Alaska Department of Fish and Game
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CHAPTER 34 MOOSE MANAGEMENT REPORT

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

LOCATION

GAME MANAGEMENT UNITS: 25A, 25B, and 25D (47,968 mi^2)

GEOGRAPHIC DESCRIPTION: Upper Yukon River valley

BACKGROUND

Historically, moose have been relatively scarce in the upper Yukon River valley. Long-time residents of the area report moose were hard to find in the early 1900s, but were more common in the latter half of that century (F. Thomas, H. Petersen, K. Peter, personal communication with B. Stephenson, ADF&G Area Wildlife Biologist, circa 1998). However, moose density continues to be low compared with many other areas of Interior Alaska. Recent population trends in Units 25A and 25B are not well understood. Reports from experienced guides and pilots indicate moose numbers in Unit 25B have declined and are currently at a low level. Periodic surveys in Unit 25A suggest that moose numbers declined in this area from the late 1980s through the early 2000s, and have been stable at lower densities since then.

In Unit 25D, a few population surveys were conducted in the late 1970s, and more extensive surveys began in 1981 when the Alaska Department of Fish and Game (ADF&G) established a Fort Yukon area office. In the 1980s and 1990s trend count surveys and stratified random sampling were used by ADF&G and the U.S. Fish and Wildlife Service (FWS) to estimate population density. Estimates ranged from a low of 0.1 moose/mi^2 in the western Yukon Flats in 1984 to a high of 0.64 moose/mi^2 in the eastern Yukon Flats in 1989.

State regulations for moose hunting have changed little over the past decade in Units 25A and 25B. In Unit 25A, seasons were either 1–20 September or 5–25 September with an any bull bag limit for residents and an antler restricted bag limit (50-inch antlers or at least 4 brow tines on one side) for nonresidents. For most of Unit 25B, the resident moose hunting season was 5–25 September and 1–15 December with an any-bull bag limit. The nonresidents season was 5–25 September with an antler restricted bag limit (50-inch antlers or at least 4 brow tines on one side). In the upper Porcupine River drainage, the season was changed in 2003 from 20–30 September for residents and nonresidents to 10–25 September. A community harvest permit hunt (CM001) was established in 2003 for most of Unit 25B with a bag limit of any bull and a season during 5–25 September and 1–15 December.

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

Unit 25D was divided into Unit 25D West and Unit 25D East in the early 1980s to allow the use of regulatory schemes that reflected the different status of these moose populations. The boundary between the 2 areas lies along Preacher and Birch Creeks south of the Yukon River and along the Hadweenzic River north of the Yukon River. Low moose density in Unit 25D West, combined with the relatively high demand for moose by local residents, resulted in the use of permit systems that limited hunting primarily to residents of the area. In 1983, in Unit 25D West, a registration hunt for 1 bull moose was established, with 60 permits available to residents of Beaver (25 permits), Stevens Village (25 permits), and Birch Creek (10 permits). In 1984 the fall season was shortened and 2 winter hunting periods were added and by 1986 a harvest quota was established for 35 bull moose. In regulatory year (RY) 1990 (RY = 1 July through 30 June, e.g., RY90 = 1 July 1990 through 30 June 1991) a Tier II permit hunt was established because the harvestable surplus was deemed insufficient to support all subsistence uses, and restrictions were thought to be necessary. During most of the 1990s, 125 permits and 3 hunting seasons were available. Also, beginning in 1990, the Federal Subsistence Board promulgated regulations for subsistence use on federal lands and provided an unlimited number of permits to residents of the 3 communities in Unit 25D West to hunt bull moose on federal lands. The state Tier II permit system remained in effect and applied to both private and federal lands. However, during RY93–RY99, state Tier II permits were not recognized on federal land. During this period, a maximum of 30 federal permits and 125 state Tier II permits were issued. In 1999, discussions with local residents helped identify steps that could improve moose management on the western Yukon Flats. These steps included revising the harvest quota for moose, reducing the maximum number of Tier II permits available, and aligning state and federal hunting seasons. In 2000, based on these discussions, the Alaska Board of Game lengthened the state season in Unit 25D West to 25 August–28 February (aligning it with the federal season), increased the harvest quota from 35 to 60 bull moose, and reduced the number of Tier II permits from 125 to 75 permits. State Tier II permits issued to residents of Unit 25D West were again recognized as valid on federal lands beginning in 2000, when 60 federal and 75 state Tier II permits were available, with a combined state and federal harvest quota of up to 60 bull moose.

In Unit 25D East, moose hunting remained under the general harvest ticket system for 1 bull moose with a short fall season of 10–20 September and a short winter season of 1–10 December or 18–28 February. A nonresident hunt in the fall has been available with 50-inch antler restrictions and implemented in 1990–1991. In 2000 the board also approved a regulation that established a community harvest permit program for part of Unit 25D East. The board established the Chalkyitsik Community Harvest Area (CM001) and a community harvest bag limit for moose in the portion of Units 25D and 25B included in the community harvest area.

Other state regulations influenced moose hunting regulations in Unit 25D. In 1987 the Alaska Board of Game determined there was a positive customary and traditional use finding for moose in Unit 25D (5 AAC 99.025). The board identified 2 populations of moose for subsistence purposes in Unit 25D. Amounts reasonably necessary for subsistence uses (ANS) were established in Unit 25D West as 25–50 moose and in Unit 25D East as 150–250. In 1992 the customary and traditional finding was reaffirmed. In 2002 the board revised the ANS to 50–70 moose for Unit 25D West.

Federal regulations have also influenced moose hunting in Unit 25D. Since 1990, dual management by ADF&G and federal agencies significantly affected hunting regulations in

Unit 25D. The cumulative effect of various annual permit application requirements, confusion over geographic boundaries, and other circumstances have resulted in low reporting and limited participation by local residents in the harvest management system.

Separate survey areas have been conducted in Units 25D East and 25D West by ADF&G and FWS, respectively. Since 1999, population surveys were conducted by ADF&G and FWS using geospatial population estimators (GSPE) described by Ver Hoef (2001, 2008) and Kellie and DeLong (2006). From 1999 to 2009, estimated densities from fall surveys have ranged from 0.18 to 0.41 moose/mi^2. Survey data indicated that moose numbers were slightly higher in the eastern Yukon Flats compared to the western Yukon Flats. Both populations are at low density for Interior Alaska (Gasaway et al. 1992).

