

Moose Management Report and Plan, Game Management Unit 26A:

Report Period 1 July 2015–30 June 2020, and

Plan Period 1 July 2020–30 June 2025

Carmen Daggett



Moose Management Report and Plan, Game Management Unit 26A:

Report Period 1 July 2015–30 June 2020, and
Plan Period 1 July 2020–30 June 2025

PREPARED BY:

Carmen Daggett
Area Wildlife Biologist

APPROVED BY:

Phillip Perry
Management Coordinator

REVIEWED BY:

Adam Craig Joelle Hepler
Biometrician Wildlife Research Biologist

PUBLISHED BY:

Sky Guritz
Publications Coordinator

©2024 Alaska Department of Fish and Game

Alaska Department of Fish and Game
Division of Wildlife Conservation
PO Box 115526
Juneau, AK 99811-5526



Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and pay state hunting license and tag fees. These taxes and fees fund the federal Wildlife Restoration Program and the State of Alaska's Fish and Game Fund, which provided funding for the work reported on in this publication.

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 Phillip Perry, Management Coordinator for Region V for the Division of Wildlife Conservation.

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). To subscribe to email announcements regarding new technical publications from the Alaska Department of Fish and Game, Division of Wildlife Conservation please use the following link: <http://list.state.ak.us/mailman/listinfo/adfgwildlifereport>.

This document, published in PDF format only, should be cited as:

Daggett, C. 2024. Moose management report and plan, Game Management Unit 26A: Report period 1 July 2015–30 June 2020, and plan period 1 July 2020–30 June 2025. Alaska Department of Fish and Game, Species Management Report and Plan ADF&G/DWC/SMR&P-2024-3, Juneau.

Please contact the authors or the Division of Wildlife Conservation at (907) 465-4190 if you have questions about the content of this report.

The State of Alaska is an Affirmative Action/Equal Opportunity Employer. The Alaska Department of Fish and Game complies with Title II of the Americans with Disabilities Act of 1990. This document is available in alternative communication formats. If you need assistance, please contact the Department ADA Coordinator via fax at (907) 465-6078; TTY/Alaska Relay 7-1-1 or 1-800-770-8973.

ADF&G does not endorse or recommend any specific company or their products. Product names used in this publication are included for completeness but do not constitute product endorsement.

Contents

Purpose of this Report.....	1
I. RY15–RY19 Management Report	1
Management Area.....	1
Summary of Status, Trend, Management Activities, and History of Moose in Unit 26A.....	1
Management Direction.....	3
Existing Wildlife Management Plans	3
Goals	3
Codified Objectives	3
Amounts Reasonably Necessary for Subsistence Uses	3
Intensive Management.....	3
Management Objectives.....	3
Management Activities	4
1. Population Status and Trend	4
2. Mortality-Harvest Monitoring and Regulations.....	7
Habitat Assessment-Enhancement.....	9
Nonregulatory Management Problems or Needs.....	10
Data Recording and Archiving	10
Agreements	11
Permitting.....	11
Conclusions and Management Recommendations	11
II. Project Review and RY20–RY24 Plan	11
Review of Management Direction	11
Management Direction.....	11
Goals	11
Codified Objectives	11
Amounts Reasonably Necessary for Subsistence Uses	11
Intensive Management.....	12
Management Objectives.....	12
Review of Management Activities.....	12
Population Status and Trend	12
2. Mortality-Harvest Monitoring	13
3. Habitat Assessment-Enhancement.....	13
Nonregulatory Management Problems or Needs.....	13
Data Recording and Archiving	13
Agreements	13
Permitting.....	14
Acknowledgments.....	14
References Cited	14

List of Figures

Figure 1. Game management Unit 26A, Colville River drainage, Alaska. Moose habitat/minimum count area outlined in black. The core minimum count area (annual count area) is outlined in pink.	2
Figure 2. Colville River drainage moose minimum counts during 1970–2017 Unit 26A, northern Alaska.	4
Figure 3. Results of the moose core minimum count surveys in the annual core survey area (Fig. 1), 1992–2020, Alaska.	5

List of Tables

Table 1. Moose hunter residency and success, Unit 26A, Alaska, regulatory years 2015–2019. ..	8
Table 2. Transportation methods used by hunters from regulatory years 2015 to 2019, Alaska. ..	9

Purpose of this Report

This report provides a record of survey and inventory management activities for moose (*Alces alces*) in Game Management Unit 26A for the 5 regulatory years 2015–2019 and plans for survey and inventory management activities in the next 5 regulatory years, 2020–2024. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY14 = 1 July 2014–30 June 2015). This report is produced primarily to provide agency staff with data and analysis to help guide and record agency efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game’s (ADF&G, the department) Division of Wildlife Conservation (DWC) launched this 5-year report to report more efficiently on trends and to describe potential changes in data collection activities over the next 5 years. It replaces the moose management report of survey and inventory activities that was previously produced every 2 years.

