potlatches took place.

### HABITAT

We continued work with the Alaska Department of Natural Resources-Division of Forestry on an 880-acre timber sale in the lower Tok River drainage designed to increase deciduous browse and cover for wildlife while providing nursery structure for spruce regeneration. Timber harvest began in 2008 and scarification began in 2010. A total of 88 acres were scarified using a disk-trencher or blade during spring and summer 2010–2012. In 2001 we completed a burn plan

with the Alaska Department of Natural Resources-Division of Forestry to create early seral habitat in the Robertson River drainage. The plan was in review during RY13 and may be implemented when prescription conditions and funding allow.

## RESULTS AND DISCUSSION

### POPULATION STATUS AND TREND

*Population Size*

The population estimate derived from the 2011 survey in the 1,602 $mi^2$ Nabesna Road moose survey area was 1,261 observable moose (±17%, 90% CI; 0.79 moose/$mi^2$). Using an SCF of 1.20, similar to all Unit 12 surveys since 2008, the total estimated number of moose in the area was 1,249–1,777 (0.8–1.1 moose/$mi^2$).

The 2012 combined ADF&G and Tetlin NWR GSPE moose surveys produced an estimate of 4,773 (±15%, 90% CI) observable moose in Unit 12 excluding Wrangell–St. Elias National Park and Preserve. After applying an SCF of 1.20, the total estimated number of moose in the 6,000 $mi^2$ of suitable moose habitat was 4,883–6,571 (0.8–1.1 moose/$mi^2$). The highest moose densities (1.36 moose/$mi^2$) were in northwestern Unit 12. Similar density estimates of 0.9–1.1 moose/$mi^2$ in 2008 (unitwide) and 0.94, 1.07, and 1.43 moose/$mi^2$ in northwestern Unit 12 in 2005, 2006, and 2008, respectively, suggest a stable population trend (Table 1).

*Population Composition*

In 2011 we estimated a bull:cow ratio of 34:100 and a calf:cow ratio of 27:100 within the Nabesna Road area of Units 11 and 12. This is similar to the estimated 29 bulls:100 cows and 27 calves:100 cows in northwestern Unit 12 in 2012 (Table 2). However, the 2012 bull:cow and calf:cow ratios were a decrease from the 46 bulls:100 cows and 35 calves:100 cows estimated in 2008. Although the decrease in bull:cow ratios between 2008 and 2012 was not statistically significant (90% confidence intervals overlapped), the decrease warrants continued monitoring.

Based on a sample of 140 moose observed in the upper Tok River drainage during the northwestern Unit 12 moose survey in 2012, we estimated a bull:cow ratio of 30:100 and a calf:cow ratio of 27:100 within the Tok River drainage. This is similar to the 34 bulls:100 cows and 23 calves:100 cows observed in the upper Tok River trend count area in 2010. Conservative antler restrictions implemented in RY06 have been effective at maintaining bull:cow ratios at or above 30:100 within the Tok River drainage.

Based on a sample of 240 moose observed in the Robertson River trend count survey in 2013, we estimated a bull:cow ratio of 33:100 and a calf:cow ratio of 24:100. This survey was conducted in part to address concerns that hunting pressure had increased in recent years and the low bull:cow ratio (24:100) estimated in the area during the northwestern Unit 12 survey in 2012. However, our confidence in the 2012 estimate is low due to a low sample size. The estimated bull:cow ratio from the 2013 survey is comparable to the bull:cow ratio in all of northwestern Unit 12 of 29 bulls:100 cows in 2012 and in southeastern Unit 20D (all of Unit 20D east of the Johnson River, including the West Fork Robertson River) of 31 bulls:100 cows in 2011.

*Distribution and Movements*

Moose generally occur below 4,500 feet throughout Unit 12 and do not occupy the large portions of Unit 12 composed of rock and ice at high elevation in the Alaska, Wrangell, and Nutzotin mountains. Based on this criterion, 6,000 $mi^2$ (15,540 $km^2$) of Unit 12 is suitable moose habitat. The LANDFIRE vegetation classification based on 2001 Landsat™ imagery was used to estimate 5,250 $mi^2$ (13,597 $km^2$) of available winter moose habitat (deciduous woody browse $\geq$0.5 m tall) and 6,572 $mi^2$ (17,021 $km^2$) of summer range (winter range plus all other vegetated types; Paragi and Kellie 2011:Table 2). I continued to use the more general 6,000 $mi^2$ of moose habitat for this report because the LANDFIRE classification system has not yet been validated.

