Species Management Report and Plan ADF&G/DWC/SMR&P–2023–1

Moose Management Report and Plan, Game Management Unit 21B:

Report Period 1 July 2015–30 June 2020

Plan Period 1 July 2020–30 June 2025

Sara M. Longson

2023

Alaska Department of Fish and Game Division of Wildlife Conservation

Species Management Report and Plan ADF&G/DWC/SMR&P-2023-1

Moose Management Report and Plan, Game Management Unit 21B:

Report Period 1 July 2015–30 June 2020

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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 Lincoln Parrett, Regional Supervisor for Region III, Division of Wildlife Conservation.

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Purpose of this Report

This report provides a record of survey and inventory management activities for moose (*Alces alces*) in Game Management Unit 21B 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

Unit 21B is located in western Interior Alaska, south of the Yukon River, and east of Galena, primarily consisting of the drainages of the Nowitna River (Fig. 1). Unit 21B encompasses 9,330 mi^2, and the terrain is a combination of hills and lowland riparian areas. Mean elevation within the unit is 825 feet with a range between 136 and 4,473 feet. Vegetation is dominated by white and black spruce (*Picea glauca* and *Picea mariana*) forests, low and tall shrub, mixed and deciduous forest, and grassland and herbaceous communities (Boggs et al. 2012). Portions of 3 ecoregions found in Unit 21B include the Kuskokwim Mountains, Ray Mountains, and Yukon River lowlands (Nowacki et al. 2001). Maps of the most current Unit 21B boundaries and special management areas are located on the ADF&G website: http://www.adfg.alaska.gov/index.cfm?adfg=maps.main.

Summary of Status, Trend, Management Activities, and History of Moose in Unit 21B

Early accounts of this portion of Interior Alaska mentioned the presence of moose (*Alces alces*; Osborne 1990). Moose had apparently become abundant by the time gold seekers converged on the area in the early 1900s. The village of Ruby had a population of 10,000 people during the 1910 gold rush, and many moose were harvested to supply the community with meat. Several severe winters in the late 1960s and early 1970s initiated widespread declines in moose populations throughout the Interior, including Unit 21B. The Nowitna River, east of Ruby, is a popular hunting area for residents of Ruby, Tanana, and to a lesser extent, Galena. It is also a popular hunting area for Fairbanks residents who use boats and aircraft for access. Because of its long history of use by both local and nonlocal hunters, this area has been the focus of much of the management effort in Unit 21B.