I. RY15–RY19 Management Report

Management Area

Game Management Unit (Unit) 26A is the northernmost unit in Alaska located 56,000 square miles north of the Arctic Circle. It consists of the area from Cape Lisburne to just west of the Itkillik River drainage, and west of the east bank of the Colville River between the Itkillik River and the Arctic Ocean, and all Arctic river drainages south to Gates of the Arctic National Park and Anaktuvuk Pass (Fig. 1).

Moose are primarily found in riparian corridors in the southeast portion of Unit 26A. During summer, moose move into small tributaries and hills surrounding riparian habitat, and some disperse as far as the foothills of the Brooks Range and across the coastal plain. The highest winter densities of moose are found in the inland portions of the Colville River drainage.

Summary of Status, Trend, Management Activities, and History of Moose in Unit 26A

Archeological records suggest that moose have been present on the North Slope, either sporadically or at low densities, for many years (Carroll 2012). Written records document moose in the area sometime in the later 20th century, in the Point Hope area in the late 1960s (Hall 1973), and DWC survey-inventory reports note them becoming more abundant on the North Slope in the 1940s (Carroll 2012).

Since 1970, late-winter core area minimum count surveys have been attempted annually to assess population status and short yearling recruitment rates in the 3 major river drainages: Colville, Chandler, and Anaktuvuk (Fig. 1) Additionally, minimum population count surveys were attempted triennially which include the Colville River and its tributaries outlined in black (Colville River) on Figure 1. Occasionally weather or other circumstances prevent surveys from occurring, but they are attempted following the aforementioned schedule. Moose abundance on the Colville River has been prone to variable growth and sharp declines with minimum counts as