There are both migratory and nonmigratory segments of the moose population, with moose that rut in the Tok River area moving the greatest distances. Many cows from the Tok River area migrate to areas south of the Alaska Range to calve, return to the Tok River for the rut, then move north to winter either in the area burned by the 1990 Tok wildfire or along the Tanana River; a straight-line distance of 90–100 miles (144–160 km; Kelleyhouse 1983). These movements were especially pronounced following above average snow accumulation in November and early December 2011 in the Alaska Range and Mentasta mountains. Large numbers of moose were observed moving out of the Tok River drainage, and many were observed crossing the Tok Cutoff highway in December presumably moving to areas with less snow along the Tanana River, lower Tok River and the Tetlin Hills. Similar movements were also reported along the Slana and Chistochina river drainages in Unit 13C during December 2011.

In October and November 2011, National Park Service staff conducted radiotracking flights in the Nabesna Road area of Units 11 and 12. By late November, most moose had aggregated in several subalpine areas. Although some of the radiocollared moose remained close to their October capture locations, few moose remained along the Nabesna Road, in the flats along Tanada Creek, or along the Copper River. One cow moose had moved east across the Nabesna River to Camp Creek, and 2 cows and a bull moved from Platinum Creek and Devil Mountain Pass north to the upper Tetlin River. One bull moved from lower Tanada Creek west into upper Drop Creek. These radio collar locations were used to assist in defining the moose survey area and to provide preliminary stratification information for the November 2011 GSPE moose survey.

## MORTALITY

*Harvest*

Season and Bag Limit. Seasons and bag limits in Unit 12 are summarized in Table 3.

Alaska Board of Game Actions and Emergency Orders. In March 2012 the Alaska Board of Game (board) replaced the general season hunt for the portion of Unit 12 within the Nabesna River drainage west of the east bank of the Nabesna River upstream from the southern boundary of the Tetlin NWR with a registration hunt (RM291) for residents and nonresidents. The change to a registration hunt also included that portion of Unit 11 east of the east bank of the Copper River upstream from and including the Slana River drainage; therefore, season dates and antler restrictions were aligned for Units 11 and 12 along the Nabesna Road.

Harvest by Hunters. Reported harvest in Unit 12 was 110 bulls and 1 moose of unknown sex in RY11 and 127 bulls and 1 moose of unknown sex in RY12 (Table 4). Harvest during RY06–RY10 was similar, averaging 130 bulls annually (range: 107–159).

Total unitwide harvest was ≤4% of the estimated prehunt population in recent years and has likely had little impact on unitwide population dynamics. During RY11 and RY12, the annual out-of-season take was estimated at 25–40 moose, mostly cows. However, this is highly speculative and more data are needed to refine this estimate. During RY11 and RY12, reported potlatch moose harvest totaled 8 moose (75% cows), but reporting is poor and each year a large portion of the potlatch harvest remains undocumented. During RY11 and RY12, 81% (21 of 26) of potlatch permits issued for moose within Unit 12 remained unreported. This is a lower reporting rate than during RY05–RY10, when 47% (27 of 57) of permits remained unreported. During RY05–RY10, total reported potlatch harvest was 22 bulls, 14 cows, and 16 moose of unknown sex (52 total moose, $\bar{x}$ = 9 moose/year). Most of the potlatch harvest occurred near the communities of Tok, Tanacross, Tetlin, and Northway, and along the road system between these communities. Although potlatch harvest likely has little influence on unitwide population dynamics, localized harvest of cows near communities and along the road system might hinder population growth in these areas.

Hunter Residency and Success. The number of people who reported hunting moose in Unit 12 was 482 in RY11 and 577 in RY12 (Table 5). Hunter numbers were the lowest in RY11 compared to the previous 10 years (range: 506–616) and were similar in RY12 to the previous 5-year average of 576 hunters. The success rate in RY11 (23%) and RY12 (22%) was similar to the previous 5-year average of 23%.

During RY11 and RY12, local residents accounted for an average of 46% of moose hunters, nonlocal residents averaged 42%, and nonresidents averaged 12%. The number of local resident and nonresident hunters has remained relatively constant since RY94 and, other than an increase in RY12, the number of nonlocal resident hunters has remained relatively constant since RY02. Local hunters took 40% and 30% of the reported harvested bulls in RY11 and RY12 respectively, nonlocals took 37% and 43%, and nonresidents took 23% and 26% (Table 5). Although harvest by nonlocal Alaska residents increased during RY01–RY04, it has remained relatively constant since then.

