

Dall Sheep Management Report and Plan, Game Management Unit 20A:

Report Period 1 July 2016–30 June 2021, and
Plan Period 1 July 2021–30 June 2026

Jeffrey J. Wells



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This species management report and plan was reviewed and approved for publication by Jason Caikowski, Management Coordinator for Region III for the Division of Wildlife Conservation.

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Contents

Purpose of this Report.....	1
I. RY16–RY20 Management Report	1
Management Area.....	1
Summary of Status, Trend, Management Activities, and History of Dall Sheep in Unit 20A	1
Management Direction.....	2
Existing Wildlife Management Plans	2
Goals	2
Codified Objectives	2
Amounts Reasonably Necessary for Subsistence Uses	2
Intensive Management.....	3
Management Objectives.....	3
Management Activities	3
1. Population Status and Trend	3
2. Mortality-Harvest Monitoring and Regulations.....	7
3. Habitat Assessment-Enhancement.....	10
Nonregulatory Management Problems or Needs.....	10
Data Recording and Archiving	10
Agreements	10
Permitting.....	10
Conclusions and Management Recommendations	10
II. Project Review and RY21–RY25 Plan	11
Review of Management Direction.....	11
Management Direction.....	11
Goals	11
Codified Objectives	11
Amounts Reasonably Necessary for Subsistence Uses	11
Intensive Management.....	11
Management Objectives.....	12
Review of Management Activities.....	12
1. Population Status and Trend	12
2. Mortality-Harvest Monitoring	12
3. Habitat Assessment-Enhancement.....	12
Nonregulatory Management Problems or Needs.....	13
Data Recording and Archiving	13
Agreements	13
Permitting.....	13
References Cited	13

List of Figures

Figure 1. Unit 20A Dall sheep survey area, central Alaska Range, regulatory years 2016–2020..	4
Figure 2. Total sheep observed during minimum count aerial surveys for Dall Sheep in survey units 1–3 in Unit 20A, central Alaska Range, regulatory years 1983–2020.	6
Figure 3. Reported annual Dall sheep ram harvest during regulatory years 1986–2020 within Unit 20A, central Alaska Range.	8

List of Tables

Table 1. Aerial survey results for Dall Sheep in survey units 1–3 in Unit 20A, central Alaska Range, regulatory years 2011–2020.	6
Table 2. Unit 20A Dall sheep harvest, central Alaska Range, regulatory years 2016–2020.....	8
Table 3. Dall sheep hunter (youth and general season) residency and success, Unit 20A, central Alaska Range, regulatory years 2016–2020.	9

Purpose of this Report

This report provides a record of survey and inventory management activities for Dall Sheep (*Ovis dalli*) in Game Management Unit 20A for the 5 regulatory years 2016–2020 and plans for survey and inventory management activities in the next 5 regulatory years, 2021–2025. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY16 = 1 July 2016–30 June 2017). 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 Dall Sheep management report of survey and inventory activities that was previously produced every 3 years.

I. RY16–RY20 Management Report

Management Area

Dall sheep habitat in Unit 20A includes the north side of the central Alaska Range and is bounded by the Nenana River to the west, the Delta River to the east, and the Tanana Flats to the north. Unit 20A consists of 6,797 square miles, and approximately 1,500 square miles, or that portion above 4,500 feet, is generally suitable sheep habitat. Most of the suitable sheep habitat is state of Alaska lands. The climate is typical of Interior Alaska, where temperatures at lower elevations frequently reach 80°F in summer and –40°F in winter, and overall precipitation is relatively light. The topography as well as the vegetation and large mammal communities in the area are described in detail by Arthur and Prugh (2010).

Summary of Status, Trend, Management Activities, and History of Dall Sheep in Unit 20A

The mountains of Unit 20A have a long history of being one of the most popular Dall sheep hunting areas in Interior Alaska because of their accessibility, the general hunting season, their relatively high-density sheep population, and the opportunity to hunt other species. Hunt management in Unit 20A provides for a wide variety of hunting opportunities and includes areas closed to the use of motorized vehicles (except aircraft) and an area open to hunting by bow and arrow only. Sheep management activities in Unit 20A have focused on aerial surveys and monitoring harvest, although several large sheep research projects have also been conducted within the unit.