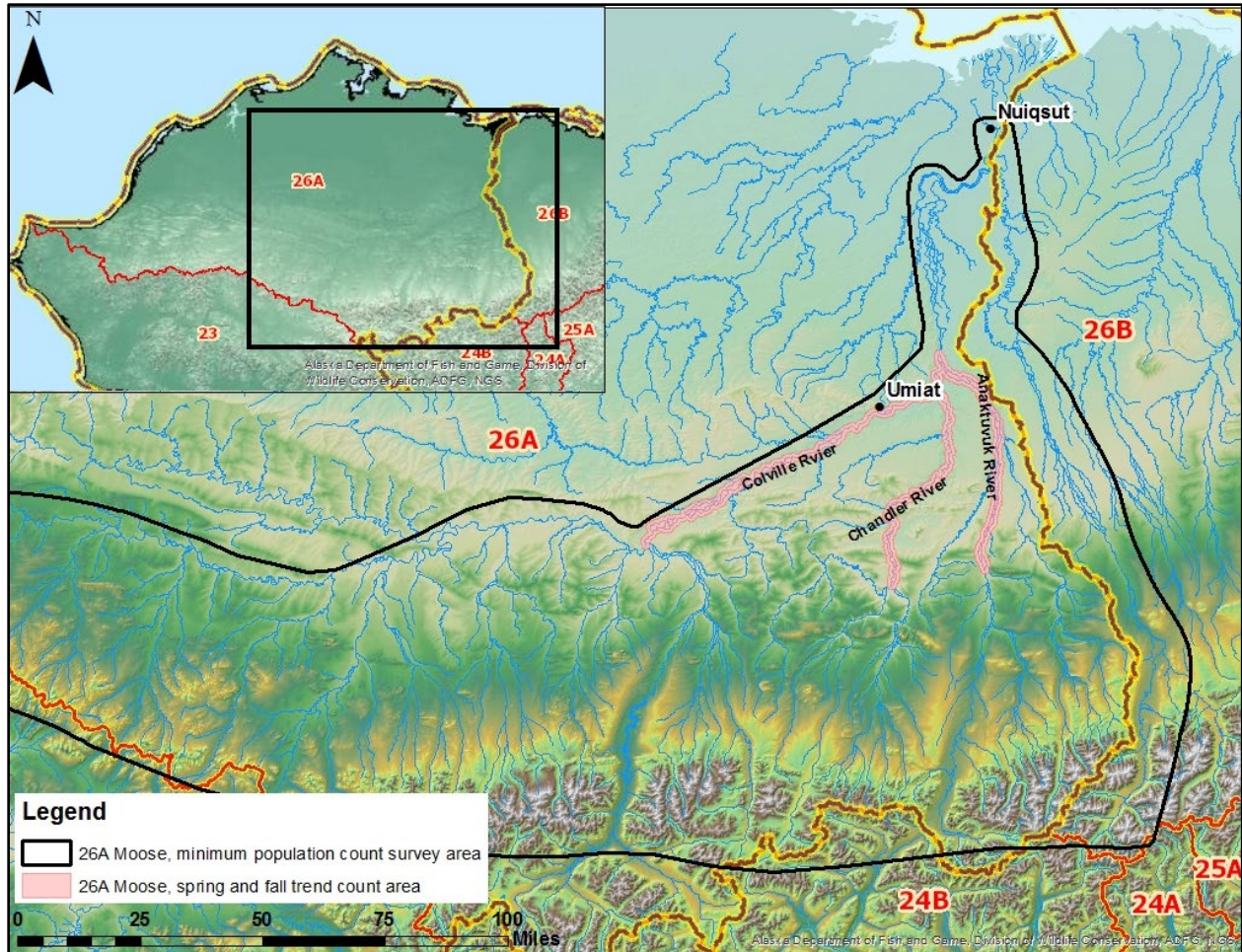


Figure 1. Game management Unit 26A, Colville River drainage, Alaska. Moose habitat/minimum count area outlined in black. The core minimum count area (annual count area) is outlined in pink.

low as 294 moose (2013) and as large as 1,535 moose (1991). Colville River moose population minimum counts were well over 1,000 animals (1970–1991) until 1999, when the population experienced a precipitous decline from 1,535 (1991) to 326 (1999) moose. The population decline of the 1990s was likely due to a combination of high adult mortality and poor calf survival, although calf production prior to and during the decline was not monitored. Fall composition surveys indicated that the parturition rate and/or summer calf survival were very low, as only 4%, 2%, and 0% calves were counted in 1993, 1994, and 1995, respectively. The decline appeared to be due to a combination of malnourishment, bacterial diseases, mineral deficiency, predation, weather factors, and competition with snowshoe hares (Carroll 2012, O’Hara et al. 1998). The population then increased over the next decade, peaking at 1,180 moose in 2008, followed once again by a sharp decline in numbers through 2014. Since 2014 the Colville River moose population has been gradually increasing.

Aircraft were used to transport moose hunters, gear, and moose parts in Unit 26A during all or part of the season from the early 1970s (Trent 1989) to 1995. Due to the population decline, more restrictive regulations were instituted in the mid-1990s, including a ban on the use of

aircraft to hunt moose between 1996 and 2005. As abundance increased, regulations were liberalized, and in fall 2005 the Board of Game (BOG) initiated a drawing permit hunt that allowed a limited number of hunters to use aircraft during moose hunts. Most local hunters travel by boat along the Colville River to hunt moose, with a high percentage (75% in 1983–2014, 73% in 2005–2014) of those hunters flying to Umiat first.

The annual average reported harvest from 1985 to 1993 was 59 moose per year, with a high of 67 moose harvested in 1991. The harvest then decreased to 40 moose per year through 1995, and as abundance declined the harvest decreased to 14 moose in 1996, and subsequently, regulations became more restrictive. Harvest throughout the 2000s was low averaging 3 moose per year during RY15–RY19.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

The last formal management plan was published in 1976 (ADF&G 1976); this has been reviewed and modified through public comments, staff recommendations, and Board of Game actions over the years. A record of these changes can be found in the division's survey-inventory and species management report and plan series.

GOALS

- G1. Maintain a moose population capable of satisfying subsistence and general season needs with an amount reasonably necessary for subsistence uses (ANS) of 15–30 moose.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

- C1. The Unit 26A moose population has a positive customary and traditional use finding. The amount necessary for subsistence uses is 15–30 moose (5 AAC 99.025).

Intensive Management

The Unit 26A moose population is not recognized as an intensive management (IM) population.

MANAGEMENT OBJECTIVES

- M1. Manage for a minimum count of 600–800 moose.
- M2. Manage for a fall bull-to-cow ratio of $\geq 30:100$.
- M3. Manage for a fall calf-to-cow ratio of $\geq 30:100$.
- M4. Manage for a population that is composed of $\geq 20\%$ short yearlings in spring.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct a moose minimum count in the Colville River drainage once every 3–5 years in spring (M1).

Data Needs

Minimum counts are needed to assess trends in the Colville River drainage moose population over time. Without this information DWC wildlife managers would be unable to efficiently estimate harvestable surplus for subsistence and general hunt needs.

