Species Management Report and Plan ADF&G/DWC/SMR&P-2017-8

Moose Management Report and Plan, Game Management Unit 14B:

Report Period 1 July 2010–30 June 2015, and

Plan Period 1 July 2015–30 June 2020

Tim C. Peltier

2017

Alaska Department of Fish and Game Division of Wildlife Conservation

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Species management reports and plans provide information about species that are hunted or trapped and management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their areas, who also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Todd A. Rinaldi, Management Coordinator for the Division of Wildlife Conservation, Palmer.

Species management reports and plans are available via the Alaska Department of Fish and Game's public website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: dfg.dwc.publications@alaska.gov. The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services (www.arlis.org).

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Purpose of this Report

This report provides a record of survey and inventory management activities for moose (*Alces alces*) in Unit 14B for the previous 5 regulatory years and plans for survey and inventory management activities in the 5 years following the end of that period. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010–30 June 2011). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts, but is also provided to the public to inform them of wildlife management activities. In 2016 the Alaska Department of Fish and Game's Division of Wildlife Conservation launched this new type of 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the moose management reports of survey and inventory activities that were previously produced every 2 years.

I. RY10–RY14 Management Report

Management Area

Unit 14B covers approximately 2,512 mi^2 of the Talkeetna Mountains. It consists of all land east of the Susitna River to its confluence with the Talkeetna River south and west to its headwaters, and north of the north bank of Willow Creek and Peters Creek to the headwaters, and the hydrologic divide separating the Susitna River and the Knik Arm Drainages to the outlet creek at Lake 4408 (Fig. 1). Much of the area is above timberline or is heavily forested with birch (*Betula* spp.), aspen (*Populus* spp.), and spruce (*Picea* spp.). Several of the large river valleys contain important wintering habitat for moose.

Summary of Status, Trend, Management Activities, and History of Moose in Unit 14B

The moose population in Unit 14B has increased since the mid-1900s due in part to predator control efforts and vegetation changes resulting from increased human settlement (LeResche et al. 1974). Masteller (1995) calculated the first population estimate and determined the 1987 population was 2,814 ± 248 (80% CI). Following the deep snow winter of 1989–1990 the population decreased about 35% (Masteller 1995). The population grew to 2,336 ± 527 (80% CI) by fall 1994, however another severe winter in 1994–1995 may have resulted in up to 15% mortality (Griese 1998). Surveys completed in 2005 showed a decline to 1,413 ± 215 (80% CI; Peltier 2006). Surveys in 2009 identified an increasing trend (1,662 ± 283, 90% CI; Peltier 2012) and a survey conducted in 2013 confirmed an increasing trend with an estimate of 2,703 ± 865 (90% CI) (Table 1). The 2013 estimate includes a sightability correction factor (SCF).