MANAGEMENT DIRECTION

Unit 25D has 7 communities (Beaver, Birch Creek, Chalkyitsik, Circle, Fort Yukon, Stevens Village, and Venetie). Residents of those communities have historically and continue to harvest moose as their primary wild food resource (Van Lanen et al. 2012). The importance of moose to those communities and other Alaska residents, despite historically low moose densities, resulted in moose being identified as an intensive management (IM) species for Unit 25D. Therefore, management goals and objectives for Unit 25D and eastern Unit 25B reflect harvest needs for those subunits and most of the Unit 25 moose funding is allocated to monitor or research moose populations in Unit 25D.

During the early to mid-1990s, cooperative effort among ADF&G, FWS, and local residents of Unit 25D resulted in 2 educational videos on moose management in the Yukon Flats emphasizing the adverse effects of shooting cow moose. During this period it also became evident that there was substantial local concern about the status of moose populations; opposition to the taking of cow moose; and support for increased enforcement, biological studies, predator control, and local involvement in moose management. As a result, ADF&G initiated a cooperative effort in 2001 to develop a moose management plan for the Yukon Flats. By 2002 the *Yukon Flats Cooperative Moose Management Plan* (YFCMMP) was completed and endorsed by the Board of Game (ADF&G 2002). The plan was developed under the sponsorship of ADF&G–Division of Wildlife Conservation, in cooperation with the Yukon Flats Fish and Game Advisory Committee through the Yukon Flats Moose Management Planning Committee, an advisory group created specifically for the planning project. Other involved stakeholders included the Council of Athabascan Tribal Governments (CATG), individual tribal governments, FWS–Yukon Flats National Wildlife Refuge, FWS–Office of Subsistence Management, and other interested users of the Yukon Flats moose resource. This effort focused on community and agency initiatives that together could maintain or increase moose abundance, especially in key hunting areas near local communities, as well as the interest of nonlocal hunters and other interested parties. YFCMMP was designed to promote moose population growth in the Yukon Flats through the following guidelines: 1) improve moose harvest reporting to better document subsistence needs and improve management, 2) reduce predation on moose by increasing the harvest of bears and wolves, 3) minimize illegal cow moose harvest and reduce harvest of cows for ceremonial purposes to improve recruitment, 4) inform hunters and others about the low moose population on the Yukon Flats and avenues people can take to help in the effort to

increase moose abundance, and 5) use both scientific information and traditional knowledge to help make management decisions.

In March 2006 the board requested that ADF&G develop an IM plan for moose in the Yukon Flats in response to public proposals that requested predator control for wolves and bears in Unit 25D to reduce predation on moose. In March 2008, ADF&G presented IM options to the board that explored a wide spectrum of management options to increase moose abundance in Yukon Flats. The presentation acknowledged the difficulty of implementing broad scale predator control on FWS lands and focused on the feasibility of increased wolf and bear harvest on smaller private lands surrounding villages in order to increase moose survival. IM objectives also included improved reporting by local residents and reduced illegal cow harvest. Many of the recommendations made in the IM proposal mirrored those previously identified in YFCMMP.

During 2008–2011, ADF&G conducted an IM feasibility assessment to evaluate the efficacy of implementing an IM plan in western Unit 25D. The assessment used data from existing monitoring programs conducted by ADF&G and FWS and implementation of new programs in coordination with the Beaver Tribal Council and CATG. The IM assessment focused on evaluating whether the following 4 objectives were achievable and sustainable: 1) increase black and brown bear harvest; 2) increase wolf harvest; 3) obtain accurate harvest reporting for moose, black bears, grizzly bears, and wolves; and 4) eliminate illegal and potlatch harvest of cow moose. The results of the feasibility assessment concluded that public-based efforts to reduce black bear, brown bear, and wolf abundance to levels sufficient to improve moose survival was not currently possible. In addition, department-based predator control was not permitted on federal land which accounts for most of western Unit 25D. As a result, current management direction focuses on monitoring moose population status and improving harvest reporting rates to provide for maximum sustained harvest. Caikoski (2012) provides a more comprehensive description of the results of the feasibility assessment.

MANAGEMENT GOALS

Unit 25 Overall

- Protect, maintain, and enhance the moose population and its habitat in concert with other components of the ecosystem while providing for maximum sustained harvest.

Unit 25A

- Provide an opportunity to hunt under aesthetically pleasing conditions and provide for subsistence use.

Units 25B and 25D

- Provide for subsistence use and for the greatest opportunity to harvest moose.

- Protect, maintain, and enhance the Yukon Flats moose population and habitat, maintain traditional lifestyles and provide opportunities for use of the moose resource.

- Increase the harvestable surplus of bull moose in key hunting areas near local communities by reducing mortality from bear and wolf predation.

- Improve moose harvest reporting.

- Minimize cow moose harvest, recognizing that some cows will probably be taken for ceremonial purposes when bull moose are seasonally in poor condition.

- Work with local communities to implement harvest strategies to increase bear and wolf harvest.

MANAGEMENT OBJECTIVES

- Increase the size of the moose population by 2–5% annually in key hunting areas near local communities in Unit 25D.

- With assistance from the Division of Subsistence, implement a systematic household harvest survey in Unit 25D to obtain 90% reporting.

- Reduce illegal and potlatch harvest of cow moose to less than 5% of total annual harvest.

- Maintain a minimum of 40 bulls per 100 cows as observed in fall surveys.

ACTIVITIES

- Continue efforts to communicate with and educate local residents about moose management and the effects of cow moose harvest.

- Work with natural resource offices in local communities to obtain and exchange information on moose populations and management issues.

- Develop cooperative management programs involving state, federal, and tribal management organizations to help improve local harvest monitoring and reporting.

- Monitor moose population status through annual surveys.