Methods

Conduct a minimum count survey of the majority of available moose habitat in Unit 26A (Fig. 1) during April as weather and snow conditions allow. Methods used during RY15–RY19 for minimum count surveys are documented in Carroll (2012).

Results and Discussion

The Colville River drainage moose population experienced a substantial decline prior to 2015, reaching the lowest historical minimum count of 294 moose in 2014. The population now appears to be steadily growing again (Fig. 2). One survey was conducted during RY15–RY19 in 2017 (RY16) with a total count of 348 moose (Fig. 2)

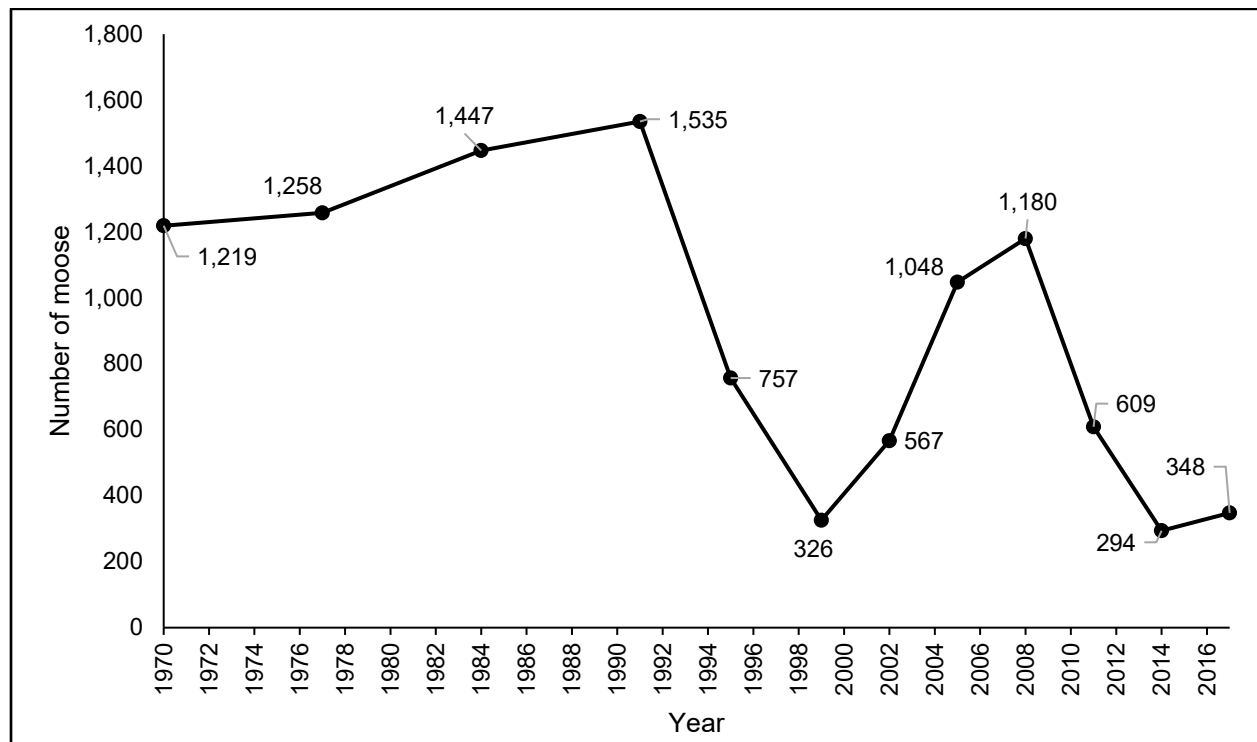


Figure 2. Colville River drainage moose minimum counts during 1970–2017 Unit 26A, northern Alaska.

Recommendations for Activity 1.1

Continue.

ACTIVITY 1.2. Determine short yearling recruitment and assess population trend in the core minimum count area in spring (M4).

Data Needs

Determining short yearling recruitment and conducting a minimum count within the core minimum count area provides population trend information in years the larger Colville River drainagewide minimum count is not conducted.

Methods

Conduct a minimum count and recruitment survey in the core moose habitat in Unit 26A during April each year as weather and snow conditions allow. This survey area contains only the major riparian corridors of the Chandler, Anaktuvuk, and a section of the Colville River (Fig. 1). A detailed description of methods is documented in Carroll (2012).

Results and Discussion

In 2015, 145 total moose and 13 short yearlings were counted. Counts peaked at 218 total moose and 42 short yearlings in 2018 and remained stable (Fig. 3).