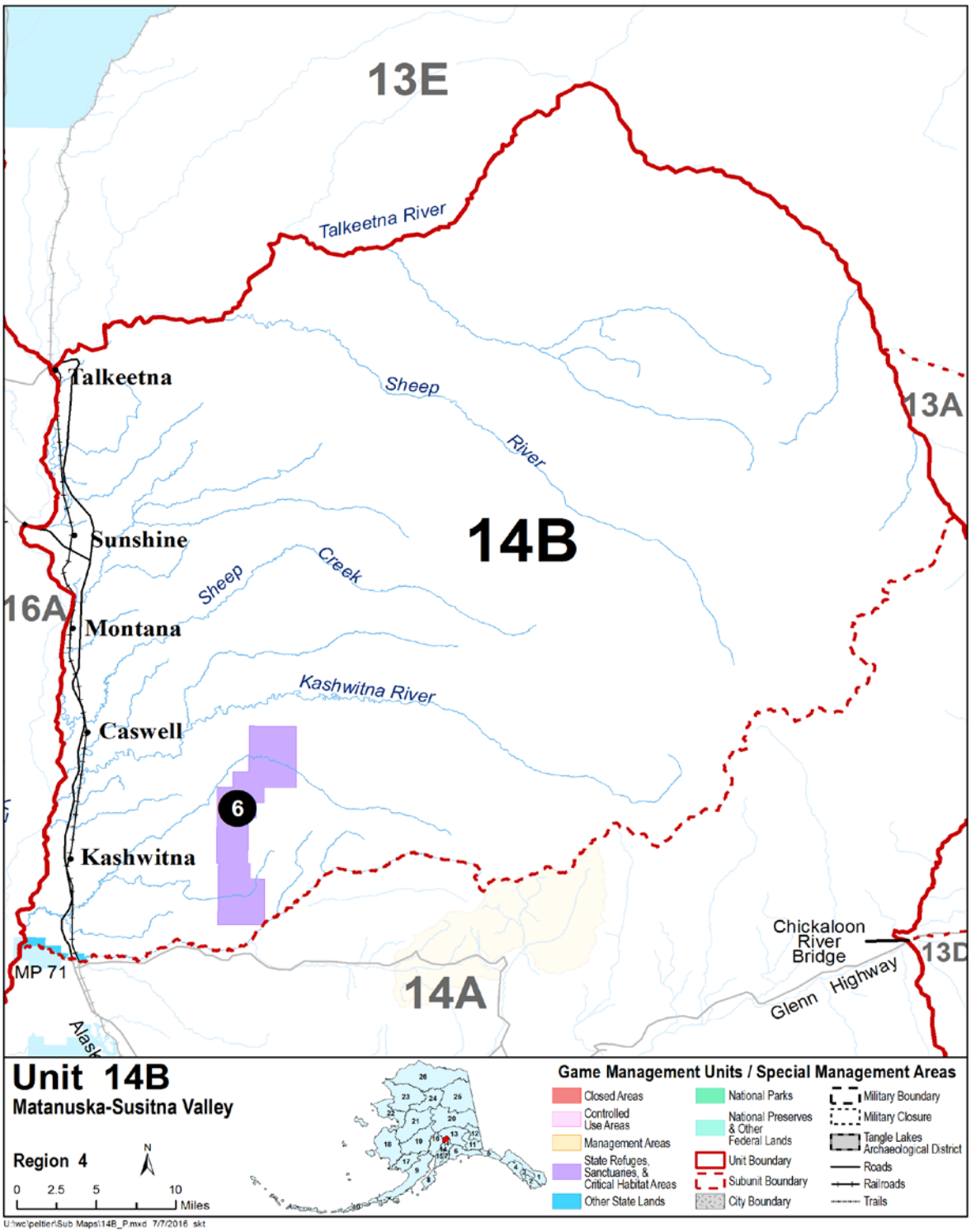

Figure 1. Unit 14B in Southcentral Alaska.

Table 1. Unit 14B moose fall composition and estimated population from geospatial population estimates, Southcentral Alaska, regulatory years[a] 2005–2013.

Regulatory year	Bulls:100 cows[b]	Yearling bulls:100 cows[b]	Calves:100 cows[b]	Percent calves[b]	Adults	Moose observed	Estimated population (90% CI[c])[d]	Estimated population w/SCF[e,f]	Moose/mi^2 w/SCF[g]
2005	31 (3)	8 (2)	14 (2)	10 (2)	582	646	1,413 (±20%)	1,789 (±35%)	1.6
2009	34 (3)	12 (2)	19 (3)	12 (2)	653	744	1,662 (±17%)	2,105 (±33%)	1.8
2013	30 (2)	6 (1)	28 (2)	17 (2)	1,041	1,261	2,111 (±9%)	2,703 (±32%)	2.4

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2005 = 1 July 2005–30 June 2006.
[b] Ninety percent confidence interval, plus and minus the estimate, in parentheses.
[c] CI = confidence interval.
[d] Geospatial population estimation (GSPE) method.
[e] SCF = sightability correction factor.
[f] Based off of sightability correction factor calculated for the 2013 GSPE (Peltier 2014).
[g] Based on habitat available as determined by the total area of the GSPE grid for each area.

While harvest by hunters in the unit has always been affected by access issues, season and bag limits have driven the greatest changes in harvest (McDonough 2002). From 1966 to 1970 hunters killed an average of 144 moose annually with most of those being bulls (Griese 1998). Liberal cow seasons allowed peak harvests to reach 372, 534, and 347 moose during 1971, 1984, and 1987, respectively (Griese 1993). With the decline in the moose population, the annual harvest during the 1990s fell to 58 moose and remained that low until 2009 (Peltier 2014).

The Alaska Railroad line travels between Seward and Fairbanks and was completed in 1923. The first moose mortality probably occurred soon after, and has been an annual occurrence ever since. The railroad line includes 39 miles of track in Unit 14B. This section of track has few road crossings, and as a result trains are capable of achieving higher speeds than the more developed areas in neighboring Unit 14A. Moose use railroad tracks in winter for easier travelling and their use becomes more pronounced in years of high snowfall, subsequently annual moose mortality from trains can vary greatly and can become excessive in high snowfall years.

Moose vehicle collisions (MVC) can be a significant mortality factor in the roaded areas of Alaska. Since its completion in 1971 the Parks Highway has served as the main thoroughfare for Unit 14B. The majority of development in the unit has been along this highway and MVCs occur primarily along this road and along the Talkeetna Spur road–the second most travelled road in the unit. Similar to moose railroad collisions, MVCs vary annually and are more common in years of high snowfall. Increased human population, development, and road expansion all combine to increase the number of MVCs occurring in the unit.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

- Direction in the Talkeetna Mountains and Talkeetna Rivers Moose Management Plans (ADF&G 1976) have been reviewed and modified through public comments, staff recommendations, and Alaska Board of Game (BOG) actions over the years. A record of these changes can be found in the division's management report series. The plan portion of this report contains the current management plan for moose in Unit 14B.

GOALS

- Protect, maintain, and enhance the moose population and its habitat in concert with other components of the ecosystem to provide for high levels of human consumptive use.
- Optimize opportunity to participate in hunting moose.

CODIFIED OBJECTIVES

<u>Amounts Reasonably Necessary for Subsistence Harvest</u>

- The Unit 14B moose population does not have a positive customary and traditional use determination finding and is in a nonsubsistence area.

Intensive Management

In 2001 the Alaska Board of Game found that moose are important for providing high levels of human consumptive use and adopted a positive finding for intensive management (IM) of moose in Unit 14B. Current IM objectives (Alaska Administrative Code 5 AAC 92.108) are as follows:

- Population objective: 2,500–2,800 moose.
- Harvest objective: 100–200 moose.

MANAGEMENT OBJECTIVES

Population objectives for moose in Unit 14B are as follows:

1. Maintain unitwide moose population of 2,500–2,800 moose.
2. Manage for a posthunt (fall) sex ratio of ≥20 bulls:100 cows.

