Species Management Report and Plan ADF&G/DWC/SMR&P–2026–4

# Moose Management Report and Plan, Game Management Units 20C, 20F, and 25C:

Report Period 1 July 2015–30 June 2020, and

Plan Period 1 July 2020–30 June 2025

**Anthony L. Hollis**

2026

Alaska Department of Fish and Game Division of Wildlife Conservation

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**PREPARED BY:**

Anthony L. Hollis
Area Wildlife Biologist (former)

**APPROVED BY:**

Jason R. Caikoski
Management Coordinator

**PUBLISHED BY**:

Ben Henning
Technical Reports Editor

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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 through 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 Jason Caikoski, Management Coordinator for Region III for the Division of Wildlife Conservation.

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

Hollis, A. L. 2026. Moose management report and plan, Game Management Units 20C, 20F, and 25C: 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-2026-4, Juneau.

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## Purpose of this Report

This report provides a record of survey and inventory management activities for moose (*Alces alces*) in Units 20C, 20F and 25C for the 5 regulatory years 2015–2019, along with plans for the 5 regulatory years, 2020–2024. A regulatory year (RY) runs from 1 July through 30 June (e.g., RY15 = 1 July 2015–30 June 2016). 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 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. RY15–RY19 Management Report

## Management Area

The management area consists of Units 20C (11,902 $mi^2$), 20F (6,267 $mi^2$), and 25C (5,149 $mi^2$). Unit 20C includes drainages into the west bank of the Nenana River and into the south bank of the Tanana River, west of the Nenana River. Most of Denali National Park and Preserve (DNPP) is within Unit 20C. Unit 20F includes drainages into the north bank of the Tanana River west of Manley Hot Springs and into the Yukon River drainage between the community of Tanana and the Dalton Highway bridge. Unit 25C includes drainages into the south bank of the Yukon River upstream from Circle to, but not including, the Charley River drainage; the Birch Creek drainage upstream from the Steese Highway bridge; the Preacher Creek drainage upstream from and including the Rock Creek drainage; and the Beaver Creek drainage upstream from and including the Moose Creek drainage.

Habitat types and terrain vary greatly in these units, with areas which are flat with little topography to rolling hills to mountainous terrain. Habitat types range from lowland riparian and grass lands, black spruce (*Picea mariana*) forest, deciduous forest, alpine and subalpine habitat, and burns of various ages. The climate is typical of Interior Alaska where temperatures frequently reach 80°F during the summer months and −40°F during the winter months. Snow depths are generally low and rarely reach 32″, although this varies greatly by elevation, with deeper snow in higher areas.

## Summary of Status, Trend, Management Activities, and History of Moose in Units 20C, 20F, and 25C

Moose densities in Units 20C, 20F, and 25C have been low for many years, presumably due to combined predation from wolves and bears (Gasaway et al. 1992), both of which are lightly harvested in these units.

The high proportion of large bull moose (50″ or greater antler spread) in the overall harvest suggests low hunting pressure, as bulls are surviving to that age and antler class. Thus, the

department considers harvest to be a minor factor affecting population dynamics relative to predation.

Additionally, low moose densities do not appear to be related to habitat limitation. Although these units contain tracts of mature black spruce, which are poor quality moose habitat, there appear to be a substantial amounts of riparian area, subalpine hills, and recently burned habitat, all of which are capable of sustaining moose densities higher than the current levels.

Trends in moose populations have been difficult to identify due to infrequent surveying and low moose density. Densities likely fluctuate between 0.1–1.1 and (more likely) 0.2–0.7 moose/mi$^2$, based on Alaska and Yukon studies in large areas (>800 mi$^2$) with 2 or more lightly harvested predators (Gasaway et al. 1992).

Moose within DNPP have been studied more intensively than moose in the remainder of these units. Within DNPP, radiocollared moose have been monitored for movement, behavior, survival, and reproduction (Franzmann and Schwartz 1997). Composition surveys and population estimates have also been conducted by DNPP biologists since 1970.

Moose in these units are an important source of food, trophies, and recreation for many residents and nonresidents. Nonconsumptive uses, including wildlife viewing and photography, are particularly important in DNPP.

# Management Direction

## Existing Wildlife Management Plans

The existing wildlife management plan (Hollis 2018) covered a 5-year period ending in June 2020. Prior to this plan, management action was guided by the draft wildlife management plan developed in 1976 (ADF&G 1976).