Since the community harvest hunt (CM300) was implemented, 3 hunters harvested 1 moose in Unit 12 in RY09 and 2 hunters were unsuccessful in Unit 12 in RY11. No CM300 permittees reported hunting in Unit 12 in RY10 or RY12.

Harvest Chronology. Beginning in RY01 the hunting season in most of Unit 12 was split into 2 periods: 24–28 August and 8–17 September. This attempt to maintain harvest within sustainable levels eliminated the large influx of hunters during the Labor Day holiday weekend but retained overall season length (15 days). During the early portion of the season in RY01–RY08 (24–28 August) harvest was reduced 36% ($\bar{x}$ = 12 bulls) compared to RY93–RY00 (1–6 September, $\bar{x}$ = 33 bulls) (Table 6). However, harvest increased during the 10-day September season, but the unitwide harvest remained within sustainable levels. Since RY01, an average of 11% of the total harvest occurred during the August portion of the season. Overall there has been little change in the harvest chronology since the change of season dates in RY01.

Transport Methods. During RY11 and RY12, the type of transportation used most by successful hunters was 4-wheelers ($\bar{x}$ = 30%), followed by highway vehicle ($\bar{x}$ = 24%), airplane ($\bar{x}$ = 15%), boat ($\bar{x}$ = 12%), horse ($\bar{x}$ = 11%), and other off-road vehicles (ORV) ($\bar{x}$ = 9%; Table 7). Other than a slightly lower use of boats by successful hunters in RY11 and RY12, there were no other deviations from the previous 10 years.

*Other Mortality*

No estimates of natural mortality were calculated during RY11 and RY12. However, based on research in adjacent Unit 20E (Boertje et al. 1988, Gasaway et al. 1992), predation by wolves and grizzly bears is probably the greatest source of mortality for moose in Unit 12 and has likely been the major factor keeping the population at a low density since the mid-1970s. During RY11 and RY12, an estimated 10–15 moose were killed annually in collisions with highway vehicles in Unit 12 (Table 4).

## HABITAT

*Assessment*

Wildfire suppression has allowed large areas of potentially good moose habitat to become dominated by spruce forests lacking abundant moose browse. However, browse surveys conducted periodically since the 1970s indicate that use of preferred browse species is low in most years relative to availability. During deep snow winters, moose concentrated in areas along the Tok and Tanana rivers and the browsing rate was much higher (Gardner 2000). In all years, disturbed sites with early successional species were used far more heavily than adjacent undisturbed areas. We do not believe that habitat was a major factor limiting the moose population in Unit 12 during RY11 and RY12. However, the creation of medium- to large-scale habitats with early seral species may result in a higher moose population, as evidenced by moose population increases in the 1969 Ladue burn in eastern Unit 20E, the 1990 Tok burn in Unit 12 (Gardner 2000), and the Teslin burn in Yukon, Canada (Boertje et al. 1995). Boertje et al. (1995) hypothesized that early seral stages also reduce predation efficiency in a variety of ways.

*Enhancement*

In 1990 a wildfire burned approximately 155 $mi^2$ of primarily black spruce muskeg in the Tetlin Hills and adjacent to Tok. Quality moose browse species now dominate much of this area. In response, the moose population within the burned area increased rapidly from an estimated 0.19 moose/$mi^2$ in 1989 to an estimated 1.0 moose/$mi^2$ by 1997. Excellent moose winter browse is expected to persist for the next 5–10 years. As a result, local residents who observed the increase in moose in this area are receptive to using fire or other habitat enhancement techniques to benefit moose, as evidenced by public support of the planned prescribed burns in the Robertson River. Wildfires occurred on 434 $mi^2$, 28 $mi^2$, and 112 $mi^2$ in Unit 12 during 2004, 2010, and 2013, respectively, improving habitat quality for moose in the area. No prescribed burns were conducted during RY11 or RY12.