MANAGEMENT ACTIVITIES

Assessing population status and trends, monitoring harvest and mortality, and assessing habitat conditions are integral components of management of moose in Unit 14B. Survey and inventory management activities used to monitor populations in Unit 14B are described below.

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial inventory and sex and age composition surveys in the unit to determine population size, composition, productivity, and trends.

Data Needs

Moose abundance is a basis from which sustainable harvest may be estimated and provides a density context for interpreting nutritional condition relative to habitat conditions. Sex and age composition information can be used to determine appropriate harvest levels and recruitment into the population. Sex and age ratio data may also be used to model population structure and trends.

Methods

Geospatial population estimator (GSPE; Kellie and DeLong 2006) surveys are conducted on all available moose habitat in the unit below 3,500 feet. Surveys are conducted between 1 November and 6 December on a triennial basis as weather and snow conditions permit. This approach produces population estimates and statistically bound sex and age composition estimates through a stratified random sampling design and geostatistical models of autocorrelation. It is designed for high search intensity (8–10 min/mi^2) from a PA-18 Super Cub or equivalent aircraft to obtain a relatively unbiased estimate of moose numbers, but we also correct sightability for typically lower achieved search intensity. Teams of pilots and observers record moose age and sex classes in the field for later analysis (Appendix A).

In Unit 14B, real time stratification is generally used and conducted with a 3- to 4-person crew at approximately 1,000 feet above ground level from a Cessna 185 prior to conducting the survey

of the rest of the unit with Super Cubs (desktop stratifications are also developed using previous survey information and interpretation of available habitat maps). Stratification into high and low moose density is based on observed moose, moose tracks, and availability of favorable moose habitat. Using only 2 strata minimizes the effects of moose movements among strata on the spatial estimate and allows continuity of GSPE surveys across weather breaks that do not adversely affect moose distribution during the survey. For stratification purposes sample units that are likely to have fewer than 5 moose in the unit are considered "low" stratum and sample units that are likely to contain ≥5 moose are considered "high" stratum units. SCFs are developed for each stratum by randomly selecting a subset of the selected units and intensively searching a quarter of the unit at 10–12 min/mi^2 and noting the difference between the number of moose seen during the regular and intensive surveys.

Results and Discussion

The Unit 14B moose population appears to be increasing and is currently within IM objectives (Table 1). The 2013 survey was completed by searching 40 high strata units (100%) and 40 low strata units (30%) of the 183 units available. In total 44% of the available moose habitat was surveyed (Appendix B). The population point estimate was 2,703 moose (± 32% at 90% CI). This is a 28% increase over the 2009 estimate using the same SCFs for each strata in that estimate. Density of moose in available habitat increased from 1.8 moose/mi^2 in 2009 to 2.4 moose/mi^2 in 2013.

The sex and age composition of the Unit 14B moose population indicated a decrease in the number of bulls and an increase in the number of calves relative to the entire population. The bull:cow ratio decreased from 34±3 bulls:100 cows in 2009 to 30±2 in 2013. The calf:cow ratio increased from 19±3 calves:100 cows in 2009 to 28±2 in 2013.

Recommendations for Activity 1.1

- Continue with GSPE surveys on a triennial basis as allowed by weather and snow conditions barring logistical constraints from higher priority surveys.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor the moose mortality through field observations, hunter harvest reports, contact with hunters, and reports of other sources of mortality on an annual basis.

Data Needs

Unit 14B was identified by BOG for IM of moose with a harvest objective of 100–200 moose annually. Monitoring, collecting, analyzing, and summarizing annual harvest data are critical for sustained yield management and to facilitate recommendations for BOG proposals. Reports from Department of Public Safety and the Alaska Railroad provide information on additional causes of mortality.

Methods

Moose hunting effort in Unit 14B is recorded through the required moose harvest report completed and submitted by hunters that participate in hunting in the unit. These reports note

number of days hunted, location, methods of take and transportation, commercial services used, the results of hunter effort, and are tracked through ADF&G's Wildlife Information Network (WinfoNet) moose database. Hunters may register for the AM415 targeted hunt in October. Applicants meeting the hunt requirements are randomly selected to harvest moose in nuisance situations or in an effort to reduce moose along the roadways that could be subject to MVCs. AM415 hunters are required to report their efforts in a timely manner.

Season and Bag Limit

During the reporting period the general season for both residents and nonresidents was 10–17 August (archery only) and 25 August–25 September (archery, firearm, and muzzleloader). Hunters are limited to 1 bull with either spike or forked (SF) antlers, at least 3 brow tines (bt) on one side or antlers ≥50 inches (SF-50-3bt) under the general season. Season and bag limit information is available on ADF&G's website:

http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting

Results and Discussion

Hunt results are summarized in Table 2. Overall harvest by hunters averaged 79 moose during the reporting period. This is a 36% increase over the previous 5-year period; although it is still below the IM harvest objective of 100–200 moose. If unreported and illegal take are included, the IM objectives were met in 4 out of 5 of the reporting years.

Hunter Residency and Success

Overall, hunter success rate for the reporting period was 16%, an increase of 3% from the previous 5-year average (Table 3). Unit 14 residents are responsible for the majority of moose taken in the unit. There was a 9% increase in the total number of hunters during the reporting period over the previous 5 years. Nonresident success rate was 31%. While nonresident moose hunters are not required to have a guide, the higher success rate may indicate more guide use among nonresidents, a greater effort among nonresidents, or a combination of the 2 factors.