## Goals

G1. Provide for a sustained harvest of these low-density populations.
G2. Promote moose habitat enhancement by allowing natural fires to alter vegetation.

## Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

C1. For Units 20C and 20F, the amounts reasonably necessary for subsistence (ANS) has been determined at 100–130 moose.
C2. For Unit 25C, that portion outside the boundaries of the Fairbanks Nonsubsistence area, ANS is 8–15 moose.

## Intensive Management

For Unit 20C, intensive management (IM) objectives are as follows:

C3. Population objective: 3,000–4,000 moose.
C4. Harvest objective: 150–400 moose.

Units 20F and 25C have a negative finding for IM.

## MANAGEMENT OBJECTIVES

M1. Maintain a bull-to-cow ratio of ≥30:100 in areas with aerial surveys and ≥20% large (50″ or greater antler spread) bull moose in the harvest in areas without aerial surveys.

## MANAGEMENT ACTIVITIES

### 1. Population Status and Trend

No proposals to the Board of Game or suspected population changes warranted a Geospatial Population Estimator (GSPE) survey during RY15–RY19. Therefore, no population status or trend activities were conducted on moose in Units 20C, 20F, or 25C during this report period.

### 2. Mortality, Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor and analyze harvest data (C1, C2, C4, M1).

*Data Needs*

Unit 20C was identified by the Board of Game for IM of moose with a harvest objective of 150–400 moose annually. Units 20F and 25C have no harvest objectives; as such, trends in reported harvest are used for monitoring the moose populations in these units.

*Methods*

The department estimated annual harvest and mortality in all units using data from mandatory harvest reports, records of telephone calls from the public concerning nonhunting mortality, Alaska Wildlife Trooper records of motor vehicle collisions with moose, and Alaska Railroad records of moose-train collisions between railroad mileposts 327 and 370.7 in Unit 20C. To estimate unreported harvest by residents of Tanana, DWC used a 1987 study conducted by the Division of Subsistence (Andersen and Alexander 1992). We summarized data regarding hunter residency and success, harvest chronology, and transport methods. When antler size of bull moose was reported, we considered bulls with antler spread of <30″ to be yearlings. Data were summarized by regulatory year.

*Season Dates and Bag Limit*

| Unit | Area | Season dates | Bag limit |
|---|---|---|---|
| Unit 20C | Entire unit | 1–25 Sep | Resident: 1 bull<br>Nonresident: 1 bull with 50″ antlers or antlers with 4 or more brow tines on at least 1 side |
| Unit 20F | Yukon River drainage downstream from but not including the Hess Creek drainage and excluding the Tanana River drainage | 5–25 Sep and 1–15 Dec | Resident only: 1 bull |
| Unit 20F | Tanana River | 5–25 Sep | Resident only: 1 bull |
| Unit 20F | Remainder | 1–15 Sep | Resident only: 1 bull |
| Unit 25C | Entire unit | Resident: 1–15 Sep<br>Nonresident: 5–15 Sep | Resident: 1 bull<br>Nonresident: 1 bull |

*Results and Discussion*

Harvest by Hunters

The average reported moose harvest during RY15–RY19 was 148 (range 105–181) in Unit 20C, 42 moose (range 29–61) in Unit 20F, and 85 moose (range 64–116) in Unit 25C (Table 1). The average harvest increased in Unit 20C during RY15–RY19 compared to RY10–RY14, which averaged 137 moose. The average harvest decreased slightly in Unit 20F and Unit 25C during RY15–RY19 compared to RY10–RY14. During RY15–RY19, 33% of the bulls harvested in Unit 20C were large bulls (50″ or greater antler spread). In Unit 20F, 45% of the bulls harvested were large bulls. In Unit 25C, 38% of the bulls harvested were large bulls.

Hunter Residency and Success

During RY15–RY19, the total number of hunters in Unit 20C averaged 541, as compared to the RY10–RY14 average of 517. In Unit 20F, the average number of hunters during RY15–RY19 was 172, as compared to the RY10–RY14 average of 159. The average number of hunters in Unit 25C was 359 during RY15–RY19, compared to 335 during RY10–RY14 (Table 1). The average number of moose harvested annually during RY15–RY19 was 174 in Unit 20C, 50 in Unit 20F, and 100 in Unit 25C (Table 2).