METHODS

POPULATION STATUS AND TREND

Unit 25A and Unit 25B Survey Area and Methods

No population estimation or composition surveys have been conducted in Unit 25B since the late 1980s. Composition surveys have occasionally been conducted in a small portion of eastern Unit 25A since 1991. The survey area consists of the riparian habitat upstream of Bear Mountain in the Coleen drainage and the riparian habitat upstream of Double Mountain in the Sheenjek drainage. Survey methods have varied slightly between years, especially with respect to search time and aircraft type, but generally consist of surveying most of the available moose habitat, counting the total number of moose observed, and classifying observed moose as adult bull, yearling bull, calf, or cow. Most surveys were conducted by the FWS, with the exception of 2012 when ADF&G conducted the Coleen portion of the survey and FWS conducted the Sheenjek portion of the survey.

Unit 25D East Survey Area and Methods

No population estimation or composition surveys were conducted in Unit 25D East during RY11 or RY12 due to poor survey conditions. However, surveys of Unit 25D East have been regularly conducted over the past decade. Caikoski (2008, 2010) provide survey area descriptions and methods for surveys conducted in prior years.

Unit 25D West Survey Area and Methods

FWS conducted a moose population survey in fall 2010 and in spring 2013 in the western portion of Unit 25D using GSPE described by Ver Hoef (2001, 2008) and Kellie and DeLong (2006). Survey area descriptions and methods for both surveys are described by Lake (2010, 2013).

Unit 25D Extrapolated Population Estimate Methods

The estimated moose population size for all of Unit 25D was obtained by extrapolating the estimated density range from the Unit 25D East survey area across the remainder of Unit 25D East (10,750 mi^2) and by extrapolating the estimated density range from the Unit 25D West survey area across the remainder of Unit 25D West (6,750 mi^2). The extrapolated densities for Units 25D East and 25D West were then converted to total moose for each respective area and summed to obtain the total observable moose population for Unit 25D. The observable moose population estimate was expanded upward to account for sightability. For Unit 25D East, the most recent fall survey results occurred in 2007 and were used. For Unit 25D West, the 2008 fall survey was used because a high proportion of survey units were surveyed and precision was good compared to the most recent survey which occurred in 2010.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Units 25A and 25B. No population surveys were conducted in Unit 25A or Unit 25B in RY11 or RY12. The total number of moose observed while conducting composition surveys suggest that moose abundance may have declined in the upper Sheenjek and Coleen river drainages in eastern Unit 25A during the late 1980s and early 2000s and have stabilized at lower numbers since the early 2000s (Table 1). However, these surveys were not designed to estimate moose abundance. The current trend in moose abundance in Units 25A and 25B is unknown, though moose are likely widespread at low density throughout both units.

Unit 25D East – ADF&G Survey. No population estimation surveys were conducted during RY11 or RY12. However, fall density estimates for moose in Unit 25D East have been stable and consistently low (0.13–0.34 observable moose/mi^2) since GSPE surveys were implemented in 1999 (Table 2A, Table 2B). A more comprehensive description of recent survey results is described in prior reports (Caikoski 2008, 2010, 2012).

Unit 25D West – FWS Survey. No population estimation surveys were conducted during RY11 or RY12. However, fall density estimates for Unit 25D West have been low (0.18–0.30 observable moose/mi^2) since GSPE survey methods were implemented in 1999 (Table 2A). A more comprehensive description of recent survey results conducted by FWS is described by Lake (2008, 2010).

Unit 25D Totals. Based on the most current estimated moose density range (0.15–0.25 moose/mi^2) from the 2007 fall survey conducted in a portion of Unit 25D East, the extrapolated observable moose population in all of Unit 25D East (10,750 mi^2) is 1,600–2,700 moose. Based on the estimated moose density range (0.19–0.25 moose/mi^2) from the 2008 fall survey conducted in a portion of Unit 25D West, the extrapolated observable moose population in all of Unit 25D West (6,750 mi^2) is 1,300–1,700 moose. Combining extrapolated estimates for Units 25D East and 25D West, the total observable moose population for Unit 25D (17,500 mi^2) is 2,900–4,400 moose (0.16–0.25 moose/mi^2). Assuming similar density for remaining areas of Unit 25D and an average sightability correction factor of 1.23 for GSPE surveys conducted at 7–8 min/mi^2 (R. Boertje and K. Kellie, ADF&G, Fairbanks, memorandum 22 May 2007), we estimated the total moose population in Unit 25D at 3,500–5,400 moose (0.2–0.3 moose/mi^2).

Population Composition

Units 25A and 25B. No composition surveys were conducted in Unit 25B in RY11 or RY12. ADF&G and FWS conducted a composition survey in a small portion of eastern Unit 25A in fall 2012. The composition survey resulted in a high bull:cow ratio (122 bulls:100 cows) and moderate summer calf survival and yearling recruitment (Table 1). Moderate to low harvests related to logistic limitations in this remote area suggest that hunting has had a minor effect on bull:cow ratios.

Unit 25D. No composition surveys were conducted during RY11 or RY12. However, fall bull:cow ratios have ranged from moderate to high (range: 31–95 bulls:100 cows) since 1999 (Table 3). Yearling bull:cow ratios have ranged low to moderate (range: 3–24) and calf:cow ratios have generally been moderate (range: 22–59 calves:100 cows) since 1999. Significant variation between years and survey areas and poor precision in ratio estimates due to small sample sizes make detection of trends in demographics difficult. Causes for large variation in estimated ratio data may be the result of 1) natural fluctuations typical of moose populations in low density dynamic equilibrium (Gasaway et al. 1992); 2) poor performance of current moose survey techniques; 3) changes in moose distribution between years; and 4) annual variation in the extent of cow harvest. A more comprehensive description of past composition data is described in Caikoski (2008, 2010).

Distribution and Movements

Moose are distributed throughout Units 25A, 25B, and 25D in varying low densities. Large areas currently support densities of 0.1–0.3 moose/mi^2 and somewhat higher densities occur in localized areas in Unit 25D, particularly in late winter when moose tend to concentrate in riparian habitat. Moose also concentrate in relatively small areas during early winter along the upper Sheenjek and Coleen rivers in Unit 25A. Telemetry studies in Units 25D East and 25D West indicate some moose are migratory, moving between higher elevation early winter range and low elevation late winter and summer ranges (Maclean and Golden 1991).