Harvest Chronology

Typically the greatest percentage of moose is taken during the last 10 days of the season — as moose become more vulnerable closer to the rut (Table 4). The 5-year average of bulls harvested in the last 10 days of the season in Unit 14B was 46%.

Transport Methods

All-terrain vehicles and highway vehicles account for the majority of the transportation types used by successful hunters in the past 10 seasons (Table 5).

Table 2. Unit 14B moose harvest and accidental death, Southcentral Alaska, regulatory years[a] 2010–2014.

Regulatory year	Reported				Estimated			Accidental deaths[b]			Grand total
	M	F	Unknown	Total	Unreported[c]	Illegal[d]	Total	Road	Train	Total	
2010	91	1	0	92	9	20	29	20[e]	39	59	180
2011	83	0	1	84	8	20	28	28	129	157	269
2012	46	0	0	46	5	20	25	16	7	23	94
2013	82	0	0	82	8	20	28	15	12	27	137
2014	89	1	0	90	9	20	29	9	8	17	136

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.
[b] Road and train deaths are minimum numbers. Roadkills do not include unsalvageable animals.
[c] Derived by taking 10% of the total reported kill.
[d] Includes moose taken in defense of life or property.
[e] Estimated minimum based on the previous years as data were missing for this period.

Table 3. Unit 14B moose hunter residency and success, Southcentral Alaska, regulatory years[a] 2010–2014.

Regulatory year	Successful						Unsuccessful						Total hunters
	Local resident[b]	Nonlocal resident	Nonresident	Unk	Total	(%)	Local resident[b]	Nonlocal resident	Nonresident	Unk	Total	(%)	
2010	84	2	6	0	92	(17)	422	11	17	1	451	(83)	543
2011	75	1	7	1	84	(16)	412	12	11	1	436	(84)	520
2012	41	2	4	0	47	(11)	370	11	8	1	390	(89)	437
2013	70	5	7	0	82	(18)	346	18	19	1	384	(82)	466
2014	72	6	12	0	90	(17)	411	16	24	1	452	(83)	542

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.
[b] Unit 14 residents.

Table 4. Unit 14B moose harvest chronology, Southcentral Alaska, regulatory years[a] 2010–2014.

Regulatory	August			September					
year[b]	10–17	20–26	27–31	1–7	8–14	15–20	21–25	Unknown	Total[c]
2010	3	4	7	12	23	23	17	3	92
2011	1	6	8	13	16	14	25	1	84
2012	3	5	2	4	13	8	12		47
2013	1	9	12	10	11	17	21	2	83
2014	1	9	7	19	9	21	22	2	90

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.
[b] Open season = 10–17 August (archery only), 25 August–25 September (general, spike-fork 50, 3 brow tines).
[c] Chronology does not include moose taken out of season.

Table 5. Unit 14B percent transport methods of successful moose hunters, Southcentral Alaska, regulatory years[a] 2010–2014.

Regulatory	Transport method (%)									No. moose
year	Airplane	Horse	Boat	ATV[b]	Snowmachine	ORV[c]	Highway vehicle	Unknown	Airboat	harvested
2010	7	1	0	58	0	12	18	4	0	90
2011	4	0	4	59	0	8	20	5	0	84
2012	7	0	6	45	0	21	11	10	0	47
2013	9	0	1	54	0	12	22	2	0	82
2014	11	2	9	54	0	7	8	9	0	90

[a] Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2010 = 1 July 2010–30 June 2011.
[b] ATV = all-terrain vehicle.
[c] ORV = off-road vehicle.

Other Mortality

Road and railroad mortality is highly variable and reflects the amount of snowfall received each winter (Table 2). For example, in RY11 the amount of snow received that winter was much higher than normal; this resulted in a combined road and rail mortality that was 3 times greater than any other year in the reporting period.

Anecdotal evidence suggested that the black and brown bear population may have been increasing in Unit 14B and this may have been reflected in the relatively low calf:cow ratio noted in 2005. However, calf:cow ratios have improved in subsequent GSPE surveys indicating that the effects of predation may be slight or negligible.

Alaska Board of Game Actions and Emergency Orders

Few changes to moose hunting regulations were addressed during the reporting period. In the spring 2013 meeting BOG included Unit 14B into the existing targeted moose hunt (AM415) designed to address nuisance moose and MVC issues in Unit 14A. They also included archery as an acceptable method of take to the previously accepted use of shotguns with slugs. Hunters participating in this program must have Hunter's Education and Bow Hunter's Education certification as appropriate. In spring 2015 BOG allowed the taking of brown bears over black bear bait in Unit 14B. This regulation may result in a decrease in the brown bear population, and a subsequent increase in moose calf recruitment. BOG summary information is available on the ADF&G website:

http://www.adfg.alaska.gov/index.cfm?adfg=gameboard.meetinginfo

There were no emergency actions during this reporting period.

Recommendations for Activity 2.1

Continue with modifications:

- Monitor total harvest for comparison with current IM objectives.
- Consider opportunities for additional harvest of bulls
- Utilize the age data gathered from MVCs and AM415 to address questions regarding the age structure of the population.
  Antlerless hunts should be phased in as the moose population is within the management objective and showing a positive trend. Further increases may result in exceeding our current population objective and should be avoided.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Assess habitat condition and browse utilization.