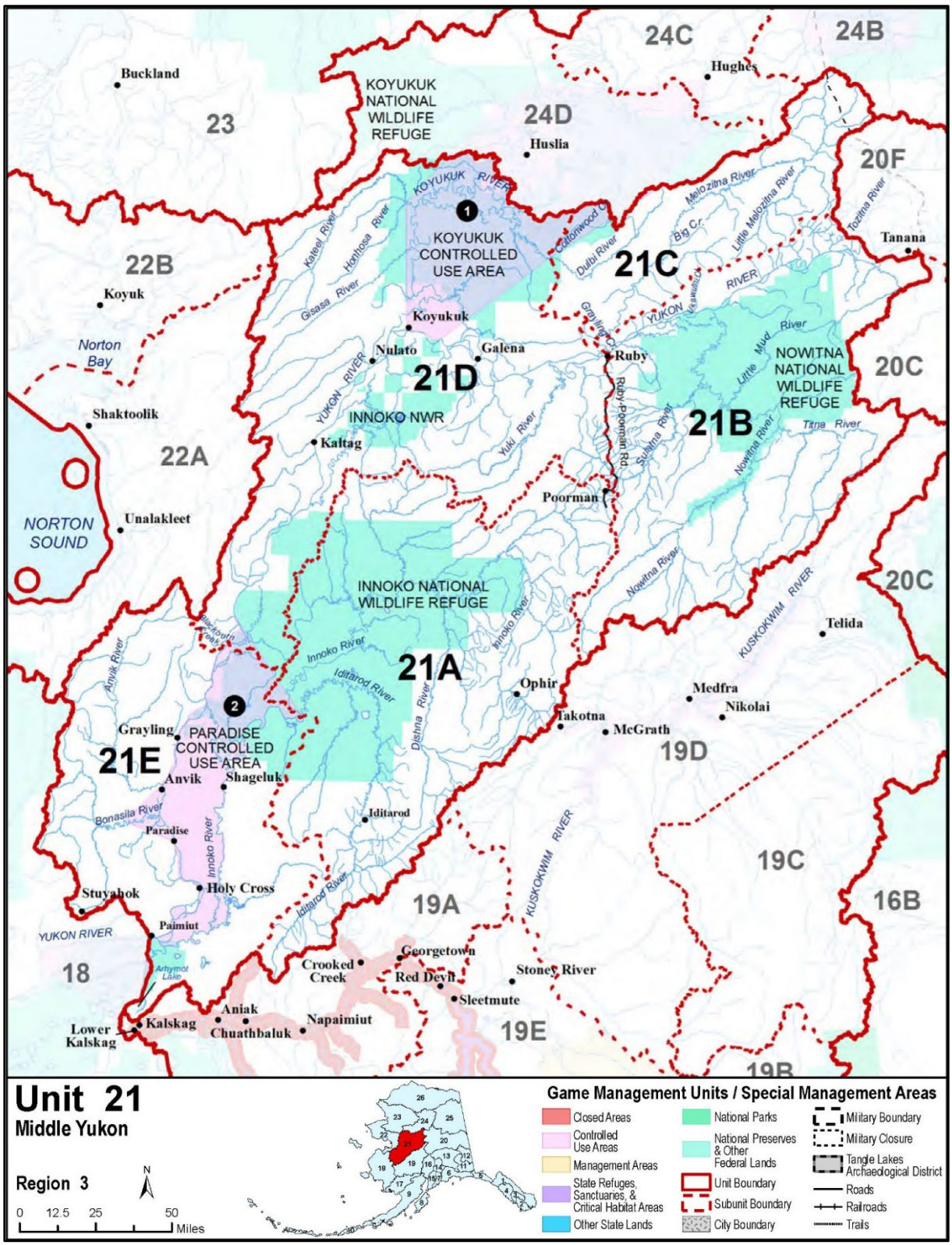

Figure 1. Map showing the Unit 21 boundaries in Interior Alaska with indicators of controlled use areas (numbered circles), administrative subunits, and federal lands as found in the Alaska Hunting Regulations.

In addition to the lower Nowitna River drainage, Unit 21B includes the area east of the Ruby-Poorman Road, the banks of the Yukon River drainage between Ruby and Tanana, the Blind River drainage, and the Boney River drainage. The Alaska Board of Game (board) made several changes related to Unit 21B in 2004 and 2006 that substantially changed the data collection and analysis from that point forward. In 2004 the board adopted regulations to implement 3 drawing hunts and a registration hunt for Unit 21. In 2006 the board added the upper Nowitna drainage (formerly part of Unit 21A) to Unit 21B, adopted an additional drawing permit and registration permit hunts in part of the area added, and added 10 days of fall moose hunting opportunity for resident hunters.

The U.S. Fish and Wildlife Service (USFWS) is a cooperator in moose management in this area, conducting annual trend count area (TCA) surveys to assess composition in parts of Unit 21B independent of the department. USFWS also operates a hunter checkstation on the lower Nowitna River during the fall hunting season.

Management Direction

Existing Wildlife Management Plans

Direction for the management of Unit 21B 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 species management report and plan series. The plan portion of this report contains the current management plan for moose in Unit 21B.

Goals

Manage Unit 21B moose on a sustained-yield basis to provide consumptive and nonconsumptive opportunity.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

C1. There is a positive customary and traditional use finding for moose in Unit 21. The amounts reasonably necessary for subsistence uses is set at 600–800 moose (Units 21A, 21B, 21C, 21D, and 21E) on an annual basis.

Intensive Management

Unit 21B has a positive intensive management (IM) finding. The Board of Game established the following objectives in March 2010:

C2. The population objective for moose in Unit 21B is 4,000–6,000 moose. The harvest objective is 200–300 moose.

MANAGEMENT OBJECTIVES

M1. Provide for a harvest of ≥25 bull moose.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor U.S. Fish and Wildlife Service (USFWS) trend count data for information on age-sex composition (M1).

Data Needs

Management decisions regarding appropriate harvest levels for moose are based on age and sex composition data obtained from trend count area (TCA) surveys. Harvest levels are managed by adjusting the number of drawing permits available to hunters, the season length for registration permits, and the hunt conditions of registration hunts.