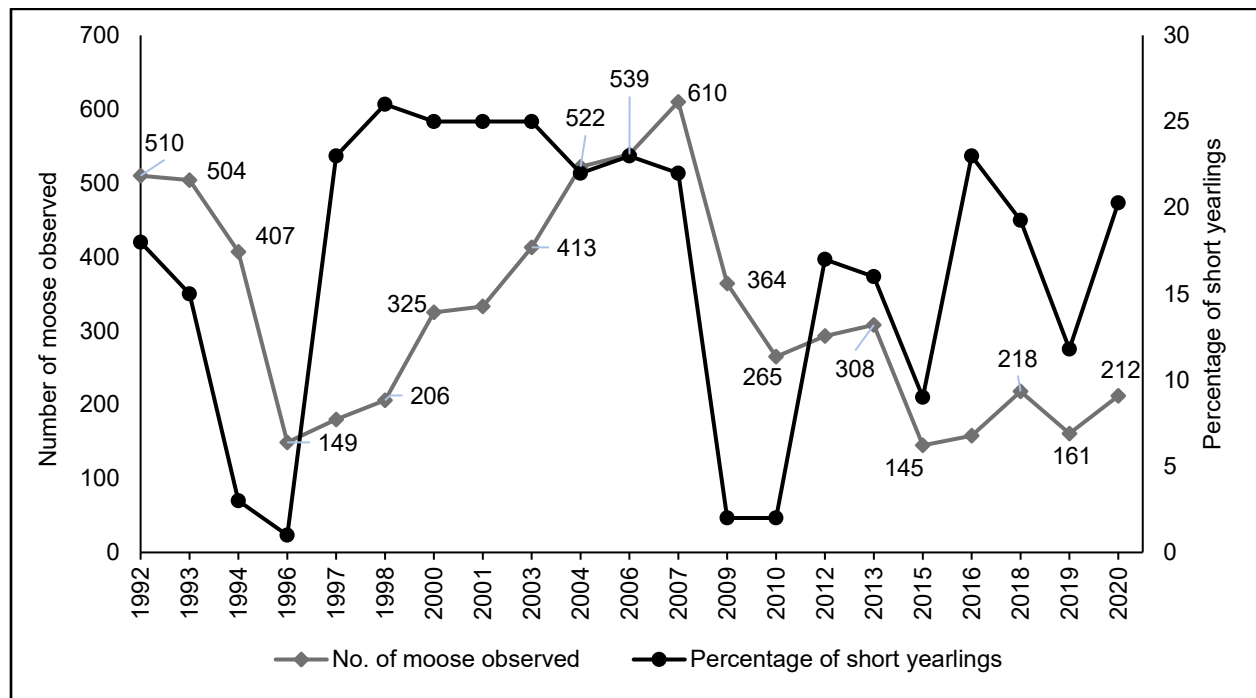


Figure 3. Results of the moose core minimum count surveys in the annual core survey area (Fig. 1), 1992–2020, Alaska.

The most recent minimum count was in 2017 with 394 moose and 18% short yearlings (Fig. 2). Core area moose minimum counts during RY15–RY19 show a stabilizing population while the

Colville River moose minimum counts depict growth. The percentages of short yearlings remain below Management Objective M4, with the percentage of short yearlings trending with the total number of moose in Figure 3.

Recommendations for Activity 1.2

Continue.

ACTIVITY 1.3. Determine sex and age composition in the core minimum count area every 2 years in the fall (M2, M3).

Data Needs

Sex and age composition surveys in the core minimum count area are necessary for determining bull-to-cow ratios, calf-to-cow ratios, and the percentage of calves. These data are important for understanding moose production and harvestable surplus.

Methods

Conduct a composition survey of the core moose habitat every 2 years in November as weather and snow conditions allow. Survey will not be conducted if bull-to-cow and calf-to-cow ratios approach management objectives or there is an observed decline in spring minimum count numbers for 3 or more years. Like the minimum population count, this method produces a direct count of the core survey area; however, the survey area contains only the major riparian corridors of the Colville, Chandler, and Anaktuvuk Rivers (Fig. 1). The pilot and observer visually searched the landscape to locate all visible moose in the core minimum count survey area. The observer records the GPS location, number of adult male and female moose, and number of calves. Sightability is good in November and comparable to spring surveys in the same area.

Results and Discussion

No new composition surveys were conducted during RY15–RY19. During this period 3–5 moose were harvested annually. A harvest this low was unlikely to have had a significant impact on the composition of the moose population; therefore, this survey was not warranted.