Data Needs

Monitoring browse utilization by moose and forage plant condition enables an evaluation of the impact of increasing moose density on the available habitat and can serve as a signal to liberalize harvest in order to avert habitat degradation and a subsequent decline in productivity and the

moose population. By sampling Unit 14B at a time when the population is within the objective and has been below the objective for at least the last 17 years we will establish a baseline that we can use to monitor the effects of further population growth and its impact on the available browse.

Methods

Staff developed a browse survey sampling design based on the work of Paragi and Kellie (2011), and Seaton et al. (2011) with a modification that allowed for sampling in highly developed areas. Using the GSPE grid of Unit 14B, we randomly selected 40 units for sampling and selected plot centers randomly within those units.

Results and Discussion

At this time browse utilization assessment in Unit 14B has not occurred. We anticipate completing the study in the future as time and resources allow.

Recommendations for Activity 3.1

Continue.

ACTIVITY 3.2. Modify fire suppression levels to allow for natural fire regime to enhance moose habitat.

Data Needs

Natural fires return forests to earlier seral stages which are more productive for moose and other wildlife. By reducing the level of fire suppression determined by Division of Forestry (DOF) from full or modified to limited, wildland firefighting efforts would be reduced should a natural fire occur in the unit. This in turn would allow more acres of mature stands to burn and return to earlier seral stages at minimal cost to the state.

Methods

ADF&G coordinated with DOF to determine where fire suppression levels could be reduced to modified or limited and sent a letter of support for changing suppression levels where appropriate (Appendix C).

Results and Discussion

The modification of fire suppression levels is the responsibility of DOF. We have been informed that the Mat-Su Area Forester and area staff will be working to implement the requested changes in fall 2016.

Recommendations for Activity 3.2.

Continue.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

There were no nonregulatory management needs during the reporting period.

Data Recording and Archiving

RECORDING

- GSPE moose survey form (Appendix A).
- Browse survey form (Appendix D).

ARCHIVING

- Survey and harvest data are stored on an internal database housed on a server (http://winfonet.alaska.gov/index.cfm). Field data sheets for surveys are stored in file cabinets located at the Palmer Area Office.
- All other electronic data and files such as copies of field data sheets, survey memos, maps, and reports are located on the in-house server (O:\\WC\Palmer Area Office Folder\Species\Moose)

Conclusions and Management Recommendations

GSPE estimates place the Unit 14B population within the IM population objective with acceptable bull:cow and calf:cow ratios. GSPE surveys should be done every 3 years to ensure that any changes in abundance or population structure can be captured and adequately addressed by staff in a timely manner.

The harvest was below the IM objective during the reporting period; as it has been for the past 27 years. The recovery of the population to within the IM objective and the 30 bull:100 cow ratio indicates that there is room for additional harvest. Bull:cow ratios within a range of 20–30 will allow greater flexibility in management options. In the situation where the bull:100 cow ratio exceeds 30, other opportunities for additional harvest such as an "any bull' draw hunt or an extension of the current hunting season should be considered.

II. Project Review and RY15–RY19 Plan

Review of Management Direction

MANAGEMENT DIRECTION

There are no changes in the management direction for Unit 14B.

GOALS

Remain unchanged from the report. Specifically they are to:

- Protect, maintain, and enhance the moose population and its habitat in concert with other components of the ecosystem to provide for high levels of human consumptive use.
- Optimize opportunity to participate in hunting moose.

CODIFIED OBJECTIVES

IM objectives (Alaska Administrative Code 5 AAC 92.108) are as follows:

Population	Finding	Population objective	Harvest objective
Unit 14B	Positive	2,500–2,800	100–200

MANAGEMENT OBJECTIVES

In addition to the population and harvest goals stated above, manage for a posthunt (fall) sex ratio of 20–30 bulls:100 cows.

Changing the bull:cow ratio from ≥20 to a range of 20–30 would provide managers with set points in which to manage the population. When the bull:cow ratio exceeds 30 other management options such as adding an "any bull" draw hunt or extending the existing season will be considered to provide additional opportunity, reduce the bull:cow ratio to the acceptable range, and ensure that the harvest objectives are being met.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct fall GSPE survey to inventory and determine sex and age composition in the unit to determine population size, productivity, and trends. The survey should be designed such that the interval proportion of the mean is ≤20% at the 90% confidence interval.

Data Needs

No change from reporting period.

Methods

No change from reporting period.

Recommendations

- In order to maintain a triennial survey regime, the next scheduled survey should take place in fall 2016.
- Biometric review of the current sampling scheme may need to be accomplished in order to refine techniques that will result in smaller errors once SCF is taken into account.

ACTIVITY 1.2. Conduct sex and age composition surveys if the period between GSPE surveys is great enough that it does not allow us to make informed management decisions.

Data Needs

Sex and age composition surveys can be completed either posthunt or in the spring to determine age and sex composition of the unit population when a full GSPE is not logistically possible. These surveys can be used to determine appropriate harvest levels and recruitment into the

population. Sex and age ratio data may also be used to model population structure and trends acknowledging that surveys conducted in late winter or early spring will have to address antler loss.