Methods

USFWS methods for surveying their TCAs are described in Pamperin (2012, 2014). These include the 149 mi^2 Nowitna-Sulatna confluence and the 102 mi^2 Nowitna mouth TCAs. Piper PA-18 (or equivalent) aircraft were used, and contiguous survey units of approximately 6 mi^2 each were searched at a rate of about 5 min/mi^2 at 70–80 mph and 300–800 feet above ground level depending on terrain and vegetation. Surveys were conducted after sufficient snow had fallen to ensure sightability and moose were classified by sex and age with cows classified by number of calves present. Bulls were classified by size based on antler width and configuration.

Results and Discussion

Population Composition

TCA surveys conducted during RY15–RY19 by USFWS from the combined Nowitna-Sulatna confluence and Nowitna mouth TCAs, which extend from the Little Mud River down to the Nowitna River mouth, continued to show variable ratios of calves, bulls, and yearling bulls to 100 cows (Tables 1 and 2). Results of the RY18 and RY19 surveys indicate a decrease in total cows, bulls, and calves. Poor survey conditions existed in RY16 which prevented the inclusion or comparison of those data.

Recommendations for Activity 1.1

Continue monitoring TCA data collected by USFWS.

Table 1. Unit 21B Nowitna-Sulatna confluence aerial moose composition counts, Interior Alaska, regulatory years 2015–2019.

Regulatory year	Survey area (mi^2)	Bulls: 100 cows	Yearling bulls: 100 cows	Calves: 100 cows	Twins: 100 cows with calves	Percent calves	Moose counted	Bulls counted	Cows counted	Calves counted	Moose per mi^2
2015	149	33	8	55	3.0	29	141	25	75	41	0.95
2017	149	35	5	33	1.8	20	209	44	124	41	1.41
2018	143	30	10	19	0.7	13	134	27	90	17	0.94
2019	143	37	9	40	1.7	22	138	29	78	31	0.97

Note: Conducted by U.S. Fish and Wildlife Service. Data from 2016 is not included due to poor survey conditions.

Table 2. Unit 21B Nowitna mouth confluence aerial moose composition counts, Interior Alaska, regulatory years 2015–2019.

Regulatory year	Survey area (mi^2)	Bulls: 100 cows	Yearling bulls: 100 cows	Calves: 100 Cows	Twins: 100 cows w/calves	Percent calves	Moose counted	Bulls counted	Cows counted	Calves counted	Moose per mi^2
2015	102.0	23	7	46	6.0	27	154	21	91	42	1.51
2017	96.6	28	8	18	0.9	13	136	26	93	17	1.41
2018	96.6	16	2	15	0.0	12	138	17	105	16	1.43
2019	96.6	25	4	23	1.7	15	136	23	92	21	1.41

[a] Moose composition counts conducted by U.S. Fish and Wildlife Service. Data from 2016 is not included due to poor survey conditions.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor annual reported harvest (C1, C2, M1). Monitor hunter activity by reviewing summaries of the Nowitna River hunter checkstation operated by USFWS (C1, C2, M1).

Data Needs

Annual summaries of harvest are needed to evaluate whether the harvest objective (M1) in Unit 21B in being met. Since active management to increase recruitment of moose in Unit 21B is precluded by federal landownership, the IM harvest objective (C2) is unrealistic and difficult to assess without updated, statistically valid abundance estimates. Additionally, resources are not available to conduct unitwide GSPE surveys to obtain updated abundance estimates given other priorities within the Galena management area. Harvest levels have been stable in Unit 21B, and this further reduces the need to conduct annual population estimation surveys.

Methods

ADF&G's Wildlife Information Network (WinfoNet) was used to query the moose harvest database and construct summaries of reported harvest from permit (drawing and registration) and general season (harvest ticket) hunts. Hunters with drawing or registration permits received 1 or 2 reminder letters and usually an e-mail and telephone calls if we did not receive timely harvest reports.

Results and Discussion

Harvest by Hunters

Reported harvest in Unit 21B averaged 81 bull moose/year during RY15–RY19 (harvest ticket, drawing, and registration hunts; Table 3) which increased an average of 9 moose/year from the previous reporting period (RY10–RY14; Pamperin 2018). The number of hunters was stable during RY15–RY19 in Unit 21B and averaged 215 hunters/year (Table 4) of which 51% were checked through the Nowitna River checkstation operated by USFWS (Table 5). Estimates of unreported harvest are based on Division of Subsistence harvest survey data by community in Unit 21 (Stout 2006).