During RY15–RY19, up to 2 nonresident hunters annually reported hunting in Unit 20F (Table 1), even though this unit had no open moose season for nonresidents. This may be attributed to misreporting by hunters, data management errors by ADF&G, or legitimate harvest reports from illegal nonresident hunters.

**Table 1. Units 20C, 20F, and 25C reported moose hunter residency and success, Interior Alaska, regulatory years 2007–2019.**

| | | Successful hunters | | | | | Unsuccessful hunters | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Regulatory year | Local[a] resident | Nonlocal resident | Non-resident | Total[b] | (%) | Local[a] resident | Nonlocal resident | Non-resident | Total[b] | (%) | Total hunters |
| Unit 20C | 2007 | 90 | 34 | 16 | 140 | (27) | 221 | 132 | 18 | 371 | (73) | 511 |
| | 2008 | 86 | 40 | 13 | 142 | (30) | 178 | 137 | 14 | 335 | (70) | 477 |
| | 2009 | 77 | 49 | 13 | 139 | (28) | 222 | 105 | 23 | 352 | (72) | 491 |
| | 2010 | 58 | 40 | 7 | 105 | (23) | 185 | 141 | 19 | 348 | (77) | 453 |
| | 2011 | 75 | 41 | 10 | 126 | (30) | 177 | 108 | 13 | 298 | (70) | 424 |
| | 2012 | 82 | 72 | 1 | 157 | (28) | 229 | 163 | 13 | 406 | (70) | 563 |
| | 2013 | 82 | 45 | 3 | 130 | (24) | 231 | 155 | 29 | 417 | (76) | 547 |
| | 2014 | 98 | 62 | 10 | 170 | (30) | 241 | 152 | 12 | 405 | (70) | 575 |
| | 2015 | 82 | 53 | 10 | 146 | (25) | 256 | 158 | 31 | 447 | (75) | 593 |
| | 2016 | 107 | 53 | 10 | 170 | (28) | 244 | 161 | 20 | 427 | (72) | 597 |
| | 2017 | 96 | 63 | 21 | 181 | (30) | 255 | 125 | 36 | 417 | (70) | 598 |
| | 2018 | 79 | 60 | 10 | 149 | (25) | 258 | 151 | 32 | 442 | (75) | 591 |
| | 2019 | 92 | 59 | 21 | 172 | (28) | 258 | 144 | 32 | 435 | (72) | 607 |
| Unit 20F | 2007 | 24 | 5 | 0 | 29 | (20) | 87 | 29 | 1 | 117 | (80) | 146 |
| | 2008 | 31 | 19 | 2 | 52 | (32) | 74 | 41 | 1 | 117 | (68) | 171 |
| | 2009 | 39 | 19 | 2 | 59 | (32) | 92 | 35 | 2 | 130 | (68) | 191 |
| | 2010 | 24 | 18 | 0 | 42 | (27) | 85 | 34 | 0 | 119 | (73) | 162 |
| | 2011 | 30 | 19 | 0 | 49 | (36) | 49 | 37 | 0 | 84 | (64) | 136 |
| | 2012 | 37 | 14 | 1 | 49 | (29) | 83 | 38 | 2 | 125 | (71) | 177 |
| | 2013 | 22 | 10 | 0 | 31 | (17) | 98 | 58 | 2 | 160 | (83) | 192 |
| | 2014 | 26 | 13 | 0 | 38 | (23) | 88 | 43 | 1 | 132 | (77) | 171 |
| | 2015 | 29 | 18 | 0 | 47 | (24) | 92 | 49 | 0 | 141 | (76) | 188 |
| | 2016 | 25 | 8 | 2 | 36 | (20) | 89 | 55 | 1 | 145 | (80) | 181 |
| | 2017 | 27 | 6 | 0 | 34 | (24) | 77 | 26 | 1 | 103 | (76) | 137 |
| | 2018 | 30 | 11 | 2 | 43 | (21) | 121 | 41 | 2 | 165 | (79) | 208 |
| | 2019 | 20 | 11 | 0 | 31 | (18) | 100 | 41 | 2 | 143 | (82) | 174 |
| Unit 25C | 2007 | 4 | 55 | 9 | 68 | (19) | 9 | 252 | 33 | 296 | (81) | 364 |
| | 2008 | 6 | 64 | 10 | 80 | (25) | 16 | 191 | 32 | 243 | (75) | 323 |
| | 2009 | 3 | 97 | 15 | 116 | (34) | 11 | 191 | 23 | 226 | (66) | 342 |
| | 2010 | 7 | 79 | 8 | 96 | (26) | 16 | 237 | 23 | 278 | (74) | 374 |
| | 2011 | 9 | 63 | 19 | 92 | (33) | 10 | 163 | 18 | 191 | (67) | 283 |
| | 2012 | 12 | 58 | 16 | 87 | (25) | 12 | 215 | 38 | 267 | (75) | 354 |
| | 2013 | 6 | 51 | 6 | 64 | (19) | 8 | 232 | 34 | 274 | (81) | 338 |
| | 2014 | 5 | 60 | 16 | 81 | (21) | 14 | 261 | 35 | 311 | (79) | 392 |
| | 2015 | 5 | 68 | 19 | 93 | (23) | 10 | 257 | 43 | 311 | (77) | 404 |
| | 2016 | 4 | 65 | 20 | 89 | (23) | 12 | 245 | 47 | 306 | (77) | 395 |
| | 2017 | 2 | 51 | 18 | 72 | (19) | 15 | 253 | 40 | 309 | (81) | 381 |
| | 2018 | 5 | 47 | 15 | 67 | (19) | 11 | 248 | 24 | 283 | (81) | 350 |
| | 2019 | 2 | 82 | 18 | 102 | (27) | 17 | 229 | 24 | 270 | (73) | 372 |