Methods

- Composition surveys conducted posthunt can be completed with a reduced sampling effort and yet provide viable bull:cow and calf:cow ratios. Using techniques similar to GSPE surveys teams of pilots and observers would fly between 300 and 800 feet above ground level and record all moose of each sex and age class encountered along a predefined route in areas of known wintering concentrations.
- Midwinter or spring GSPE surveys could be completed using the same techniques as a fall GSPE survey. While it would not provide a viable bull:cow ratio it would provide a total population size and percent calves information that will provide indicators of abundance and recruitment.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor the moose mortality through field observations, hunter harvest reports, contact with hunters, and reports of other sources of mortality on an annual basis.

Data Needs

Same as report.

Methods

Staff will examine alternatives to the current hunting seasons and bag limits and make recommendations to BOG regarding methods for increasing the harvest in Unit 14B. These recommendations may include the establishment of an “any bull” draw hunt, an increase in the length of the current season dates, and/or an adjustment to the season dates toward the end of September when bulls become more vulnerable to techniques such as calling.

ACTIVITY 2.2. Age distribution of cows.

Data Needs

Determining the age distribution of cow moose may lead to understanding parameters of the population such as the potential for population growth. Comparisons of age distribution of cows harvested and animals collected from MVCs can enhance our understanding of how different age classes are subjected to different mortality events.

Methods

Hunters participating in targeted hunts (AM415) and people receiving moose through Department of Public Safety’s Roadkill Salvage Program are required to submit approximately 5 inches of the lower jaw to ADF&G. Submitted samples are examined for tooth wear and compared to teeth of known age moose for age analysis.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Assess habitat quality and availability

Data Needs

Monitoring browse utilization by moose and forage plant condition enables an evaluation of the impact of increasing moose density on the available habitat and can serve as a signal to liberalize harvest in order to avert habitat degradation and any subsequent declines in the moose population. The maximum amount of habitat available to moose below 3,500 feet is 1,140 mi^2. An assessment of habitat quality and availability will enable us to refine the total amount of habitat available to the moose population. Browse sampling within the next 5 years will establish a baseline that can be used to monitor the effects of further population growth and its impact on the available browse.

Methods

Staff will develop a browse survey scheme based on the work of Paragi and Kellie (2011) and Seaton et al. (2011) with a modification that allows for sampling in developed areas. Using the GSPE grid of Unit 14B we will randomly select 40 units for sampling and selected plot centers randomly within those units. We will sample ≥30 plots. We will access the area via R-44 helicopter and highway vehicle. We will count preferred browse species and measure a subsample of preferred browse species. We will record slope, aspect, and other data and take photos of each area (Appendix D). We will analyze data for species composition, proportional offtake, and other parameters that we can use to compare with other results statewide.

ACTIVITY 3.2. Modify fire suppression levels to allow for natural fire regime to enhance moose habitat.

Data Needs

No change form report.

Methods

No change form report.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

- None identified.

Data Recording and Archiving

RECORDING

- Moose survey form (Appendix A).
- Moose browse survey form (Appendix D).

ARCHIVING

- GSPE data are stored on an internal database housed on a server (http://winfonet.alaska.gov/index.cfm). Digitized field data sheets are stored in file folders located in the Palmer Assistant Area biologist's office.
- Field data sheets are scanned and housed on the computer server in the Palmer Area Biologist office (O:\WC\Palmer Area Office Folder\Species\Moose\Moose Population Estimation\14B Moose Survey Data\Archived Survey Sheets) and stored in file folders located in the Palmer Assistant Area Biologist's office.
- Historical (1990–2016) survey notes and data sheets should be scanned for more secure data archive.

Agreements

None.

Permitting

None.

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♦ ♦ ♦

Appendix A. Moose survey form used for composition surveys and in stratified surveys such as the geospatial population estimator.

MOOSE SURVEY FORM

Date ____/____/____ Page ____ of ____

GMU ____ Count Area ____ Mi² in count area ____

Aircraft Type ____ Pilot/Observer ____/____ Cost/hr ____

WEATHER:

Cloudcover (%) ____ Precipitation ____ Temp ____

Wind Speed and Direction ____ Turbulence ____

CONDITIONS:

Light				Snow age and cover				Flight Time
Type		Intensity		Age		Cover		Depart
Bright ☐		High ☐		Fresh ☐		Complete ☐		Start Count
Flat ☐		Medium ☐		Moderate ☐		Low vegetation showing ☐		Stop Count
		Low ☐		Old ☐		Bare ground showing ☐		Return
								Flight Time
General Survey Conditions		☐ Excellent		☐ Good		☐ Fair	☐ Poor	Survey Time

	BULLS				COWS				Unk	
Group No.	Yearlings S/F I 3 pt.		Med <50"	Large ≥50"	w/o calf	w/1 calf	w/2 calf	Lone Calf	sex/ age	Remarks
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
Total Page 1										
Total Page 2										
Totals										

Appendix B. Moose survey report summary for Units 14A and 14B, Southcentral Alaska, 2013.

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
Central/Southwest Regional Office
1800 Glenn Highway, Suite 4
Palmer, Alaska 99645-9965
Main: 907.861.2100
Fax: 907.861.2121

Memorandum

To: Lem Butler, Regional Supervisor

CC: Tim Peltier, Palmer Assistant Area Biologist

From: Todd Rinaldi, Palmer Area Biologist

Date: 25 February 2014

Subject: 2013 Moose Survey Results for GMU 14A &14B

In November of 2013 we completed 2 independent moose surveys in GMU14A and 14B using the Geospatial Population Estimator (GSPE) method.