Since 1998 we have been working in cooperation with the Alaska Department of Natural Resources-Division of Forestry to determine suitable timber harvest sites within a proposed 880-acre timber sale area in the Tok River valley. Potential areas to be harvested were selected based on numbers of marketable trees, historic winter moose use, and the potential to regenerate quality

moose browse species. Timber harvest began in 2008 and 528 acres had been harvested by spring 2013. Twenty- to 80-acre harvest units were partially harvested (e.g., trees greater than a certain diameter) or clearcut depending on market demand and silvicultural objectives. The intent is to scarify sites after harvest as warranted to encourage hardwood regeneration and leave some late-seral features to simulate natural disturbance and succession (Alaska Department of Natural Resources 2003). Scarification began in spring 2010 but several issues were encountered, including the inaccessibility of the harvest units during spring–fall; as a result, only 88 acres have been scarified. We will continue to work with the Division of Forestry to initiate scarification on accessible sites as they are harvested.

#### NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

ADF&G has worked with local communities during village council meetings and traditional knowledge workshops to improve potlatch reporting and reduce harvest of cow moose, but few corrective steps have been taken. Potlatches are culturally important and should be maintained; however, reporting must improve in order to better assess the influence of cow harvest on localized populations. In 2009, ADF&G worked with the Tetlin Village Council to develop a Tetlin tribal moose management plan to better understand how the needs of the community of Tetlin can be met within Tetlin tribal lands. We plan to continue to work with the village council concerning moose management on tribal lands.

## CONCLUSIONS AND RECOMMENDATIONS

Population surveys in fall 2012 indicate the unitwide population is likely stable at 4,883–6,571 moose (0.8–1.1 moose/mi$^2$ of suitable moose habitat), which met the intensive management population objective of 4,000–6,000 moose. The moose population in Unit 12 is likely to remain at low to moderate density if there is no change in the density of wolves and grizzly bears or number of medium- to large-scale wildfires. Furthermore, local moose numbers near some communities and along the road system may also be limited by the harvest of cows.

During RY11 and RY12 we met the Unit 12 moose management objective of maintaining a posthunting sex ratio of at least 40 bulls:100 cows east of the Nabesna River and 20 bulls:100 cows in the remainder of the unit. The bull:cow ratio in the more accessible areas now appears stable at or above 30:100 due to moderate harvest rates and low yearling bull recruitment. The bull:cow ratio in northwestern Unit 12 decreased from an estimated 46 bulls:100 cows in 2008 to an estimated 29 bulls:100 cows in 2012, though the decrease was not statistically significant (based on 90% confidence intervals). The northwestern Unit 12 population estimate and the unitwide harvest, hunters, and harvest distribution remained stable; therefore, if the bull:cow ratio is truly declining, the mechanism for the decrease is unknown. Expanding the area with moose antler restrictions into the upper Tok River drainage in RY06 successfully increased the bull:cow ratio while allowing maximum hunter opportunity. Since fall 2008 the bull:cow ratio in the upper Tok River drainage has ranged 30–39 bulls:100 cows. Similar harvest restrictions may be needed in other areas of high harvest to maintain a bull:cow ratio adequate to meet our management objectives.

Since RY08, harvest has averaged 130 moose (range 107–159). With a bulls-only harvest, this harvest rate is within sustainable levels (based on a 3–4% harvest rate). However, continued harvest of cows may be unsustainable in localized areas (causing decline or hindering population

growth). During the next report period, additional effort will be placed on increasing the potlatch reporting rate in order to more accurately track overall cow harvest within the unit.

Harvest of 111 moose in RY11 and 126 in RY12 did not meet the intensive management harvest objective of 250–450 moose. Difficult hunter access, especially on the Tetlin NWR and on private lands, combined with low moose recruitment make it unlikely we will achieve the intensive management harvest objective. Recruitment of young moose into the population must be improved, especially near roads and trails, to make progress toward this harvest objective.

We monitored population trends during RY11 and RY12. Additional habitat enhancement programs are ongoing. Hunting seasons and bag limits allowed maximum allowable hunting opportunity and met subsistence opportunity. Moose viewing opportunities were enjoyed by both visitors and local residents. We continue to work with local communities to manage harvest and reduce take of cow moose.