[a] Hunters who live within the unit in which they reported hunting were considered local.
[b] Some reports have unknown residency, so total may not reflect the sum of local, nonlocal, and nonresident hunters.

In Units 20C and 20F, most successful hunters were residents of Unit 20. In Unit 25C, however, most successful hunters resided outside Unit 25, including nonlocal residents of Alaska and nonresidents (Table 1). This difference can be attributed to relatively few people residing in Unit 25.

**Table 2. Units 20C, 20F, and 25C estimated moose harvest and accidental death, Interior Alaska, regulatory years 2007–2019.**

| | | Harvest by hunters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported[a] | | | | Estimated | | | Accidental death | | | |
| Unit | Regulatory year | Male | Female | Unknown | Total | Unreported[b] | Illegal/ Other[c] | Total | Road[d] | Train[e] | Total | Combined total |
| Unit 20C | 2007 | 140 | 0 | 0 | 140 | 25 | 0 | 25 | 0 | 4 | 0 | 169 |
| | 2008 | 142 | 0 | 0 | 142 | 25 | 0 | 25 | 0 | 8 | 0 | 175 |
| | 2009 | 139 | 0 | 0 | 139 | 25 | 0 | 25 | 0 | 2 | 0 | 166 |
| | 2010 | 105 | 0 | 0 | 105 | 19 | 0 | 19 | 0 | 6 | 0 | 130 |
| | 2011 | 124 | 0 | 2 | 126 | 22 | 0 | 22 | 0 | 9 | 0 | 157 |
| | 2012 | 152 | 1 | 4 | 157 | 28 | 0 | 28 | 0 | 4 | 0 | 189 |
| | 2013 | 130 | 0 | 0 | 130 | 23 | 0 | 23 | 0 | 3 | 0 | 156 |
| | 2014 | 166 | 1 | 3 | 170 | 30 | 0 | 30 | 0 | 0 | 0 | 200 |
| | 2015 | 146 | 0 | 0 | 146 | 25 | 0 | 25 | 0 | 0 | 0 | 171 |
| | 2016 | 168 | 0 | 2 | 170 | 30 | 0 | 30 | 0 | 1 | 0 | 201 |
| | 2017 | 180 | 0 | 1 | 181 | 32 | 0 | 32 | 0 | 3 | 0 | 216 |
| | 2018 | 148 | 0 | 1 | 149 | 26 | 0 | 26 | 0 | 2 | 0 | 177 |
| | 2019 | 171 | 0 | 1 | 172 | 30 | 0 | 30 | 0 | 14 | 0 | 216 |
| Unit 20F | 2007 | 29 | 0 | 0 | 29 | 5 | 0 | 5 | 0 | – | 0 | 34 |
| | 2008 | 53 | 0 | 1 | 54 | 10 | 0 | 10 | 0 | – | 0 | 64 |
| | 2009 | 56 | 2 | 3 | 61 | 11 | 0 | 11 | 0 | – | 0 | 72 |
| | 2010 | 43 | 0 | 0 | 43 | 8 | 0 | 8 | 0 | – | 0 | 51 |
| | 2011 | 48 | 0 | 1 | 49 | 9 | 0 | 9 | 0 | – | 0 | 58 |
| | 2012 | 49 | 0 | 3 | 52 | 9 | 0 | 9 | 0 | – | 0 | 61 |
| | 2013 | 29 | 1 | 2 | 32 | 6 | 0 | 6 | 0 | – | 0 | 38 |
| | 2014 | 39 | 0 | 0 | 39 | 7 | 0 | 7 | 0 | – | 0 | 46 |
| | 2015 | 47 | 0 | 0 | 47 | 8 | 0 | 8 | 0 | – | 0 | 55 |
| | 2016 | 34 | 0 | 2 | 36 | 6 | 0 | 6 | 0 | – | 0 | 42 |
| | 2017 | 32 | 0 | 1 | 33 | 6 | 0 | 6 | 0 | – | 0 | 39 |
| | 2018 | 42 | 0 | 1 | 43 | 8 | 0 | 8 | 0 | – | 0 | 51 |
| | 2019 | 31 | 0 | 0 | 31 | 5 | 0 | 5 | 0 | – | 0 | 36 |