Aerial sheep surveys have been conducted periodically within portions of Unit 20A since 1967, with annual surveys conducted during most years since 1994. Similar to many other ungulate populations in Alaska, sheep populations in Unit 20A were at relatively high levels in the 1960s, likely due to widespread predator control programs before statehood and favorable weather conditions, but the population declined beginning in the late-1960s through the mid-1970s (Heimer and Watson 1986). The population then stabilized before declining again between the mid-1980s and early-1990s, likely due primarily to several severe winters in a row in the early-

1990s (Eagan 1993). A unitwide sheep survey conducted in 1994 resulted in an estimated 1,942 sheep in Unit 20A (Whitten and Eagan 1995), and from then through 2015, the population fluctuated but was likely generally stable or increasing (Hollis 2019).

Unit 20A sheep harvest has been managed using full-curl harvest regulations under a general harvest ticket with a 6-week season (10 August–20 September) open to residents and nonresidents since RY84, and a 5-day youth season was added beginning in RY16. During RY84–RY15, the number of hunters and harvest averaged 244 and 88, respectively, and ranged from a high of 413 hunters who harvested 165 rams in RY89 to a low of 144 hunters who harvested 27 rams in RY00.

Past sheep research in Unit 20A has focused on sheep population demographics, horn characteristics, and habitat use. Specifically, this research included studies of sheep use of the Dry Creek mineral lick (Heimer 1974), population and horn characteristics in Unit 20A compared to the Tok Management Area (Heimer and Watson 1986), seasonal movements and ecology on Fort Greely (Spiers and Heimer 1990), monitoring methods (Whitten and Eagan 1995), lamb survival and causes of mortality (Scotton 1997), and the interrelationships of Dall sheep and predators (Arthur and Prugh 2010).

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

Unit 20A Dall sheep planned survey and inventory management activities for RY16–RY20 were outlined by Hollis (2019). Prior to RY16, *Alaska Wildlife Management Plans: Interior Alaska* (ADF&G 1976) provided direction for Dall sheep management, and was reviewed and modified through public comments, department recommendations, and Alaska Board of Game (board) actions over the years. A record of these changes can be found in Unit 20A Dall sheep species management reports. The plan portion of this document contains the current management plan for sheep in Unit 20A.

GOALS

During RY16–RY20 (and since RY07), the Unit 20A Dall sheep management goal was this:

- G1. Maintain a harvestable population of Dall sheep fluctuating within historical limits of abundance.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game has not made a customary and traditional use finding for the Unit 20A sheep population.

Intensive Management

The Unit 20A sheep population has not been identified as an intensive management population by the Alaska Board of Game.

MANAGEMENT OBJECTIVES

During RY16–RY20 (and since RY07), the Unit 20A Dall sheep management objectives were as follows:

- M1. Manage for a Dall sheep population of approximately 5,000 sheep.
- M2. Provide the opportunity for hunters to harvest mature rams during a general hunting season.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct population abundance (minimum count) and composition surveys (goal G1).

Data Needs

Minimum count population data and composition estimates are necessary to inform the public, including hunters, advisory committees, and the Board of Game, of the population status and potential trends. This information is also used to monitor the long-term population trend and gives the department an indication of the number of rams available for hunters in the Central Alaska Range.

Methods

Since 1994, our team of wildlife biologists has focused our aerial sheep surveys within a 201 square mile (521 square km) area in central Unit 20A located between the Wood and West Fork Little Delta rivers (Fig. 1). This area is subdivided into 4 survey units (SUs), which were developed in the early 1980s as part of a larger survey area for all of Unit 20A. Since 1994 we have attempted to conduct a survey of SUs 1–3 annually, and if time and weather allow, we also survey SU 4. During RY16–RY20, we flew all surveys in tandem aircraft (Piper PA-18 Super Cub or Bellanca Scout) during July when snow cover in the alpine is typically at or near its lowest level (outside of the hunting season). In addition, we did not conduct surveys when cloud cover obscured portions of sheep habitat.