Table 3. Unit 21B moose harvest by hunters, Interior Alaska, regulatory years 2015–2019.

Regulatory year	Reported harvest by hunters			Unreported harvest[b]	Total
	Bull	Cow[a]	Total		
2015	96	0	96	25	121
2016	83	0	83	25	108
2017	84	0	84	25	109
2018	68	0	68	25	93
2019	76	0	76	25	101

[a] There was no opportunity to hunt cow moose.
[b] Estimates of unreported harvest are discussed in Stout (2006).

Table 4. Unit 21B moose hunter residency and success, Interior Alaska, regulatory years 2015–2019.

	Successful				Unsuccessful				
Regulatory year	Local resident[a]	Nonlocal resident	Nonresident	Total (%)	Local resident[a]	Nonlocal resident	Nonresident	Total	Total hunters
2015	20	59	17	96 (41)	39	86	15	140	236
2016	27	45	11	83 (35)	52	89	15	156	239
2017	27	48	9	84 (42)	37	66	12	115	199
2018	19	44	5	68 (36)	28	77	17	122	190
2019	20	44	12	76 (36)	27	88	18	133	209

Note: Some hunters had multiple permits.

[a] Local residents reside in the communities of Tanana, Rampart, Manley, Ruby, and Galena.

Table 5. Unit 21B Nowitna River checkstation hunters, harvest, and percent success, Interior Alaska, regulatory years 2015–2019.

	Local communities[a]			Other Alaska residents			Nonresident			Total		
Regulatory year	Hunters	Harvest	Percent success	Hunters	Harvest	Percent success	Hunters	Harvest	Percent success	Hunters	Harvest	Percent success
2015	18	2	11	93	42	45	6	3	50	117	47	40
2016	22	4	18	89	34	38	6	1	17	117	39	33
2017	24	10	42	72	31	43	5	2	40	101	43	43
2018	15	3	20	73	29	40	3	0	0	91	32	35
2019	11	6	55	96	33	34	10	3	30	117	42	36

Note: Data collected by U.S. Fish and Wildlife Service.

[a] Local residents reside in Tanana, Ruby, and Galena**.**

Permit Hunts

Annual harvest under drawing permits (DM802, DM805, DM806, and DM808–DM811) during RY15–RY19 averaged 22 moose per year. An average of 40% of permit winners hunted, which is similar to what was reported in RY10–RY14 (Pamperin 2018). With the current draw hunt structure, hunters were distributed throughout Unit 21B, and participation was higher along the Nowitna River corridor (Table 6).

Hunters reported harvesting an average of 45 moose annually under RM834 during RY15–RY19. Use of the federal permit (FM2101) issued by USFWS was limited and averaged 10 permits annually during RY15–RY19 with an average harvest of 2 moose per year.

Hunter Residency and Success

Annually, Alaska residents composed 88% (range = 86–89%) of moose hunters in Unit 21B during RY15–RY19 (Table 4). The structure of the registration hunt RM834, which is only available to Alaska residents, and the remote nature of the area contribute to the high proportion of Alaska resident hunters. The draw permits and harvest ticket options available to nonresidents (DM802, DM805, DM808, DM809, DM811) allow for nonresident moose hunting opportunity. On average, 71 resident and 10 nonresident hunters per year were successful during RY15–RY19. The success rate for all hunters averaged 38% (range = 34–42%) during RY15–RY19, which is similar to other areas in Interior Alaska (Hollis 2018).

Transport Methods

In Unit 21B hunters typically used boats (80%) for transportation. Other transportation used to reach the hunt area was highway vehicle (9%), airplane (6%), 3- or 4-wheeler (3%), and off-road vehicles (2%). Horse/dog-team, foot, or other represented a combined total of <1%.

ACTIVITY 2.2. Assess draw permit availability annually (C1, C2, M1).

Data Needs

A combination of different regulatory hunting opportunities (e.g., general harvest tickets, registration permits, and draw permits) allow for a stable harvest and overall hunt opportunity. Harvest levels can be adjusted by changing numbers of drawing permits and changing registration permit seasons and hunt conditions based on composition data from TCAs along with annual harvest data.