*-continued-*

**Table 2. Units 20C, 20F, and 25C estimated moose harvest and accidental death, Interior Alaska, regulatory years 2007–2019, continued.**

| | | Harvest by hunters | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Reported[a] | | | | Estimated | | | Accidental death | | | |
| Unit | Regulatory year | Male | Female | Unknown | Total | Unreported[b] | Illegal/ Other[c] | Total | Road[d] | Train[e] | Total | Combined total |
| Unit 25C | 2007 | 68 | 0 | 0 | 68 | 12 | 0 | 12 | 0 | – | 0 | 80 |
| | 2008 | 79 | 1 | 0 | 80 | 14 | 0 | 14 | 0 | – | 0 | 94 |
| | 2009 | 116 | 0 | 0 | 116 | 21 | 0 | 21 | 0 | – | 0 | 137 |
| | 2010 | 96 | 0 | 0 | 96 | 17 | 0 | 17 | 0 | – | 0 | 113 |
| | 2011 | 92 | 0 | 0 | 92 | 16 | 0 | 16 | 0 | – | 0 | 108 |
| | 2012 | 85 | 0 | 2 | 87 | 15 | 0 | 15 | 0 | – | 0 | 102 |
| | 2013 | 63 | 0 | 1 | 64 | 11 | 0 | 11 | 0 | – | 0 | 75 |
| | 2014 | 81 | 0 | 0 | 81 | 14 | 0 | 14 | 0 | – | 0 | 95 |
| | 2015 | 92 | 0 | 1 | 93 | 16 | 0 | 16 | 0 | – | 0 | 109 |
| | 2016 | 89 | 0 | 0 | 89 | 16 | 0 | 16 | 0 | – | 0 | 105 |
| | 2017 | 71 | 0 | 1 | 72 | 13 | 0 | 13 | 0 | – | 0 | 85 |
| | 2018 | 66 | 0 | 1 | 67 | 12 | 0 | 12 | 0 | – | 0 | 79 |
| | 2019 | 101 | 0 | 1 | 102 | 18 | 0 | 18 | 0 | – | 0 | 120 |

[a] Data from moose harvest ticket reports in moose harvest database using WinfoNet (ADF&G's Wildlife Information Network).
[b] Based on 17.7% unreported harvest (including wounding loss) estimated by Gasaway et al. (1992).
[c] Data from Fairbanks Alaska Wildlife Troopers wildlife mortality logs and ADF&G records.
[d] Documented mortalities from Fairbanks Alaska Wildlife Troopers wildlife mortality logs.
[e] Confirmed mortalities between Alaska Railroad mileposts 327.0 and 370.7; missing (moose hit but not recovered) are not included. Data provided by the Alaska Railroad and summarized by ADF&G, Palmer. Units 20F and 25C contain no railway tracks.

### Harvest Chronology

During RY15–RY19, the highest proportion of the harvest occurred during the second or third week of the fall season in all 3 units (Table 3). The fourth week of the season in Unit 20C first occurred in RY12 and will likely continue to have a high proportion of the harvest because the onset of the moose breeding season increases bulls' vulnerability to harvest. Few moose were reported harvested during the December season in Unit 20F.

### Transport Methods

Transport methods are shown in Table 4.