Recommendations for Activity 1.3

Modify. Reduce the frequency of this survey to once every 3–5 years. The composition of this population is not expected to fall below the management objective of 30 bulls:100 cows, even in times of significant population decline (Carroll 2012: Table 4). The calf-to-cow ratio has not changed (Carroll 2012) and is likely unaffected by hunting due to the bull-only bag limit in most of Unit 26A where moose are present. The factors affecting calf-to-cow ratios are more likely related to nutrition or predation, and calf-to-adult ratios can be evaluated during spring minimum count moose surveys.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor mortality and harvest.

Data Needs

The Alaska Board of Game established an amount necessary for subsistence uses of 15–30 moose for Unit 26A. Annual summaries of harvest are needed to determine whether this objective has been met. Harvest and mortality data also help direct future harvest strategies and ensure sustained yield harvest.

Methods

Hunters obtain a harvest ticket from ADF&G and are required to report on their hunt within 30 days of the close of the season. Failure to report on a harvest ticket results in reminders. Hunt reports are recorded in ADF&G's WinfoNet harvest database, and include information regarding hunter residency, success, effort, hunt location, date of kill, transportation method, and antler size. Occasionally, ADF&G Subsistence Section will conduct household surveys to gather additional data on moose harvest in Unit 26A.

Season and Bag Limit

Area	Hunter residency	Bag limit	Hunt type	Season
Unit 26A west of long 156° 00' W excluding the Colville River drainage	Residents	1 moose ^a	HT ^b	1 Jul–14 Sep
	Nonresidents	–		No open season
Unit 26A, the Colville River drainage above and including the Anaktuvuk River drainage	Residents	1 bull	HT ^b	1 Aug–3 Sep
	Nonresidents	–		No open season
26A remainder	Residents	1 bull	HT ^b	1 Aug–30 Sep
	Nonresidents	–		No open season

^a A person may not take a calf, or a cow accompanied by a calf.

^b Harvest ticket.

Results and Discussion

Harvest by Hunters

A total harvest of 14 moose with an average of 3 animals per year were reported during RY15 to RY19 in Unit 26A. There were 7 moose taken by residents of Unit 26A, 4 taken by other residents of Alaska, and 3 were taken by hunters of unknown residency. The total number of hunters ranged from 3 to 7 per year during RY15–RY19, with the average being 5 hunters per year. No household moose-related surveys were conducted by the Alaska Department of Fish and Game or the North Slope Borough in Unit 26A during RY15–RY19.

Hunter Residency and Success

The overall harvest of moose by residents was low during RY15–RY19 (Table 1). Reported hunter harvest averaged 3 moose per year during RY15–RY19, and there was no open season for nonresidents.

Table 1. Moose hunter residency and success, Unit 26A, Alaska, regulatory years 2015–2019.

Regulatory year	Successful hunters					Percent successful	Total hunters				
	Local resident ^a	Nonlocal resident ^b	Non-resident ^c	Unknown	Total		Local resident ^a	Nonlocal resident ^b	Non-resident ^c	Unknown	Total
2015	0	0	0	3	3	60	1	1	0	3	5
2016	2	2	0	0	4	57	3	4	0	0	7
2017	3	0	0	0	3	60	3	2	0	0	5
2018	1	1	0	0	2	66	1	2	0	0	3
2019	1	1	0	0	2	50	2	2	0	0	4

^a Local resident hunters are residents of Unit 26A.

^b Nonlocal residents are Alaska residents that do not live in Unit 26A.

^c U.S. citizens who are not Alaska residents.

Transport Methods

Moose harvest overall was very low. Hunters primarily used boats and 4-wheelers to successfully harvest moose in 2015–2018. In 2019 there were 2 hunters that used aircraft to hunt which was higher than the rest of the years during RY15–RY19 (Tables 1 and 2).

Table 2. Transportation methods used by hunters from regulatory years 2015 to 2019, Alaska.

Regulatory year	Transportation method (%)			
	Airplane	Boat	4-Wheeler	Unknown
2015	0	100	0	0
2016	0	75	25	0
2017	0	66	0	33
2018	50	0	50	0
2019	50	50	0	0

Other Mortality

Other sources of mortality include predation by bears and wolves are not well understood. Observations of predation are recorded.

Recommendations for Activity 2.1.

Continue. Increase communication with the public about the requirements of harvest tickets and work with vendors to collect overlays.

Habitat Assessment-Enhancement

ACTIVITY 3.1. Evaluate the quantity and quality of moose browse in portions of Unit 26A.