In 1995, FWS conducted a telemetry study in northeastern Unit 25A and the upper Kongakut and Firth drainages of Unit 26C to determine seasonal movements and fidelity to winter and summer ranges. Fifty-seven moose (43 females and 14 males) were radiocollared in the Sheenjek, Coleen, Kongakut, and Firth drainages and relocated approximately once each month. Over 75% of moose that wintered in the upper Coleen, upper Kongakut, and Firth drainages migrated to the

Old Crow Flats in Yukon, Canada in spring and remained there until late August, when they began to move back into Alaska (Mauer 1998). Less than half of the moose radiocollared in the Sheenjek migrated to the Old Crow Flats. An additional ongoing study of moose radiocollared in the Old Crow Flats by the Yukon Department of Environment indicates moose that winter in the central portion of the Coleen exhibit a similar migratory pattern as those studied by Mauer (1998).

MORTALITY

Harvest

Seasons and Bag Limits during RY11–RY12.

Units and Bag Limits	Resident Open Season	Nonresident Open Season
Unit 25A, within the DHCMA.		
RESIDENT HUNTERS: 1 bull by bow and arrow only, by drawing permit.	1 Sep–25 Sep	
NONRESIDENT HUNTERS: 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side by bow and arrow only, by drawing permit.		1 Sep–25 Sep
Unit 25A, remainder.		
RESIDENT HUNTERS: 1 bull.	5 Sep–25 Sep	
NONRESIDENT HUNTERS: 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side.		5 Sep–25 Sep
Unit 25B, Porcupine River drainage upstream from the Coleen River drainage.		
RESIDENT HUNTERS: 1 bull.	10 Sep–25 Sep	
NONRESIDENT HUNTERS: 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side.		10 Sep–25 Sep
Remainder of Unit 25B.		
RESIDENT HUNTERS: 1 bull; or 1 bull per community harvest report by community harvest permit in an established community harvest area.	5 Sep–25 Sep 1 Dec–15 Dec	
NONRESIDENT HUNTERS: 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side.		5 Sep–25 Sep

Units and Bag Limits	Resident Open Season	Nonresident Open Season
Unit 25D West.		
RESIDENT HUNTERS: 1 bull by Tier II subsistence hunting permit only; up to 75 permits will be issued.	25 Aug–28 Feb	No open season
Unit 25D East (remainder of Unit 25D).		
RESIDENT HUNTERS: 1 bull; or 1 bull per community harvest report by community harvest permit in an established community harvest area.	10 Sep–20 Sep 18 Feb–28 Feb	
NONRESIDENT HUNTERS: 1 bull with 50-inch antlers or antlers with 4 or more brow tines on at least one side.		10 Sep–20 Sep

Alaska Board of Game Actions and Emergency Orders. There were no regulatory changes or emergency orders during RY11 and RY12.

Harvest by Hunters. The annual reported moose harvest in Unit 25A was 43 in RY11 and 45 in RY12, similar to previous years (Table 4). Slightly fewer moose were reported harvested in Unit 25B (32 and 25 moose) but harvest was similar to prior years for that unit (Table 5).

In Unit 25D East, reported moose harvest was 24 in RY11 and 25 in RY12, including 1 cow reported taken in RY11 (Table 6). Reporting rates by residents of Unit 25D have historically been low when using general season harvest tickets or Tier II permits. ADF&G-Division of Subsistence conducted comprehensive household surveys of Unit 25D communities in 2008 and 2009. Results of those surveys estimate local hunters harvested 104 moose in 2008 and 123 moose in 2009 (Van Lanen et al. 2012). The 2008 and 2009 ADF&G estimates fall within the range reported by CATG for 1993–2007 when 94–228 moose were reported harvested annually (CATG 2007). Although the household surveys conducted by ADF&G-Division of Subsistence and CATG were in communities located in Unit 25D, some moose were reported to have been taken in adjacent Units 25A and 25B. Subsistence household surveys were not conducted in RY11 or RY12; however, we assume harvest levels by residents of Unit 25D during RY11 and RY12 were similar to those estimated by ADF&G in 2008 and 2009.

Permit Hunts. Seventy-five permits were available annually in Unit 25D West for TM940; however, this permit hunt is often undersubscribed. In RY11, 75 permits were issued and in RY12 only 32 permits were issued. Reported harvests were 7 moose in RY11 and 4 in RY12 (Table 7). Most of the area encompassed by TM940 is federal land closed to moose hunting except by federally qualified subsistence hunters. For those lands, a separate federal permit hunt allows for the harvest of moose by local hunters.

No moose have been reported taken on a Chalkyitsik community harvest permit since RY03. During RY00–RY03, annual reported harvest on a community harvest permit ranged 2–11 moose in Unit 25D and 1–9 in Unit 25B.

Hunter Residency and Success. In Unit 25A, Alaska residents composed 56% of moose hunters during RY11 and RY12, consistent with prior years (Table 8). Total hunters and success rates remained similar to prior years with 95 and 97 hunters in RY11 and RY12, respectively, with success rates of 45% in RY11 and 46% in RY12. In Unit 25B, residents composed ≥86% of hunters during RY11 and RY12, consistent with prior years (Table 9). Total hunters in RY11 and RY12 were 77 and 76, respectively, and represent a decline of 15–25% compared to the previous 10 years (Table 9). However, success rates for hunters in Unit 25B remained similar to previous years at 33–42% (Table 9). The total number of hunters in Unit 25D East during RY11 and RY12 were 93 and 100 hunters, respectively, and success rate was 30% in both regulatory years. Both the number of hunters and success rates increased during the past 4 regulatory years compared to the early and mid-2000s (Table 10). However, it is likely that both increases are a result of an improvement in reporting by local residents of the unit.

Harvest Chronology. Most moose harvest in Unit 25A, Unit 25B, and Unit 25D occurred during the second and third weeks of September during RY11 and RY12 and remained consistent with previous years (Tables 11, 12, and 13). Because the hunting season opens on 5 September (Unit 25A and 25B) or 10 September (Unit 25D) and closes on 25 September (Units 25A and Unit 25B) or 20 September (Unit 25D), few moose are harvested during the first week or fourth week of September. Too few moose were reported in Unit 25D West to determine harvest chronology.