*Other Mortality*

No new information was gathered on natural or human-caused mortality outside of harvest during RY15–RY19. Some moose mortality occurs by vehicle and train collision in Unit 20C. Very minimal mortality occurs by vehicle collision in Units 20F and 25C.

*Alaska Board of Game Actions and Emergency Orders*

During RY15–RY19, no changes were made to moose seasons or bag limits in Units 20C, 20F, or 25C by the Board of Game.

*Recommendations for Activity 2.1*

Continue.

## 3. Habitat Assessment and Enhancement

There were no habitat assessment or enhancement activities performed for moose in Units 20C, 20F, or 25C during RY15–RY19. However, wildfires continue to occur in these units and improve moose habitat. During this report period, an estimated 373,900 acres burned in Unit 20C, 191,000 acres burned in Unit 20F, and 121,000 acres burned in Unit 25C. Wildfires are very beneficial to moose populations and available browse will improve within these areas. The department continues our efforts to promote natural fires to enhance moose habitat by participating in an interagency fire management team.

## NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

None.

## Data Recording and Archiving

All harvest data are stored on WinfoNet (ADF&G's Wildlife Information Network). All other electronic files are located on the Fairbanks server.

## Agreements

None.

**Table 3. Units 20C, 20F, and 25C reported moose harvest chronology by date, Interior Alaska, regulatory years 2007–2019.**

| Unit | Regulatory year | 1 Sep–7 Sep | 8 Sep–15 Sep | 16 Sep–20 Sep | 21 Sep–25 Sep | 1 Dec–10 Dec | *n* |
|---|---|---|---|---|---|---|---|
| Unit 20C | 2007 | 43 | 64 | 30 | – | – | 137 |
| | 2008 | 31 | 61 | 47 | – | – | 139 |
| | 2009 | 39 | 57 | 39 | – | – | 135 |
| | 2010 | 30 | 44 | 30 | – | – | 104 |
| | 2011 | 32 | 49 | 41 | – | – | 122 |
| | 2012[a] | 27 | 46 | 43 | 36 | – | 152 |
| | 2013 | 21 | 25 | 46 | 35 | – | 127 |
| | 2014 | 35 | 41 | 54 | 35 | – | 165 |
| | 2015 | 25 | 40 | 37 | 44 | – | 146 |
| | 2016 | 27 | 46 | 50 | 40 | – | 163 |
| | 2017 | 29 | 60 | 57 | 34 | – | 180 |
| | 2018 | 26 | 47 | 47 | 29 | – | 149 |
| | 2019 | 24 | 52 | 54 | 41 | – | 171 |
| Unit 20F | 2007 | 4 | 17 | 7 | – | 1 | 29 |
| | 2008 | 12 | 28 | 12 | – | 1 | 53 |
| | 2009 | 15 | 20 | 20 | – | 3 | 58 |
| | 2010 | 5 | 23 | 11 | – | 4 | 43 |
| | 2011 | 9 | 23 | 13 | – | 3 | 48 |
| | 2012 | 8 | 29 | 11 | – | 2 | 50 |
| | 2013 | 7 | 14 | 5 | – | 3 | 29 |
| | 2014[b] | 3 | 17 | 9 | 8 | 1 | 38 |
| | 2015 | 12 | 19 | 10 | 6 | 0 | 47 |
| | 2016 | 1 | 17 | 11 | 4 | 2 | 35 |
| | 2017 | 5 | 12 | 9 | 6 | 1 | 33 |
| | 2018 | 5 | 22 | 8 | 3 | 4 | 42 |
| | 2019 | 2 | 13 | 8 | 4 | 4 | 31 |
| Unit 25C | 2007 | 29 | 37 | – | – | – | 66 |
| | 2008 | 34 | 42 | – | – | – | 76 |
| | 2009 | 44 | 69 | – | – | – | 113 |
| | 2010 | 36 | 57 | – | – | – | 93 |
| | 2011 | 28 | 61 | – | – | – | 89 |
| | 2012 | 34 | 49 | – | – | – | 83 |
| | 2013 | 18 | 45 | – | – | – | 63 |
| | 2014 | 23 | 55 | – | – | – | 78 |
| | 2015 | 45 | 46 | – | – | – | 91 |
| | 2016 | 31 | 54 | – | – | – | 85 |
| | 2017 | 28 | 40 | – | – | – | 68 |
| | 2018 | 13 | 47 | – | – | – | 60 |
| | 2019 | 39 | 62 | – | – | – | 101 |

*Note*: Does not include mortalities reported outside open hunting seasons or hunters who did not report date of mortality. En dashes indicate nonapplicable seasons and dates.