Survey crews consisted of a pilot and an observer seated behind the pilot. The flight path technique varied by pilot-observer team, although typically the surveys were flown along contours in suitable sheep habitat, and flight paths were maintained at 300–700 feet above ground level at airspeeds of 60–80 mph. Our goal was to thoroughly search each survey unit and to observe as many of the sheep within the unit as possible. When we observed sheep, we recorded the group size and composition. Composition was defined by the following categories: ewe (or ewe-like; this category includes yearlings of both sexes and rams of $\frac{1}{4}$ curl or less), lamb, $<\frac{1}{2}$ -curl ram, $\frac{1}{2}$ - to $\frac{3}{4}$ -curl ram, $\frac{3}{4}$ - to $<$ full-curl ram, and \geq full-curl ram. We did not

estimate a sightability correction factor during the RY16–RY20 surveys; therefore, the total number of sheep observed represents a minimum count estimate.

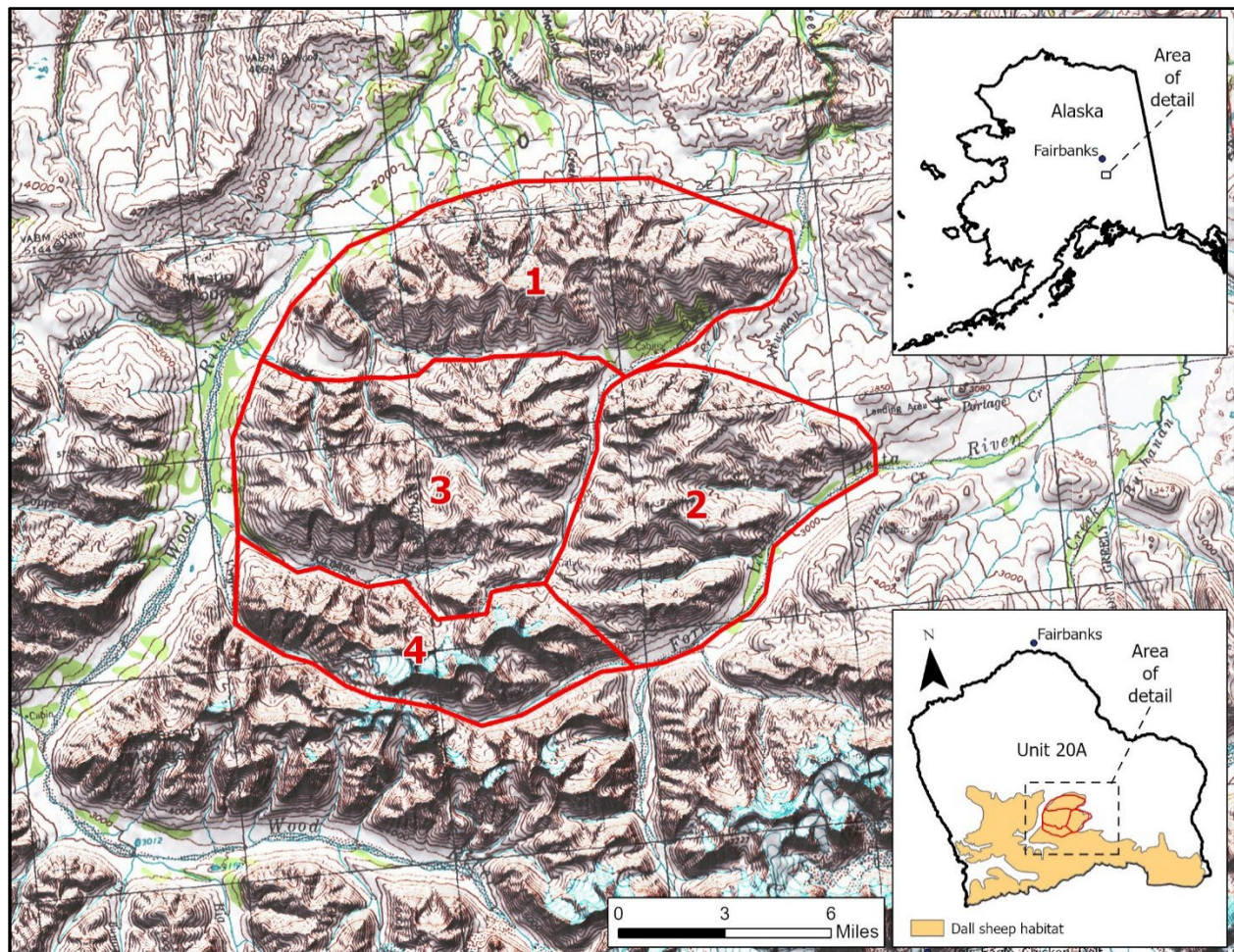


Figure 1. Unit 20A Dall sheep survey area, central Alaska Range, regulatory years 2016–2020.