Transport Methods. Aircraft were the most common transport method in Unit 25A, used by 86% of successful hunters in RY11 and 68% in RY12. Boats were used by most of the remaining successful hunters (Table 14). Transport methods remained consistent in Unit 25A during RY11 and RY12 compared to RY02–RY10 and reflect difficulty in accessing this unit due to the absence of roads. Boats were used by 86% and 85% of successful hunters in Units 25B and 25D East, respectively, during RY11 and RY12, consistent with prior years (Tables 15 and 16). Too few moose were reported in Unit 25D West to determine transport methods, but boats were likely the most common method.

HABITAT

Assessment and Enhancement

Empirical observations and habitat surveys indicated that the upper Yukon River valley provides excellent moose habitat in Units 25A, 25B, and 25D. Moose in Unit 25D appear to be well below carrying capacity and are in excellent nutritional condition as indexed by relatively high pregnancy and twinning rates (Bertram and Vivion 2002, Boertje et al. 2007).

Habitat surveys in 2000 indicated that moose browsing intensity is low in both riparian and upland sites and browse production for winter forage is moderately high (Paragi et al. 2008). The occurrence of broomed plants (plants with branched growth forms as a result of multi-year browsing) is low compared to the Tanana Flats and other areas with high moose densities (Paragi et al. 2008). Feltleaf willow (*Salix alaxensis*) provides high quality food for moose and is the most common shrub in riparian habitats. Limited moose browsing is reflected by the extensive stands of 6–50 foot tall feltleaf willows that show little or no evidence of brooming.

Other common trees and shrubs, most of which are potential forage species for moose, include sandbar willow (*S. interior*), little tree willow (*S. arbusculoides*), pacific willow (*S. lasiandra*), blueberry willow (*S. nova-anglii/monticola*), diamond leaf willow (*S. pulchra*), fire willow (*S. scouleriana*), bebb willow (*S. bebbiana*), barren ground willow (*S. brachycarpa*), red osier dogwood (*Cornus stolonifera*), balsam poplar (*Populus balsamifera*), and aspen (*P. tremuloides*).

Extensive wildfires in the upper Yukon area have maintained early successional vegetation and created large areas of good habitat for moose. Between 2004 and 2006, 7 wildfires in excess of 100,000 acres combined occurred in the upper Yukon drainage, mostly in Unit 25D. No large fires occurred during 2007–2008 and 2 fires in excess of 150,000 acres combined occurred in 2009. During 2010–2013, wildfires burned approximately 375,000 acres.

CONCLUSIONS AND RECOMMENDATIONS

UNITS 25A AND 25B

Although few moose surveys have been conducted in Units 25A and 25B, moose densities are generally considered among the lowest in Interior Alaska. Anecdotal information and limited survey data suggest that the population may have declined from the late 1980s through the early 2000s and has stabilized at lower densities since the early 2000s. Habitat quality is considered good and annual harvest is low due to remoteness. Although population dynamics for these areas are poorly understood, predation by wolves and bears likely maintains this population at low density dynamic equilibrium.

UNIT 25D

Moose densities in the Yukon Flats have been historically low and are among the lowest population densities found among low density moose–bear–wolf systems (Gasaway et al. 1992). Sources and extent of adult moose mortality is poorly documented in the Yukon Flats. However, Bertram and Vivion (2002) observed 87% annual survival rates for radiocollared adult cows from 1998 to 2000. These estimates are similar to or lower than other studies of moose populations in Interior Alaska (Keech and Boudreau 2006, Boertje et al. 2009). Predation accounted for most sources of the mortality in all Interior Alaska studies. Survey data for the Yukon Flats indicate adult cow mortality remains higher than would be expected from predation alone (ADF&G 2002). Efforts by local hunters, tribal and village governments, and state and federal agencies resulted in development and implementation of YFCMMP, which emphasized the importance of reduced cow harvest and increased bear and wolf harvest. However, estimated moose densities in the Yukon Flats remain among the lowest in Interior Alaska.

The Yukon Flats moose population has potential to grow, as indicated by the highest reproductive rates in Interior Alaska (Boertje et al. 2007). Bertram and Vivion (2002) observed mean pregnancy and twinning rates of 89% and 63%, respectively, during 1998 and 1999. High twining rates and low browse removal rates indicate that winter forage availability and moose nutritional status are excellent (Boertje et al. 2007, Seaton et al. 2011). However, early calf mortality, primarily from black and grizzly bear predation, combined with wolf predation of calves and adult moose during winter limit annual recruitment and population growth (Bertram and Vivion 2002, Lake et al. 2013). In addition, harvest of cow moose by local residents likely results in additive mortality to this segment of the moose population.

Monitoring moose population status in Unit 25D has been difficult using current GSPE techniques. Poor precision associated with estimates of population size and demographics are inadequate to measure efficacy of potential management actions that are expected to result in moderate changes in population size (Kellie 2011).

UNITS 25A, 25B, AND 25D MANAGEMENT OBJECTIVES

We likely did not meet out first management objective to increase the size of the moose population by 2–5% annually in key hunting areas near local communities. In addition, current survey techniques do not have the power to detect small to moderate changes in moose population size over desired time periods. The estimated moose population for all of Unit 25D remains below the lower end of the range for the IM objective.

We did not conduct a systematic household harvest survey in coordination with ADF&G-Division of Subsistence for communities in Unit 25D in RY11 or RY12. However, estimates of harvest in 2008 and 2009 were obtained and are considered representative of current harvest rates.

We do not know whether we met our third management objective to reduce illegal and potlatch harvest of cow moose to less than 5% of total annual harvest.

Although moose population or composition surveys were not conducted during RY11 or RY12, we likely met our fourth management objective to maintain a minimum of 40 bulls per 100 cows in the population based on surveys conducted in prior report periods and current estimated harvest levels.

REFERENCES CITED

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Table 1. Unit 25A winter aerial composition counts, 1989–2012.

Year	Bulls:100 cows	Yearling bulls:100 cows	Calves:100 cows	Moose observed
1989[a]	n/a	n/a	n/a	367
1991[a]	90	16	36	314
2000[a]	100	25	38	150
2002[a]	88	6	48	124
2012[b]	122	15	34	105

[a] Unpublished data from U.S. Fish and Wildlife Service.
[b] Unpublished data from U.S. Fish and Wildlife Service and ADF&G (Fairbanks).