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Table 1. Unit 12 population estimates using the geospatial population estimator, 2003–2012.

| Survey area | Year | Survey size (mi²) | Number of sample units surveyed | Population estimate (±90% CI) | Population estimate with SCF | Moose/mi² w/SCF |
|---|---|---|---|---|---|---|
| Northwestern Unit 12[a] | 2003 | 2,845 | 69 | 3,064 (±35%) | 3,830[b] | 1.35[b] |
| | 2005 | 2,845 | 48 | 2,129 (±15%) | 2,661[b] | 0.94[b] |
| | 2006 | 2,702 | 89 | 2,317 (±18%) | 2,896[b] | 1.07[b] |
| | 2008 | 2,702 | 92 | 3,225 (±18%) | 3,870[c] | 1.43[c] |
| | 2012 | 2,702 | 80 | 3,058 (±12%) | 3,670[c] | 1.36[c] |
| Southeastern Unit 12[d] | 2003 | 2,954 | 80 | 1,317 (±19%) | 1,646[b] | 0.56[b] |
| | 2004 | 2,954 | 80 | 1,272 (±20%) | 1,590[b] | 0.54[b] |
| | 2008 | 2,954 | 80 | 1,843 (±20%) | 2,212[c] | 0.75[c] |
| | 2012 | 2,954 | 80 | 1,613 (±17%) | 1,936[c] | 0.66[c] |
| Nabesna Road[e] | 2011 | 1,602 | 81 | 1,272 (±17%) | 1,526[c] | 0.95[c] |

[a] Survey area includes state and private lands in northwestern Unit 12. Survey conducted by Alaska Department of Fish and Game.
[b] Sightability correction factor of 1.25 used in estimate.
[c] Sightability correction factor of 1.20 used in estimate.
[d] Survey area includes federal and private lands in eastern and southern Unit 12. Survey conducted by Fish and Wildlife Service, Tetlin National Wildlife Refuge.
[e] Survey area includes portions of Unit 11 and 12 mostly within the Wrangell-St. Elias National Park and Preserve.

Table 2. Unit 12 aerial moose composition counts, fall 2003–2012.

| Year | Bulls:100 Cows | Yearling bulls:100 Cows | Calves:100 Cows | Percent calves | Calves observed | Adults observed | Moose observed |
|---|---|---|---|---|---|---|---|
| Northwestern Unit 12[a] | | | | | | | |
| 2003 | 25 | 7 | 32 | 19 | 111 | 464 | 575 |
| 2005 | 22 | 11 | 30 | 18 | 69 | 315 | 384 |
| 2006 | 37 | 7 | 41 | 21 | 185 | 688 | 873 |
| 2008 | 46 | 15 | 35 | 20 | 218 | 899 | 1,117 |
| 2012 | 29 | 6 | 27 | 16 | 133 | 650 | 819 |
| Southeastern Unit 12[b] | | | | | | | |
| 2003 | 89 | 15 | 33 | 16 | 89 | 475 | 564 |
| 2004 | 70 | 16 | 48 | 20 | 89 | 351 | 440 |
| 2008 | 62 | 14 | 24 | 13 | 81 | 552 | 633 |
| 2012 | 52 | 9 | 18 | 9 | 65 | 634 | 699 |
| Nabesna Road[c] | | | | | | | |
| 2011 | 34 | 3 | 27 | 14 | 75 | 476 | 551 |

[a] Survey area includes state and private lands in northwestern Unit 12. Survey conducted by Alaska Department of Fish and Game.
[b] Survey area includes federal and private lands in eastern and southern Unit 12. Survey conducted by U.S. Fish and Wildlife Service, Tetlin National Wildlife Refuge.
[c] Survey area includes portions of Unit 11 and 12 mostly within the Wrangell-St. Elias National Park and Preserve.

Table 3. Unit 12 moose hunting seasons and bag limits, regulatory years[a] 2011 and 2012.

| Regulatory year | Area | Season | | Bag limit[b] |
|---|---|---|---|---|
| 2011 | Unit 12, that portion in the Tok River drainage upstream from the Tok Cutoff Bridge, including the Little Tok River drainage.[c] | RESIDENT: | 24–28 Aug<br>8–17 Sep | 1 bull with spike–fork antlers or 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | | NONRESIDENT: | 8–17 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | Unit 12, east of the Nabesna River and south of the winter trail running southeast from Pickerel Lake to the Canadian Border. | RESIDENT: | 1–30 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | | NONRESIDENT: | 1–30 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | Remainder of Unit 12 | RESIDENT: | 24–28 Aug<br>8–17 Sep | 1 bull.<br>Or 1 bull. |
| | | NONRESIDENT: | 8–17 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| 2012 | Unit 12, that portion in the Tok River drainage upstream from the Tok Cutoff Bridge, including the Little Tok River drainage.[c] | RESIDENT: | 24–28 Aug<br>8–17 Sep | 1 bull with spike–fork antlers or 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | | NONRESIDENT: | 8–17 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side |
| | Unit 12, east of the Nabesna River and south of the winter trail running southeast from Pickerel Lake to the Canadian Border | RESIDENT: | 1–30 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | | NONRESIDENT: | 1–30 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |
| | Unit 12, that portion in the Nabesna River drainage west of the east bank of the Nabesna River upstream from the southern boundary of Tetlin National Wildlife Refuge | RESIDENT: | 20 Aug–17 Sep | 1 bull with spike–fork antlers or 50-inch antlers or antlers with 3 or more brow tines on at least one side by registration permit. |
| | | NONRESIDENT: | 20 Aug–17 Sep | 1 bull with 50-inch antlers or antlers with 3 or more brow tines on at least one side by registration permit. |
| | Remainder of Unit 12 | RESIDENT: | 24–28 Aug<br>8–17 Sep | 1 bull, or<br>1 bull. |
| | | NONRESIDENT: | 8–17 Sep | 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side. |