GMU 14A

During 15-17 November 2013, 4 pilot/observer teams in PA-18s sampled 520 mi^2 of GMU 14A (total survey area = 2195 mi^2). This translates to 34 high and 48 low strata for a total of 82 of 345 available quadrats. Snow cover was mostly complete but many areas had low vegetation showing.

We randomly selected 40 of the sampled quadrats (19 high and 21 low) for intensive sampling. These quadrats were flown at search intensities of 3.9-4.6 min/km^2 immediately upon completion of the quadrat to calculate a sightability correction factor (SCF) following Gasaway et al. 1986.

We observed 1750 moose and many were still on the slopes of Mt. Baldy suggesting that the snow had yet to push the moose completely out of the higher country. The GSPE population estimate was calculated at 6851 moose (SE = 679.89). The bull to cow ratio was 21:100 which is an increase of 4% from 2011. Calf to cow ratio also showed a slight increase at 45:100. After applying the SCF (1.14 high and 1.35 low), the population in GMU14A was determined to be at 8500 moose. This is an increase from the 2011 estimate of 8000 moose and is consistent with the continued growth of the moose population in GMU14A since at least 1988. The population remains above the objective of 6000-6500 moose and has been since 2000. This survey took 79 flight hours to complete at a cost of $19,651.

GMU 14B

We completed the survey of GMU 14B in 3 days between 25-29 November 2013 using five PA-18s. The survey took 89 flight hours to complete at a cost of $21,138. Weather prevented flights on 27-28 November; however there is no evidence that this weather instigated any substantial movements by moose.

For 2013, we increased the sampling effort to include 40 high (253 mi^2) and 39 low (243 mi^2) strata consistent with sampling protocols described in Kellie and DeLong (2006) for better precision. This represents 43% of the survey area. Of the sampled strata, 16 high and 14 low strata were randomly selected and flown at 3.9-4.6 min/km^2 to calculate an SCF. Snow cover was complete throughout the survey area.

We counted 1261 moose and calculated the population estimate at 2112 (SE = 112.75). The bull to cow ratio was 30:100 - a decrease of 4% from 2009. Calf to cow ratio showed a 10% increase to 28:100. After applying the SCF (1.15 high and 1.31 low) the population in GMU14B was determined to be at 2700 moose. This is an increase from the uncorrected 2011 estimate of 1662 moose and may be the first time since 1987 that the moose population in GMU14B is within its objective of 2500-2800.

	14A		Corrected Est. & SCF		14B		Corrected Est. & SCF	
Parameter	Estimate	90% Interval	Estimate	90% CI or Variance	Estimate	90% Interval	Estimate	90% CI or Variance
All Moose	6851	0.163	8500	21.4%	2112	0.087	2700	31.8%
High Strata	3263	0.176	1.15	0.005	477	0.020	1.15	0.003
Low Strata	3588	0.267	1.35	0.025	1635	0.113	1.31	0.082
Bulls:100 Cow	20.9	0.179	-	-	29.9	0.179	-	-
Calves:100 Cow	44.5	0.247	-	-	27.5	0.129	-	-

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Appendix C. Letter to Alaska Division of Forestry requesting changes in wildland fire protection levels in Units 14A, 14B, and 16, Southcentral Alaska, 2014.

THE STATE of ALASKA
GOVERNOR SEAN PARNELL

Department of Fish and Game
DIVISION OF WILDLIFE CONSERVATION
Central/Southwest Region

1800 Glenn Highway, Suite 4
Palmer, Alaska 99645-6736
Main: 907.861.2100
Fax: 907.861.2121

July 11, 2014

Norm McDonald
Alaska Division of Forestry
Mat-Su Area Fire Management Officer
101 Airport Rd
Palmer, Alaska 99645

Dear Mr. McDonald:

At our meeting on 10 July 2014 you indicated that fire suppression management options may be reconsidered in parts of Game Management Unit 14A&B and 16. We strongly encourage the Department of Natural Resources to consider reducing the fire suppression levels from full or modified to limited wherever it is prudent to do so and encourage the use of a modified suppression level where a more conservative approach is necessary. Allowing fire to play a natural role in the ecosystem leading to early successional hardwood habitats will greatly benefit moose, grouse and other wildlife species by providing essential cover and browse.