Table 2a. Summary of moose geospatial population estimates (GSPE)[a] in Unit 25D, 1999–2013.

Location and survey year	Survey area (mi²)	Strata size (mi²) Low	Strata size (mi²) High	Area searched (mi²) Low	Area searched (mi²) High	Total search area (mi²)	No. of moose estimated by stratum and density (moose/mi²) Low	No. of moose estimated by stratum and density (moose/mi²) High	Population estimate ±90% CI	Average density (moose/mi²)	No. of sample units counted
Unit 25D East											
1999 GSPE	2,936	1,828	1,108	175	366	541	229/0.13	596/0.54	829±20%	0.28	102
2000 GSPE	2,936	1,639	1,297	218	375	594	368/0.22	359/0.28	726±25%	0.25	112
2001 GSPE	2,936	1,612	1,324	186	419	605	52/0.03	487/0.37	514±27%	0.18	115
Mar 2004 GSPE	2,936	1,649	1,286	187	413	600	53/0.03	324/0.25	382±20%	0.13	113
2004 GSPE	2,936	1,607	1,329	175	424	599	138/0.08	648/0.49	773±17%	0.26	113
2005 GSPE	2,936	1,548	1,388	202	440	642	428/0.27	552/0.38	1008±20%	0.34	121
2006 GSPE	2,936	1,548	1,388	181	440	620	206/0.13	593/0.43	799±17%	0.27	117
2007 GSPE	2,936	1,538	1,398	181	403	584	178/0.12	408/0.29	585±23%	0.20	110
Birch Creek Survey[b]											
2006 GSPE	3,630	2,295	1,335	195	277	472	495/0.21	237/0.18	732±33%	0.20	87
Venetie Survey[b]											
2004 GSPE	2,858	1,623	1,235	109	204	313	105/0.06	413/0.33	551±60%	0.19	60
2005 GSPE	2,858	1,638	1,219	115	418	533	71/0.04	280/0.23	423±32%	0.15	101
Unit 25D West[c]											
Mar 1999 GSPE	2,269	1,714	554	253	264	517	318/0.19	422/0.76	735±17%	0.32	96
1999 GSPE	2,269	1,444	825	156	345	501	295/0.20	567/0.69	862±19%	0.38	93
2000 GSPE	2,269	1,281	987	124	371	495	124/0.10	553/0.56	670±24%	0.30	
2001 GSPE	2,269	1,374	865	205	334	539	161/0.12	506/0.56	668±24%	0.29	100
Mar 2003 GSPE	2,269	1,682	587	194	264	458	156/0.09	383/0.65	508±29%	0.22	85
Mar 2004 GSPE	2,269	1,720	548	216	274	490	310/0.19	319/0.57	632±20%	0.28	91
2004 GSPE	2,299	1,569	700	151	350	501	198/0.13	298/0.43	511±25%	0.29	93
2006 GSPE	2,269	1,612	656	172	350	522	n/a	n/a	417±21%	0.18	97
2008 GSPE	2,269	1,493	776	393	544	937	n/a	n/a	490±13%	0.22	174
2010 GSPE	2,269	1,326	943	178	340	518	n/a	n/a	440±28%	0.19	96
Mar 2013 GSPE	2,269	1,294	976	178	367	545	n/a	n/a	460±21%	0.20	101

[a] Population estimates are of observable moose and do not include a sightability correction factor. Surveys conducted in fall-early winter unless otherwise indicated.

[b] Methods are provided in Caikoski 2008.

[c] Data for western Unit 25D moose surveys provided by U.S. Fish and Wildlife Service–Yukon Flats National Wildlife Refuge (Bertram and Vivion, FWS–YFNWR, 1999–2004 unpublished moose survey reports; Bertram 2007, unpublished moose survey report; and Lake 2008, unpublished moose survey report).

Table 2b. Summary of moose geospatial population estimates (GSPE)[a] in Unit 25D, 2008–2009.

Location and survey year	Survey area (mi²)	Area searched (mi²)	Population estimate ±90% CI	Average density (moose/mi^2)	Bulls:100 cows	Yearling bulls:100 cows	Calves:100 cows	No. of sample units counted
Beaver Mgmt Area Survey								
2008	536	268	182±15%	0.34	54	7	35	50
2009	536	268	221±16%	0.41	33	5	37	50
Fort Yukon Survey								
2008	533	270	76±25%	0.14	43	0	43	51

[a] Population estimates are of observable moose and do not include a sightability correction factor. Surveys conducted in fall-early winter unless otherwise indicated.

Table 3. Estimated moose population composition based on fall geospatial population estimate (GSPE) surveys in Unit 25D, 1999–2010.

Survey year and area (mi²)	Bulls:100 cows	Yearling bulls:100 cows	Calves:100 cows
Unit 25D East			
1999 (2,936)	57	24	59
2000 (2,936)	79	19	49
2001 (2,936)	95	17	43
2004 (2,936)	43	10	51
2005 (2,936)	80	22	58
2006 (2,936)	60	12	37
2007 (2,936)	64	15	39
Fort Yukon Survey			
2008 (533)	43	0	43
Venetie Survey			
2004 (2,858)	75	24	41
2005 (2,858)	44	4	58
Birch Creek Survey			
2006 (3630)	55	8	29
Unit 25D West			
1999 (2,269)	31	6	31
2000 (2,269)	71	12	22
2001 (2,269)	52	9	27
2004 (2,269)	72	5	34
2006 (2,269)	65	18	22
2008 (2,269)	51	3	44
2010 (2,269)	35	5	32
Beaver Survey			
2008 (536)	54	7	35
2009 (536)	33	5	37

Table 4. Unit 25A reported moose harvest, regulatory years[a] 2002–2012.

Regulatory	Reported[b] harvest			
year	M	F	Unk	Total
2002	49	0	0	49
2003	36	0	0	36
2004	29	0	0	29
2005	52	0	1	53
2006	44	0	0	44
2007	32	0	0	32
2008	47	0	0	47
2009	45	0	1	46
2010	42	0	1	43
2011	43	0	0	43
2012	45	0	0	45

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25A moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).

Table 5. Unit 25B reported moose harvest, regulatory years[a] 2002–2012.