Data Needs

Determining the quantity and quality of moose browse are important factors for understanding moose health and resource competition (e.g., snowshoe hares). Additionally, in times of a fluctuating population, quantifying moose browse quality and metrics may provide context for other factors contributing to mortality or growth (e.g., predator populations).

Methods

Monitoring of browse plants provides information about how much of available browse is being removed by the existing moose population and the degree of browsing pressure during the life of the plant (Seaton 2002). Browse biomass removal is an indicator of moose nutritional condition (Seaton 2002, Boertje et al. 2007, Seaton et al. 2011). Browse plant architecture provides additional information on the effects of moose browsing on vegetation condition as a function of moose density (Seaton 2002, Paragi et al. 2015). Fully detailed methods on browse surveys are outlined in Paragi et al. (2015).

Results and Discussion

There were no browse surveys conducted during RY15–RY19.

Recommendations for Activity 3.1

Continue. Conduct another moose browse removal study, modeled after the Paragi et al. 2015 study, when the Colville River drainage moose population reaches the minimum count of 600–800 moose (M1), or if the population experiences another sharp decline.

ACTIVITY 3.2. Evaluate moose distribution.

Data Needs

Moose distribution information provides context for moose minimum counts as moose numbers are not evenly distributed across the landscape. In addition, the department is required to comment on environmental impact statements regarding development on the North Slope, it is important to understand proximity of moose to proposed development projects.

Methods

GPS locations of moose are collected during Activity 1.1.

Results

Moose were abundant on the section of the Colville River between the Killik and Anaktuvuk Rivers. They were also present on the Chandler and Anaktuvuk River proper. Moose were distributed as far north as Ocean Point and as far west as the Nuka River.

Recommendations for Activity 3.2

Research and local traditional knowledge suggest that potential moose habitat continues to expand as the riverine willow corridors increase across the North Slope (Zhou et al. 2020). It is important to continue to search for new potential pockets of moose expansion in river drainages that may be close or become connected to the Colville River drainage prioritizing areas of willow expansion.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- All moose survey datasheets are in files in the Utqiagvik area biologist's office; digital files are stored on the area biologist's computer hard drive (C:\Users\ctdaggett\Documents\Barrow Backup 6_15_23\Documents\REGION V\Moose\26A Moose).
- Moose harvest data are stored on in ADF&G's Wildlife Information Network (WinfoNet, <http://winfonet.alaska.gov/index.cfm>).

Agreements

There are no agreements for Unit 26A moose.

Permitting

None.

Conclusions and Management Recommendations

The Colville River moose population was relatively low in abundance during RY15–RY19. Calf recruitment was below the 20% management objective (M4). Albeit moose abundance seems to be steadily increasing, the population should continue to be managed conservatively, with resident-only harvest until the population reaches 600–800 moose. Once abundance increases to 600–800 moose, drawing permits and a nonresident season could be considered. In the future, management staff might consider conducting fall composition surveys to ensure the management objectives of ≥ 30 bulls:100 cows and ≥ 30 calves:100 cows are met after a nonresident season were to open.

Reported harvest remains relatively low, ranging from 1–4 moose annually and averaging 3 moose per year. Unreported harvest is unknown as there are no subsistence household surveys to compare with reported harvest. Outreach to encourage the public to report their harvest should continue.

II. Project Review and RY20–RY24 Plan

Review of Management Direction

MANAGEMENT DIRECTION

There are no changes in the management direction for the Unit 26A moose population. Moose mortalities will continue to be investigated and samples will be collected if there is a large die off.

GOALS

- G1. Maintain a moose population capable of satisfying subsistence and general season needs with an amounts reasonably necessary for subsistence uses (ANS) of 15–30 moose.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The Unit 26A moose population has a positive customary and traditional use finding. The amount necessary for subsistence uses is 15–30 moose (5 AAC 99.025).

Intensive Management

The Unit 26A moose population is not recognized as an intensive management (IM) population.

MANAGEMENT OBJECTIVES

M1. Manage for a minimum count of 600–800 moose.

M2. Manage for a fall bull-to-cow ratio of $\geq 30:100$.

M3. Manage for a fall calf-to-cow ratio of $\geq 30:100$.

M4. Manage for a population that is composed of $\geq 20\%$ short yearlings in spring.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Determine population abundance once every 3–5 years in spring.

Data Needs

No change from RY15–RY19 report.

Methods

No change from RY15–RY19 report.

ACTIVITY 1.2. Determine short yearling recruitment and assess population trend in the core minimum count area in spring.

Data Needs

No change from RY15–RY19 report.