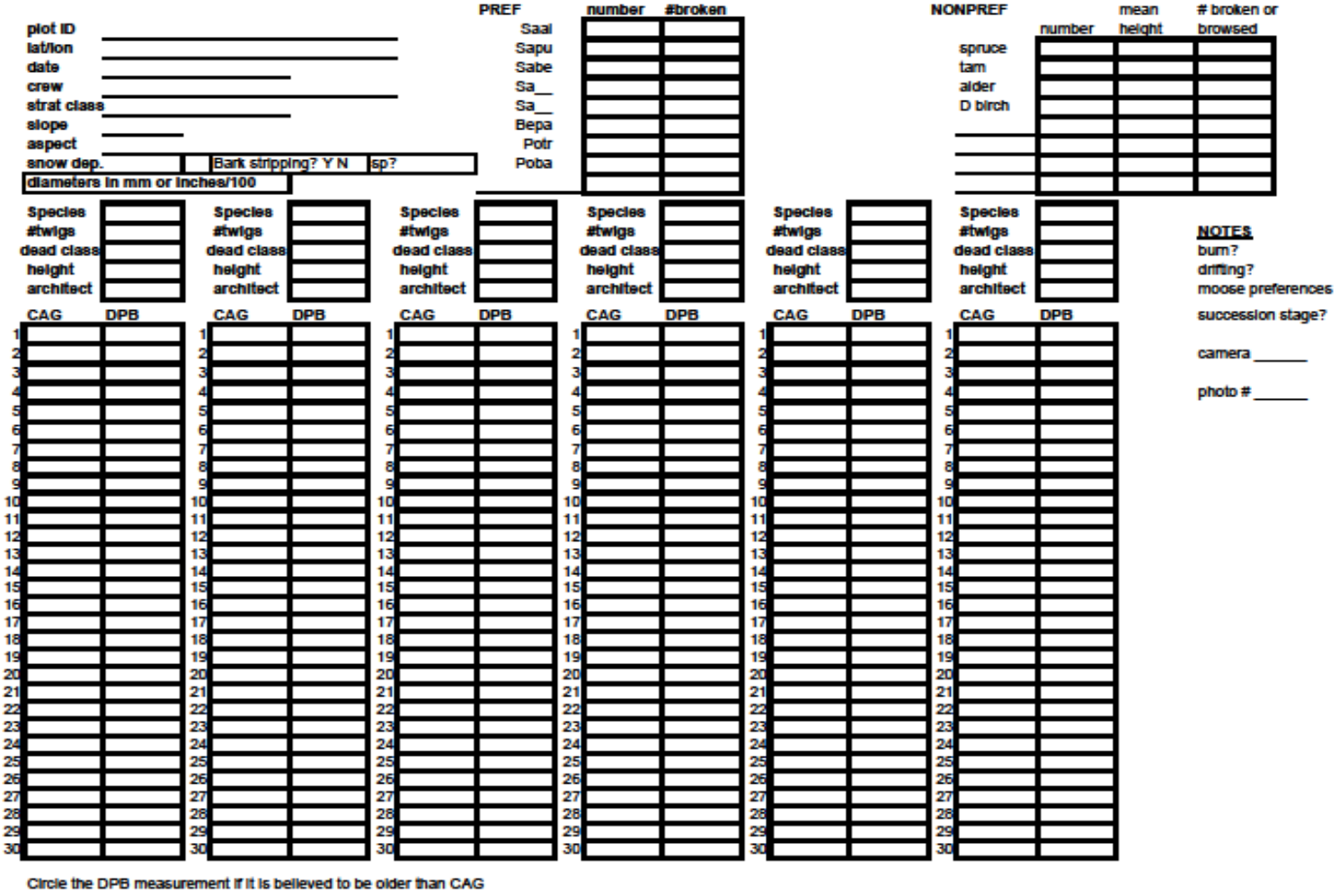
Moose populations in these management units are especially important. The Alaska Board of Game identified these moose populations as important for providing high levels of harvest for human consumptive use. Establishing and maintaining a mosaic of serial stages and forest types that mimic wildfires and natural succession would enhance the habitat and the likelihood of meeting moose population and harvest objectives in coming years.

Thank you for your consideration of this request. We will gladly consult with you and provide additional information, when necessary, as you review the wildfire designations for these areas.

Sincerely,

Lem Butler
Regional Supervisor
Division of Wildlife Conservation, Region IV

Appendix D. Browse survey data sheet.



plot ID _____
lat/lon _____
date _____
crew _____
strat class _____
slope _____
aspect _____
snow dep. _____ Bark stripping? Y N sp? _____
diameters in mm or inches/100

PREF	number	#broken
Saal		
Sapu		
Sabe		
Sa__		
Sa__		
Bepa		
Potr		
Poba		

NONPREF	number	mean height	# broken or browsed
spruce			
tam			
alder			
D birch			
_____			
_____			
_____			

Species _____
#twigs _____
dead class _____
height _____
architect _____

	CAG	DPB
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
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16		
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25		
26		
27		
28		
29		
30		

NOTES
burn?
drifting?
moose preferences
succession stage?

camera _____

photo # _____

Circle the DPB measurement if it is believed to be older than CAG

Architecture classes (browsing history of the plant, includes this year, and all visible evidence of past years)
broomed- more than half of the CAG twigs rise from lateral twigs that are the result of browsing
unbrowsed- no evidence of past browsing
browsed- less than half of the CAG twigs rise from lateral twigs that are the result of browsing

Species					
#twigs					
dead class					
height					
architect					

	CAG	DPB	CAG	DPB	CAG	DPB	CAG	DPB	CAG	DPB	CAG	DPB
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
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23												
24												
25												
26												
27												
28												
29												
30												

Dead classes (amount of dead material that comprizes a plant)
X= no dead
L= less dead than live material
M= more dead than live material

STEPS IN SURVEY
1. Locate center of plot
2. Locate boundary of plot
3. If no pref plants, pick alt
4. Snow depth
5. Choose random distance and direction from center to start measuring closest plant of each pref species
6. Turn head and grab stem on plant
7. Measure 10 twigs starting at terminal end of that stem
8. height, # twigs, spp, arch. # stems only between 0.5m and 3.0m
9. Choose next random distance and direction from center for other plants to measure
9.5. Goal is 30 twigs/ spp
10. Estimate # of all woody browse plants by species in plot

TIPS
*Pref plant has CAG twigs between 0.5m and 3m
*Bepa, Sasi, Sabe, etc., can be nonpref plants if they are too tall
*measure plant height from ground


ALASKA
DEPARTMENT OF FISH AND GAME