[a] The season was lengthened 5 days in Unit 20C beginning in RY12.

[b] The season was lengthened by 5 days in Unit 20F in beginning in RY14.

**Table 4. Units 20C, 20F, and 25C reported moose harvest percent by transport method, regulatory years 2007–2019.**

| | | Harvest percent by transport method | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Unit | Regulatory year | Airplane | Horse/ dogsled | Boat | 3- or 4-wheeler | Snow-machine | Other ORV[a] | Highway vehicle | Unk/ other | $n$[b] |
| Unit 20C | 2007 | 24 | 1 | 28 | 28 | 0 | 11 | 7 | 1 | 140 |
| | 2008 | 37 | 1 | 30 | 18 | 0 | 12 | 2 | 0 | 142 |
| | 2009 | 20 | 1 | 32 | 26 | 0 | 14 | 6 | 1 | 140 |
| | 2010 | 19 | 0 | 31 | 30 | 0 | 13 | 7 | 0 | 101 |
| | 2011 | 23 | 0 | 31 | 35 | 0 | 7 | 4 | 0 | 122 |
| | 2012 | 15 | 1 | 37 | 28 | 0 | 12 | 5 | 2 | 155 |
| | 2013 | 22 | 2 | 30 | 27 | 0 | 13 | 5 | 1 | 130 |
| | 2014 | 18 | 0 | 34 | 27 | 0 | 11 | 5 | 5 | 170 |
| | 2015 | 22 | 0 | 39 | 21 | 0 | 11 | 5 | 2 | 146 |
| | 2016 | 19 | 0 | 37 | 26 | 0 | 12 | 4 | 2 | 170 |
| | 2017 | 23 | 0 | 31 | 28 | 0 | 10 | 6 | 2 | 181 |
| | 2018 | 27 | 0 | 34 | 19 | 0 | 13 | 4 | 3 | 149 |
| | 2019 | 31 | 0 | 27 | 20 | 0 | 16 | 3 | 3 | 172 |
| Unit 20F | 2007 | 3 | 0 | 31 | 38 | 7 | 7 | 14 | 0 | 29 |
| | 2008 | 3 | 2 | 31 | 39 | 4 | 9 | 12 | 0 | 54 |
| | 2009 | 0 | 0 | 36 | 46 | 7 | 2 | 8 | 2 | 61 |
| | 2010 | 6 | 2 | 33 | 34 | 9 | 7 | 7 | 2 | 43 |
| | 2011 | 2 | 0 | 35 | 37 | 6 | 6 | 14 | 0 | 49 |
| | 2012 | 6 | 0 | 35 | 24 | 4 | 6 | 19 | 6 | 52 |
| | 2013 | 0 | 0 | 22 | 50 | 9 | 13 | 6 | 0 | 32 |
| | 2014 | 0 | 0 | 51 | 21 | 3 | 10 | 10 | 5 | 39 |
| | 2015 | 0 | 0 | 43 | 30 | 0 | 4 | 21 | 2 | 47 |
| | 2016 | 3 | 0 | 39 | 31 | 6 | 3 | 11 | 7 | 36 |
| | 2017 | 0 | 0 | 21 | 32 | 3 | 3 | 38 | 3 | 34 |
| | 2018 | 5 | 0 | 33 | 37 | 9 | 2 | 12 | 2 | 43 |
| | 2019 | 3 | 0 | 32 | 42 | 6 | 0 | 13 | 4 | 31 |
| Unit 25C | 2007 | 1 | 0 | 22 | 53 | 0 | 0 | 25 | 0 | 68 |
| | 2008 | 4 | 0 | 23 | 51 | 1 | 1 | 19 | 1 | 80 |
| | 2009 | 5 | 0 | 21 | 51 | 0 | 6 | 15 | 2 | 114 |
| | 2010 | 2 | 0 | 28 | 55 | 0 | 2 | 12 | 1 | 95 |
| | 2011 | 1 | 0 | 26 | 51 | 0 | 2 | 20 | 0 | 91 |
| | 2012 | 5 | 0 | 18 | 49 | 0 | 2 | 24 | 2 | 86 |
| | 2013 | 8 | 0 | 14 | 56 | 0 | 5 | 17 | 0 | 64 |
| | 2014 | 6 | 0 | 34 | 46 | 0 | 1 | 11 | 2 | 80 |
| | 2015 | 3 | 0 | 26 | 48 | 0 | 2 | 20 | 1 | 93 |
| | 2016 | 6 | 0 | 31 | 40 | 0 | 4 | 17 | 2 | 89 |
| | 2017 | 3 | 0 | 21 | 54 | 0 | 3 | 17 | 2 | 72 |
| | 2018 | 3 | 0 | 36 | 40 | 0 | 1 | 16 | 4 | 67 |
| | 2019 | 7 | 0 | 20 | 49 | 0 | 4 | 20 | 0 | 102 |