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).
[b] Fifty-inch antlers defined as having a spread of at least 50 inches at the widest point or at least 4 brow tines on at least one side.
[c] This hunt area and season dates include hunters using general harvest tickets and those hunting under the CM300 permit.

Table 4. Unit 12 moose harvest and accidental death, regulatory years[a] 2003–2012.

| Regulatory year | Harvest by hunters: Reported M (%) | Reported F (%) | Reported Unk | Reported Total | Estimated Unreported | Estimated Illegal | Estimated Total | Accidental death Road | Accidental death Total | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| 2003 | 132 (99) | 1 (1) | 1 | 134 | 20–50 | 3–10 | 23–60 | 3–5 | 3–5 | 160–199 |
| 2004 | 137 (100) | 0 (0) | 0 | 137 | 20–50 | 3–10 | 23–60 | 3–5 | 3–5 | 163–202 |
| 2005 | 134 (100) | 0 (0) | 2 | 136 | 20–30[b] | 5–10 | 25–40 | 3–5 | 3–5 | 164–181 |
| 2006 | 118 (100) | 0 (0) | 0 | 118 | 20–30[b] | 5–10 | 25–40 | 3–5 | 3–5 | 146–163 |
| 2007 | 121 (100) | 0 (0) | 1 | 122 | 20–30[b] | 5–10 | 25–40 | 3–5 | 3–5 | 150–167 |
| 2008 | 159 (100) | 0 (0) | 0 | 159 | 20–30[b] | 5–10 | 25–40 | 3–5 | 3–5 | 187–204 |
| 2009 | 143 (99) | 1 (1) | 2 | 146 | 20–30[b] | 5–10 | 25–40 | 14 | 14 | 185–200 |
| 2010 | 105 (100) | 0 (0) | 2 | 107 | 20–30[b] | 5–10 | 25–40 | 13 | 13 | 145–160 |
| 2011 | 110 (100) | 0 (0) | 1 | 111 | 20–30[b] | 5–10 | 25–40 | 10–15 | 10–15 | 146–166 |
| 2012 | 127 (100) | 0 (0) | 1 | 128 | 20–30[b] | 5–10 | 25–40 | 10–15 | 10–15 | 163–183 |

[a] Regulatory year (RY) begins 1 July and ends 30 June (e.g., RY03 = 1 July 2003–30 June 2004).

[b] Includes reported ceremonial potlatch harvest of 9, 2, 7, 15, 19, 0, 3, and 5 moose during RY05–RY12.

Table 5. Unit 12 moose hunter residency and success, regulatory years[a] 2003–2012.