Methods

No change from RY15–RY19 report.

ACTIVITY 1.3. Determine sex and age composition in the core minimum count area every 3–5 years in the fall.

Data Needs

Sex and age composition surveys in the core minimum count (i.e., trend count) area are necessary for determining bull-to-cow ratios, calf-to-cow ratios, and the percentage of calves. These data are important for understanding moose production and harvestable surplus.

Methods

The survey will be conducted using the same method as outlined in the above RY15–RY19 report except the frequency has been reduced to 3–5 years.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor mortality and harvest.

Data Needs

The Alaska Board of Game established an amount necessary for subsistence uses of 15–30 moose for Unit 26A. Annual summaries of harvest are needed to determine whether this objective has been met. Harvest and mortality data also help direct future harvest strategies and ensure sustained yield harvest.

Methods

No change from RY15–RY19 report.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Evaluate the quantity and quality of moose browse in portions of Unit 26A.

Data Needs

No change from RY15–RY19 report.

Methods

No change from RY15–RY19 report.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- All moose survey datasheets are in files in the Utqiagvik area biologist's office; digital files are stored on the area biologist's computer hard drive (C:\Users\ctdaggett\Documents\Barrow Backup 6_15_23\Documents\REGION V\Moose\26A Moose).
- Moose harvest data are stored on in ADF&G's Wildlife Information Network (WinfoNet, <http://winfonet.alaska.gov/index.cfm>).

Agreements

There are no agreements for Unit 26A moose.

Permitting

None.

Acknowledgments

Thank you to Christie Osburn, Shawna Karpovich, Paul Zaczkowski, Marty and Mary Webb, and Katie Zaczkowski who all helped in conducting surveys on the Colville River. I would also like to thank Miles Spathelf who assisted greatly in compiling and processing GIS data.

References Cited

- Alaska Department of Fish and Game. 1976. Alaska wildlife management plans: A public proposal for the management of Alaska's wildlife: Arctic Alaska. Draft proposal subsequently approved by the Alaska Board of Game. Division of Game, Federal Aid in Wildlife Restoration Project W-17-R, Juneau.
- Boertje, R. D., K. A. Kellie, C. T. Seaton, M. A. Keech, D. D. Young, B. W. Dale, L. G. Adams, and A. R. Aderman. 2007. Ranking Alaska moose nutrition: Signals to begin liberal antlerless harvests. *Journal of Wildlife Management* 71(5):1494–1506.
<https://doi.org/10.2193/2006-159>.
- Carroll, G. 2012. Unit 26A moose management report. Pages 655–676 [In] P. Harper, editor. Moose management report of survey and inventory activities 1 July 2009–30 June 2011. Alaska Department of Fish and Game, Species Management Report ADF&G/DWC/SMR-2012-5, Juneau.
- Hall, E. S. 1973. Archaeological and Recent Evidence for Expansion of Moose Range in Northern Alaska, *Journal of Mammalogy* 54(1):294–295.
<https://doi.org/10.2307/1378902>.
- O’Hara, T. M., J. Dau, G. Carroll, J. Bevins, and R. L. Zarnke. 1998. Evidence of exposure to *Brucella suis biovar 4* in northern Alaska moose. *Alces* 34(1):31–40.
- Paragi, T. F., C. T. Seaton, K. A. Kellie, R. D. Boertje, K. Kielland, D. D. Young Jr., M. A. Keech, and S. D. DuBois. 2015. Browse removal, plant condition, and twinning rates before and after short-term changes in moose density. *Alces* 51:1–21.
https://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/research_pdfs/alces/1805.pdf
- Seaton, C. T. 2002. Winter foraging ecology of moose in the Tanana Flats and Alaska Range foothills. Master's Thesis, University of Alaska Fairbanks.
- Seaton, C. T., T. F. Paragi, R. D. Boertje, K. Kielland, S. DuBois, and C. L. Fleener. 2011. Browse biomass removal and nutritional condition of moose *Alces alces*. *Wildlife Biology* 17(1):55–66. <https://doi.org/10.2981/10-010>

- Trent, J. N. 1989. Moose survey-inventory progress report. Pages 353–360 [*In*] S.O. Morgan, editor. Annual report of survey-inventory activities: 1 July 1987–30 June 1988: Part VIII - moose. Alaska Department Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Study 1, Juneau.
- Zhou, J., K. D. Tape, L. Prugh, G. Kofinas, G. Carroll, and K. Kielland. 2020. Enhanced shrub growth in the Arctic increases habitat connectivity for browsing herbivores. *Global Change Biology* 26:3809–3820.