Regulatory	Reported harvest[b]			
year	M	F	Unk	Total
2002[c]	34	0	0	34
2003[d]	23	0	0	23
2004	26	0	0	26
2005	26	0	0	26
2006	35	0	0	35
2007	37	0	0	37
2008	36	0	0	36
2009	38	0	0	38
2010	26	0	0	26
2011	32	0	0	32
2012	25	0	0	25

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25B moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] Includes 1 moose taken in Chalkyitsik community harvest permit hunt.
[d] Includes 9 moose taken in Chalkyitsik community harvest permit hunt.

Table 6. Unit 25D East reported moose harvest, regulatory years[a] 2002–2012.

Regulatory year	Reported harvest[b]			
	M	F	Unk	Total
2002[c]	24	0	0	24
2003[d]	12	0	0	12
2004	8	0	0	8
2005	23	0	0	23
2006	16	0	0	16
2007	15	0	0	15
2008	18	1	0	19
2009	23	1	0	24
2010	25	0	0	25
2011	23	1	0	24
2012	25	0	0	25

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25D East moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] Includes 11 moose taken in Chalkyitsik community harvest permit hunt.
[d] Includes 9 moose taken in Chalkyitsik community harvest permit hunt.

Table 7. Unit 25D West moose harvest for permit hunt TM940 and federal subsistence permits, regulatory years[a] 2002–2012.

	Tier II permit hunt (TM940)								
Regulatory year	Permits issued	Successful hunters (%)	Unsuccessful hunters (%)	Did not hunt (%)	Did not report (%)	Bulls (%)	Cows (%)	Total harvest	Federal harvest permit
2002	49	4 (20)	16 (80)	23 (47)	6 (12)	4 (100)	0 (0)	4	7[b]
2003	51	4 (29)	10 (71)	30 (59)	7 (14)	4 (100)	0 (0)	4	–[b]
2003	51	3 (23)	10 (77)	31 (61)	7 (14)	3 (100)	0 (0)	3	26[c]
2004	72	1 (6)	15 (94)	29 (40)	27 (38)	1 (100)	0 (0)	1	15[d]
2005	53	7 (24)	22 (76)	22 (42)	2 (4)	7 (100)	0 (0)	7	14
2006	75	2 (11)	17 (89)	56 (75)	0 (0)	2 (100)	0 (0)	2	10
2007	75	2 (11)	16 (89)	57 (76)	0 (0)	2 (100)	0 (0)	2	10
2008	75	0 (0)	20 (100)	55 (73)	0 (0)	0 (0)	0 (0)	0	5
2009	55	2 (9)	20 (91)	29 (53)	4 (7)	2 (100)	0 (0)	2	1
2010	73	11 (37)	19 (63)	32 (44)	11 (15)	11 (100)	0 (0)	11	0
2011	75	7 (25)	21 (75)	37 (49)	10 (13)	7 (100)	0 (0)	7	–[e]
2012	32	4 (25)	12 (75)	15 (47)	1 (3)	4 (100)	0 (0)	4	–[e]

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] No federal harvest reports were received from Stevens Village.
[c] Includes 6 cows reported taken by Stevens Village hunters.
[d] Includes 5 cows reported taken by Stevens Village hunters.
[e] Federal harvest reports unavailable.

Table 8. Unit 25A moose hunter residency and success, regulatory years[a] 2002–2012[b].

Regulatory year	Successful					Unsuccessful					Total hunters
	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	
2002	2	20	27	0	49 (43)	3	33	29	0	65 (57)	114
2003	2	9	25	0	36 (39)	5	24	27	0	56 (61)	92
2004	2	7	17	2	28 (33)	3	26	27	1	57 (67)	85
2005	3	24	26	0	53 (56)	3	24	15	0	42 (44)	95
2006	3	20	21	0	44 (37)	3	34	38	0	75 (63)	119
2007	2	16	14	0	32 (27)	1	45	41	0	87 (73)	119
2008	1	17	27	2	47 (42)	0	32	34	0	66 (58)	113
2009	2	29	14	0	45 (43)	3	27	30	0	60 (57)	105
2010	2	22	19	0	43 (39)	1	35	28	2	66 (61)	109
2011	1	17	25	0	43 (45)	3	27	22	0	52 (55)	95
2012	2	24	19	0	45 (46)	0	34	18	0	52 (54)	97

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25A moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] Resident of Units 25A, 25B, or 25D.

Table 9. Unit 25B moose hunter residency and success, regulatory years[a] 2002–2012[b].

	Successful					Unsuccessful					
Regulatory year	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	Total hunters
2002	1	29	3	0	33 (33)	4	60	2	0	66 (67)	99
2003	5	16	1	1	23 (25)	6	54	9	0	69 (75)	92
2004	3	18	5	0	26 (29)	6	48	10	0	64 (71)	90
2005	12	13	1	0	26 (35)	9	29	10	0	48 (65)	74
2006	13	14	8	0	35 (35)	11	42	11	1	65 (65)	100
2007	4	28	5	0	37 (37)	1	50	11	0	62 (63)	99
2008	6	26	4	0	36 (40)	1	43	10	0	54 (60)	90
2009	7	29	1	1	38 (38)	3	50	5	3	61 (62)	99
2010	4	19	3	0	26 (34)	1	44	5	0	50 (66)	76
2011	4	23	5	0	32 (42)	1	38	4	2	45 (58)	77
2012	1	22	2	0	25 (33)	2	41	7	1	51 (67)	76

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).

[b] Source: Unit 25B moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet); does not include moose taken under the Chalkyitsik community harvest permit during regulatory years 2000–2001 through 2006–2007.

[c] Resident of Units 25A, 25B, or 25D.

Table 10. Unit 25D East moose hunter residency and success, regulatory years[a] 2002–2012[b].