| Regulatory year | Successful | | | | | Unsuccessful | | | | | Total hunters |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local[b] resident | Nonlocal resident | Nonresident | Unk | Total (%) | Local[b] resident | Nonlocal resident | Nonresident | Unk | Total (%) | |
| 2003 | 54 | 44 | 36 | 0 | 134 (24) | 230 | 164 | 35 | 4 | 433 (76) | 567 |
| 2004 | 49 | 53 | 34 | 1 | 137 (25) | 204 | 167 | 30 | 0 | 401 (75) | 538 |
| 2005 | 53 | 51 | 30 | 2 | 136 (24) | 234 | 167 | 35 | 2 | 438 (76) | 574 |
| 2006 | 48 | 42 | 26 | 2 | 118 (20) | 255 | 178 | 40 | 3 | 476 (80) | 594 |
| 2007 | 61 | 38 | 23 | 0 | 122 (20) | 256 | 189 | 45 | 3 | 493 (80) | 615 |
| 2008 | 53 | 57 | 49 | 0 | 159 (26) | 251 | 160 | 42 | 4 | 457 (74) | 616 |
| 2009 | 60[b] | 57 | 26 | 3 | 146 (27) | 217[c] | 162 | 23 | 0 | 402 (73) | 548 |
| 2010 | 44 | 47 | 16 | 0 | 107 (21) | 215 | 151 | 28 | 5 | 399 (79) | 506 |
| 2011 | 44 | 41 | 26 | 0 | 111 (23) | 193[c] | 149 | 27 | 2 | 371 (77) | 482 |
| 2012 | 38 | 54 | 33 | 1 | 126 (22) | 211 | 199 | 39 | 2 | 451 (78) | 577 |

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).
[b] Residents of Units 12, 20E, and eastern 20D are considered local residents. Local residents live mainly at Eagle, Chicken, Boundary, Northway, Tetlin, Tok, Tanacross, Slana, and Dot Lake.
[c] Includes hunters hunting under the CM300 community harvest permit.

Table 6. Unit 12 moose harvest chronology by month/day, regulatory years[a] 2003–2012.

| Regulatory year | Harvest chronology by month/day (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 8/15–8/28 | 9/1–9/6 | 9/7–9/13 | 9/14–9/20 | 9/21–9/27 | 9/28–10/5 | Unknown | *n* |
| 2003 | 12 (9) | 2 (1) | 63 (47) | 40 (30) | 12 (9) | 2 (1) | 3 (2) | 134 |
| 2004 | 7 (5) | 3 (2) | 68 (50) | 43 (32) | 10 (7) | 4 (3) | 0 (0) | 135 |
| 2005 | 12 (9) | 0 (0) | 58 (46) | 43 (34) | 7 (6) | 7 (6) | 0 (0) | 127 |
| 2006 | 15 (13) | 2 (2) | 60 (51) | 31 (26) | 4 (3) | 4 (3) | 2 (2) | 118 |
| 2007 | 15 (12) | 0 (0) | 58 (48) | 36 (30) | 5 (4) | 3 (2) | 5 (4) | 122 |
| 2008 | 16 (10) | 3 (2) | 82 (52) | 42 (26) | 12 (8) | 3 (2) | 1 (1) | 159 |
| 2009 | 22 (15) | 2 (1) | 71 (49) | 42 (29) | 6 (4) | 2 (1) | 1 (1) | 146 |
| 2010 | 8 (8) | 1 (1) | 55 (51) | 39 (36) | 3 (3) | 1 (1) | 0 (0) | 107 |
| 2011 | 15 (13) | 3 (3) | 43 (39) | 43 (39) | 6 (5) | 0 (0) | 1 (1) | 111 |
| 2012 | 16 (13) | 3 (2) | 61 (48) | 35 (28) | 7 (6) | 1 (1) | 3 (2) | 126 |

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

Table 7. Unit 12 moose harvest percent by transport method, regulatory years[a] 2003–2012.

| Regulatory year | Harvest percent by transport method | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Airplane | Horse | Boat | 3- or 4-wheeler | Snowmachine | Other ORV | Highway vehicle | Unknown | *n* |
| 2003 | 12 | 13 | 16 | 31 | 0 | 10 | 16 | 1 | 134 |
| 2004 | 15 | 11 | 15 | 36 | 0 | 7 | 15 | 1 | 137 |
| 2005 | 13 | 10 | 13 | 36 | 0 | 7 | 19 | 1 | 136 |
| 2006 | 24 | 3 | 16 | 37 | 0 | 9 | 9 | 1 | 118 |
| 2007 | 17 | 8 | 13 | 30 | 0 | 10 | 18 | 3 | 122 |
| 2008 | 18 | 11 | 18 | 32 | 0 | 8 | 11 | 3 | 159 |
| 2009 | 17 | 6 | 13 | 38 | 0 | 6 | 19 | 1 | 146 |
| 2010 | 15 | 4 | 21 | 34 | 0 | 6 | 20 | 0 | 107 |
| 2011 | 17 | 9 | 14 | 28 | 0 | 8 | 22 | 2 | 111 |
| 2012 | 13 | 12 | 9 | 31 | 0 | 9 | 25 | 1 | 126 |

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).