RY16

We surveyed SUs 1–4 on 23–24 July with pilot Marty Webb and observers Tony Hollis and Brad Wendling. Survey conditions were good, and the total survey time was 7.2 hours.

RY17

We surveyed SUs 1–3 on 19–20 July with pilot Marty Webb and observers Tony Hollis and Jesse Dunshie. Survey conditions were good, and total survey time was 6.3 hours.

RY18

We surveyed SUs 1–3 on 13–14 July with pilot Marty Webb and observers Tony Hollis and Jesse Dunshie. Survey conditions were good, and total survey time was 6.3 hours.

RY19

We surveyed SUs 1–3 on 23–24 July with pilot Marty Webb and observer Mark Nelson. Survey conditions were good, and total survey time was 5.8 hours.

RY20

We surveyed SUs 1–3 on 11 July with pilot Marty Webb and observer Tony Hollis. Survey conditions were good, and total survey time was 5.8 hours.

Results and Discussion

The Unit 20A sheep population was likely relatively stable during RY16–RY19 but likely declined between RY19 to RY20. The number of sheep we observed during RY16–RY19 varied annually but averaged 575, which is slightly below the RY11–RY15 average of 680 sheep (Table 1). Annual variation in the number of sheep observed can vary by factors other than changes in sheep abundance, such as sheep movements in and out of the survey area and annual variability in sightability. For these reasons, we assess the variability in the number of sheep observed during RY16–RY19 to likely be due a combination of these factors as opposed to annual changes in sheep abundance. Conversely, we interpret the reduced number of sheep we observed in RY20 to be the result of an actual reduction in population size. The number of sheep we observed in RY20 dropped to 385, which is the lowest number observed going back through RY83 but is similar to the second lowest count of 408 in RY94 (Fig. 2). The reduction in the number of sheep we observed in RY20 was mostly the result of fewer rams and lambs observed compared to previous years, while the number of ewes (which includes ewe-likes) observed was relatively similar to previous years. Although the specific factors that contributed to the population decline are unknown, it is likely that winter weather was a primary contributing factor. The snowpack in spring 2020 persisted through April and was considerably deeper than average at the end of April in most of Tanana River basin (U.S. Department of Agriculture 2020), and previous research has shown that lamb-to-ewe ratios are lower during years with later snow melt (Rattenbury et al. 2018).

Lamb-to-ewe ratios and ram composition varied during RY16–RY20, with the most notable changes during RY19–RY20. Lamb-to-ewe ratios averaged 32:100 during RY16–RY19, which is greater than the previous 5-year average of 22:100 (Table 1). However, the lamb-to-ewe ratio of 15:100 in RY20 was much below average and similar to the low ratios observed in RY13–RY14, which were also years with late snow persistence. For ram composition, the percent of rams we judged to be legal (\geq full curl) declined from an average of 27% during RY16–RY18 to an average of 17% during RY19–RY20 (Table 1), although it is worth noting these values are within the range observed in the past. The decrease in the proportion of full-curl rams could be due to poor lamb recruitment during RY13–RY14 (these rams would have been 6–7 years old during the RY20 survey) as well as the potential loss of some older-aged rams over the 2019–2020 winter.

Recommendations for Activity 1.1.

Continue.

Table 1. Aerial survey results for Dall Sheep in survey units 1–3 in Unit 20A, central Alaska Range, regulatory years 2011–2020.