Regulatory year	Successful					Unsuccessful					Total hunters
	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	Local[c] resident	Nonlocal resident	Nonresident	Unk	Total (%)	
2002	5	6	1	1	13 (16)	22	32	12	0	66 (84)	79
2003	6	3	3	0	12 (16)	22	34	7	0	63 (84)	75
2004	4	4	0	0	8 (15)	14	25	7	0	46 (85)	54
2005	16	5	1	1	23 (33)	17	23	6	0	46 (67)	69
2006	12	4	0	0	16 (26)	17	21	8	0	46 (74)	62
2007	9	6	0	0	15 (18)	22	39	4	3	68 (82)	83
2008	10	6	3	0	19 (28)	20	24	5	0	49 (72)	68
2009	13	8	4	2	27 (27)	21	43	8	2	74 (73)	101
2010	21	15	0	0	36 (35)	24	37	4	3	68 (65)	104
2011	20	5	1	2	28 (30)	31	31	2	1	65 (70)	93
2012	17	12	0	1	30 (30)	27	35	7	1	70 (70)	100

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).

[b] Source: Unit 25D East moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet); does not include moose taken under the Chalkyitsik community harvest permit during regulatory years 2000–2001 through 2006–2007.

[c] Resident of Unit 25.

Table 11. Unit 25A reported moose harvest chronology percent by month/day, regulatory years[a] 2002–2012[b].

Regulatory year	Harvest chronology percent by month/day						
	9/1–9/7	9/8–9/14	9/15–9/21	9/22–9/28	9/29–10/5[c]	Unk	*n*
2002	16	47	31	4	0	2	49
2003	0	26	44	24	6	0	34
2004	0	14	55	28	3	0	29
2005	8	40	40	8	0	6	53
2006	0	41	48	9	0	2	44
2007	3	9	50	31	6	0	32
2008	0	15	46	35	4	0	46
2009	7	31	51	9	0	2	45
2010	12	36	45	2	0	5	42
2011	9	47	41	2	0	0	43
2012	14	45	34	5	0	2	44

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25A moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] No open season.

Table 12. Unit 25B reported moose harvest chronology percent by month/day, regulatory years[a] 2002–2012[b].

Regulatory	Harvest chronology percent by month/day								
year	Aug[c]	9/1–9/7	9/8–9/14	9/15–9/21	9/22–9/28	9/29–10/5	Dec	Unk	*n*
2002	0	12	36	36	15	0	0	0	33
2003	0	9	36	18	14	9	14	0	22
2004	0	0	12	23	50	15	0	0	26
2005	4	4	38	27	23	0	4	0	26
2006	3	3	23	43	23	3	3	0	35
2007	3	3	22	44	24	0	3	0	36
2008	3	3	31	49	14	0	0	0	35
2009	5	3	49	35	8	0	0	0	37
2010	4	4	8	69	8	0	4	4	26
2011	0	10	29	48	3	3	3	4	31
2012	0	20	32	36	8	0	4	0	25

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25B moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] No open season.

Table 13. Unit 25D East reported moose harvest chronology percent by month/day, regulatory years[a] 2002–2012[b].

Regulatory year	Harvest chronology percent by month/day							
	Aug[c]	9/1–9/7	9/8–9/14	9/15–9/21	9/22–9/28	9/29–10/5	Unk	*n*
2002	0	0	31	46	15	0	8	13
2003	0	0	0	50	42	8	0	12
2004	0	0	14	57	28	0	0	7
2005	4	9	43	35	9	0	0	23
2006	6	13	19	63	0	0	0	16
2007	0	13	33	40	13	0	0	15
2008	0	5	42	42	11	0	0	19
2009	4	7	37	37	15	0	0	27
2010	6	6	40	37	6	0	5	35
2011	4	11	33	41	7	0	0	27
2012	3	10	40	33	0	10	0	30

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).
[b] Source: Unit 25D East moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).
[c] No open season.

Table 14. Unit 25A moose harvest percent by transport method, regulatory years[a] 2002–2012[b].

Regulatory year	Harvest percent by transport method									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	Other ORV	Highway vehicle	Airboat	Unk	*n*
2002	71	10	18	0	0	0	0	0	0	49
2003	83	8	8	0	0	0	0	0	0	36
2004	69	17	10	0	0	0	0	0	3	29
2005	66	15	11	2	0	0	0	2	4	53
2006	77	2	14	2	0	0	0	0	5	44
2007	69	6	22	0	0	0	0	0	3	32
2008	66	4	21	2	0	0	0	0	6	47
2009	74	2	20	2	0	0	0	0	2	46
2010	67	2	23	2	0	0	0	0	5	43
2011	86	5	7	0	2	0	0	0	0	43
2012	68	5	25	0	0	0	0	0	2	44

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).

[b] Source: Unit 25A moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).

Table 15. Unit 25B moose harvest percent by transport method, regulatory years[a] 2002–2012[b].

Regulatory year	Harvest percent by transport method									*n*
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	Other ORV	Highway vehicle	Airboat	Unk	
2002	12	0	82	6	0	0	0	0	0	33
2003	9	3	83	3	0	0	0	0	0	23
2004	15	0	69	4	0	0	0	0	12	26
2005	12	0	85	0	4	0	0	0	0	26
2006	20	0	71	6	3	0	0	0	0	35
2007	19	0	73	3	3	0	0	0	3	37
2008	14	0	81	3	0	0	0	0	3	36
2009	13	0	84	0	0	0	3	0	0	38
2010	27	0	62	0	4	0	4	0	4	26
2011	6	0	91	0	3	0	0	0	0	32
2012	12	0	80	0	0	0	0	0	8	25

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).

[b] Source: Unit 25B moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).

Table 16. Unit 25D East moose harvest percent by transport method, regulatory years[a] 2002–2012[b].

Regulatory year	Harvest percent by transport method									
	Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	Other ORV	Highway vehicle	Airboat	Unk	*n*
2002	15	0	77	0	0	0	8	0	0	13
2003	17	0	83	0	0	0	0	0	0	12
2004	25	0	50	12	0	0	0	0	12	8
2005	9	0	83	4	0	0	0	4	0	23
2006	6	0	75	13	0	0	6	0	0	16
2007	6	0	80	13	0	0	0	0	0	15
2008	11	0	84	5	0	0	0	0	0	19
2009	26	0	67	4	0	0	0	0	4	27
2010	6	6	69	11	3	0	0	0	6	36
2011	7	0	82	0	4	0	4	0	4	28
2012	10	0	87	0	0	3	0	0	0	30

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2002 = 1 July 2002–30 June 2003).

[b] Source: Unit 25D East moose harvest ticket reports from moose harvest database on ADF&G's Wildlife Information Network (WinfoNet).