Methods

Population estimates were calculated using survey data and moose densities for each draw permit (DM802, DM805, DM806, and DM810–812). Using these population estimates, allowable harvest estimates were calculated using either a 5% or 7% prescribed harvest rate (Boertje et al. 2009). Subsistence harvest estimates were calculated using a combination of local harvest and subsistence registration permit harvest. Subsistence harvest estimates were then subtracted from the allowable harvest estimate to get the allowable harvest. The allowable harvest was multiplied by the success rate (Table 6) which resulted in the number of permits available. To assess

Table 6. Unit 21B hunter success and participation by draw permit hunt, Interior Alaska, regulatory years 2015–2019.

Hunt	Regulatory year	Permits issued	Successful hunters[a] (%)	Unsuccessful hunters[a] (%)	Did not hunt (%)
DM810	2015	10	3 (30)	1 (10)	6 (60)
	2016	10	2 (20)	2 (20)	6 (60)
	2017	10	4 (40)	2 (20)	4 (40)
	2018	10	4 (40)	1 (10)	5 (50)
	2019	10	6 (60)	3 (30)	1 (10)
DM809	2015	3	1 (33)	1 (33)	1 (33)
	2016	3	0 (0)	1 (33)	2 (67)
	2017	3	2 (67)	1 (33)	0 (0)
	2018	3	0 (0)	1 (33)	2 (67)
	2019	3	2 (67)	1 (33)	0 (0)
DM811	2015	7	3 (43)	4 (57)	0 (0)
	2016	7	4 (57)	1 (14)	2 (29)
	2017	7	3 (43)	3 (43)	1 (14)
	2018	7	2 (28.5)	3 (43)	2 (28.5)
	2019	7	4 (57)	3 (43)	0 (0)
DM806	2015	16	10 (63)	1 (6)	5 (31)
	2016	16	2 (13)	5 (31)	9 (56)
	2017	16	5 (31)	6 (38)	5 (31)
	2018	16	4 (25)	4 (25)	8 (50)
	2019	16	6 (38)	5 (31)	5 (31)
DM805	2015	4	2 (50)	0 (0)	2 (50)
	2016	4	1 (25)	2 (50)	1 (25)
	2017	4	1 (25)	1 (25)	2 (50)
	2018	4	0 (0)	4 (100)	0 (0)
	2019	4	2 (50)	1 (25)	1 (25)
DM802	2015	45	3 (7)	17 (38)	25 (56)
	2016	34	2 (6)	9 (26)	23 (68)
	2017	28	3 (11)	5 (18)	20 (71)
	2018	57	3 (5)	13 (23)	41 (72)
	2019	23	2 (9)	11 (48)	10 (43)
DM808	2015	30	7 (23)	11 (37)	12 (40)
	2016	54	3 (6)	17 (31)	34 (63)
	2017	33	6 (18)	3 (9)	24 (73)
	2018	28	2 (7)	8 (29)	18 (64)
	2019	25	5 (20)	8 (32)	12 (48)

[a] Percent successful and percent unsuccessful were calculated using the total number of hunters who included enough information in their harvest report to determine whether they harvested a moose.

whether the population provided for a harvest of ≥25 bull moose, I used 1,899, the lower end of the 90% confidence interval (CI) from the most recent geospatial population estimator (GSPE) survey (2008 GSPE = 1,899–2,736 moose). I compared the total moose counted at the last TCA survey in 2008 to the total moose counted in RY15–RY19 composition surveys, which resulted in a 7% decrease in the total count. I applied the 7% decrease to the lower end of the population estimate (1,899 moose) and estimated that there was a minimum of 1,766 moose in Unit 21B. I applied a 5% harvest rate to this estimated minimum count and estimated that there were 88 moose available for harvest each year. Other factors that went into permit availability were the ratio of bulls to 100 cows, undersubscribed history, and resident and nonresident allocation.

Results and Discussion

The RM834 provided all residents of Alaska the opportunity to hunt moose in Unit 21B except the portion 2 miles on either side of the Nowitna River upstream from the Little Mud River Drainage. The draw permit system also allowed for this level of harvest. Both regulation and population estimates provided for a harvest of ≥25 bull moose.

Alaska Board of Game Actions and Emergency Orders

No regulation changes were adopted during RY15–RY19.