[a] ORV refers to off-road vehicles.
[b] $n$ indicates sample size.

## Permitting

None.

## Conclusions and Management Recommendations

Moose populations in Units 20C, 20F, and 25C are at low densities. Hunting pressure was relatively low during RY15–RY19. The department met our goal to promote natural fires to enhance moose habitat through our efforts on an interagency fire management team. We met our goal to provide for sustained harvest of the low-density moose populations in these units by providing harvest ticket moose hunts. We met our objective of ≥20% large bulls in the harvest (33% in Unit 20C, 45% in Unit 20F, and 38% in Unit 25C) in areas where we do not conduct aerial surveys. Our intensive management harvest objective was met in Unit 20C, as was the ANS in Units 20C, 20F, and 25C outside the Fairbanks Nonsubsistence area.

We have no recommendations for regulatory action at this time. The wildfires which occurred during RY15–RY19 will likely improve the moose habitat, but this is unlikely to aid in increasing the overall moose density. Hunters in these areas appear to be mostly satisfied with regulations which allow for the harvest of any bull compared to other units which have antler restrictions.

# II. Project Review and RY20–RY24 Plan

## Review of Management Direction

### Management Direction

There are no changes to the management direction for moose in Units 20C, 20F, or 25C during RY20–RY24.

### Goals

G1. Provide for a sustained harvest of these low-density populations.
G2. Promote moose habitat enhancement by allowing natural fires to alter vegetation.

### Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

C1. In Units 20C and 20F, ANS has been determined at 100–130 moose.
C2. In Unit 25C, that portion outside the boundaries of the Fairbanks Nonsubsistence area, ANS is 8–15 moose.

Intensive Management

In Unit 20C, IM objectives will remain as follows:

C3. Population objective: 3,000–4,000 moose.
C4. Harvest objective: 150–400 moose.

Units 20F and 25C have a negative finding for IM.

## MANAGEMENT OBJECTIVES

M1. Maintain a bull-to-cow ratio of ≥30:100 in areas with aerial surveys and ≥20% large bull moose in the harvest in areas without aerial surveys.

## REVIEW OF MANAGEMENT ACTIVITIES

### 1. Population Size, Status, and Trend

ACTIVITY 1.1. Conduct a GSPE survey in Unit 20C (C1, C3, M1).

*Data Needs*

If public proposals to the Board of Game or indications of a changing population (Activity 2.1) warrant collection of population data, a GSPE survey may be needed to determine if the Unit 20C moose population meets the IM population objective of 3,000–4,000 moose.

*Methods*

If needed, a GSPE survey (Ver Hoef 2001, 2008; Kellie and DeLong 2006) may be conducted with, if necessary, input from department biometric staff to verify and refine the methods prior to conducting this survey.

### 2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor and analyze harvest data (C1, C2, C4, M1).

*Data Needs*

No change from RY15–RY19. The department will monitor harvest in Units 20C, 20F, and 25C to determine whether objectives are met. The data will also be analyzed for indicators such as success rate, effort, total harvest, and harvest composition, which may indicate changes in population levels.

*Methods*

1. Monitor harvest records for comparison with the IM harvest objective and ANS, as described in the methods conducted for Activity 2.1 during RY15–RY19.
2. Compare reported harvest, using 3-year running means to account for annual variation, to the lower limit of the IM harvest objective in Unit 20C.
3. Use linear regression models to evaluate harvest trends.
4. Use biometric review to evaluate harvest numbers.

## NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

None.

Data Recording and Archiving

Harvest and GSPE data are stored in WinfoNet. All other electronic files are located on the Fairbanks server.

Agreements

None.

Permitting

None.

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