Recommendations for Activity 2.2

Continue to monitor reported harvest. Continue to monitor hunter activity by reviewing summaries of the Nowitna River hunter checkstation operated by USFWS.

3. Habitat Assessment-Enhancement

There were no projects to assess or enhance habitat in Unit 21B during RY15–RY19.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

There were no additional moose management problems or needs during RY15–RY19 in Unit 21B.

Data Recording and Archiving

Harvest data will be stored on ADF&G's Wildlife Information Network (WinfoNet, http://winfonet.alaska.gov/index.cfm), which is an internal database housed on a server. Electronic copies of data and reports will be stored in WinfoNet—Data Archive (Project title: Moose Management Program Unit 21B, Project ID: GMU 21B Moose, Primary region: Region III).

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

Based on trend count area (TCA) survey data, the moose population in Unit 21B is likely declining. Harvest has been stable and the continuation of a conservative harvest strategy is warranted. The total number of moose counted in TCAs will continue to be monitored to evaluate whether this declining trend persists. It is important to note that composition data varied in RY15–RY19 within the range of values observed previously within TCAs since the early 2000s. This variability in TCA data is likely a factor of the small size of TCAs, which increases sensitivity to changes in timing and conditions under which surveys are conducted. For this reason, management decisions will continue to be based on long-term harvest levels and success rates.

Objective M1, to provide for harvest of ≥25 bull moose, was met. Total reported harvest averaged 81 moose per year during RY15–RY19 (Table 3), which represents approximately 3.5% of the 2,317 observable moose (90% CI = 1,899–2,736) estimated in the most recent Unit 21B GSPE abundance survey in 2008.

Objective C2 was not met, but this objective is based on data from 2008 (2008 GSPE survey) and does not account for declining trends in abundance observed in RY15–RY19 TCA data. Resources are not available to conduct unitwide GSPE surveys given other priorities within the Galena management area. Area managers will consider allocating funds toward Unit 21B GSPE surveys if the consumptive demands are not being met or if there is a public concern.

II. Project Review and RY20–RY24 Plan

Review of Management Direction

Management Direction

There are no changes in the management direction. We will continue to monitor annual harvest and listen to public concerns, should any arise.

Goals

Provide a sustained opportunity to participate in hunting moose.

Codified Objectives

Amounts Reasonably Necessary for Subsistence Uses

C1. There is a positive customary and traditional use finding for moose in Unit 21. The amounts reasonably necessary for subsistence uses is set at 600–800 moose (Units 21A, 21B, 21C, 21D, and 21E) on an annual basis.

Intensive Management

Unit 21B has a positive intensive management (IM) finding. The Board of Game established the following objectives in March 2010:

C2. The population objective for moose in Unit 21B is 4,000–6,000 moose. The harvest objective is 200–300 moose.

MANAGEMENT OBJECTIVES

M1. Achieve a harvest of greater than or equal to 25 bull moose.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Monitor USFWS trend count data for information on age-sex composition.

Data Needs

Management decisions regarding appropriate harvest levels for moose are based on age and sex composition data obtained from trend count area (TCA) surveys. Harvest levels are managed by adjusting the number of drawing permits available to hunters, the season length for registration permits, and the hunt conditions of registration hunts.

Methods

No change from RY15–RY19 report.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor annual reported harvest (C1, C2, M1). Monitor hunter activity by reviewing summaries of the Nowitna River hunter checkstation operated by USFWS (C1, C2, M1).

Data Needs

No change from the RY15–RY19 report.

Methods

No change from the RY15–RY19 report.

ACTIVITY 2.2. Assess draw permit availability annually (C1, C2, M1).

Data Needs

No change from the RY15–RY19 report.

Methods

No change from the RY15–RY19 report.

3. Habitat Assessment-Enhancement

Moose habitat will not be assessed or enhanced during this planning period (RY20–RY24). There is no evidence that the moose population in Unit 21B is nutritionally limited.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

None.

Data Recording and Archiving

Harvest data will be stored on ADF&G's Wildlife Information Network (WinfoNet, https://winfonet.alaska.gov/index.cfm?sessionalwaysreset=1). Electronic copies of data and reports will be stored in the WinfoNet—Data Archive (Project title: Moose Management Program: Unit 21B, Project ID: GMU 21B Moose, Primary region: Region III).

Agreements

None.

Permitting

None.

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