Regulatory year	Dates	Total	Ewes/ ewe-like ^a	Lambs	Rams	Legal rams (n)	% Legal	Lambs: 100 ewes	Rams: 100 ewes
2011	6–7 Jul	823	496	127	200	22	11	26	40
2013	12,13 Jul	625	383	44	198	35	18	11	52
2014	18 Jul	516	311	47	158	27	17	15	51
2015	23, 24 Jul	755	417	140	198	43	22	34	47
2016	13, 14 Jul	525	297	72	156	43	28	24	53
2017	19, 20 Jul	586	341	131	114	32	28	38	33
2018	13, 14 Jul	636	383	94	159	41	26	25	42
2019	23, 24 Jul	552	262	107	183	26	14	41	70
2020	11 Jul	385	253	38	94	18	19	15	37

Note: Surveys during RY11 and RY13 used helicopters and during RY14–RY20 used fixed-wing aircraft.

^a Includes ewes, yearlings of both sexes, and rams of ¼ curl or less.

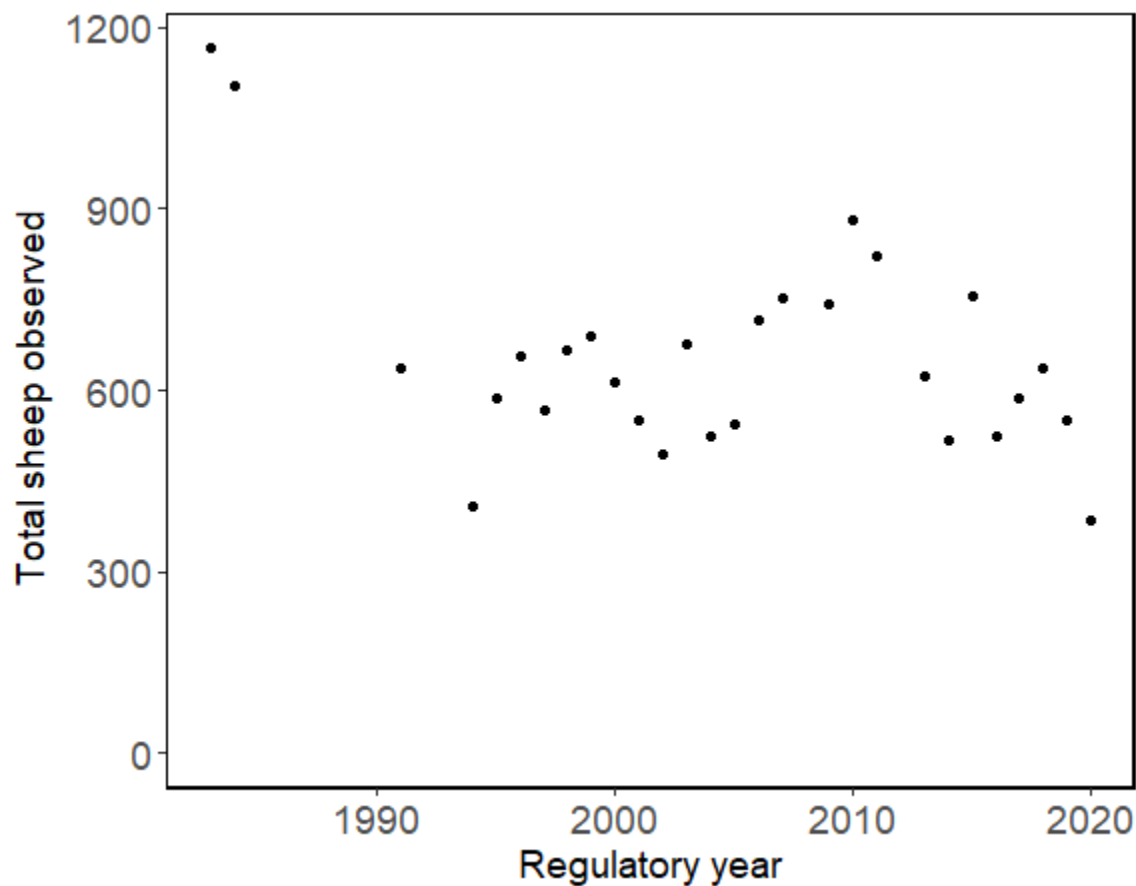


Figure 2. Total sheep observed during minimum count aerial surveys for Dall Sheep in survey units 1–3 in Unit 20A, central Alaska Range, regulatory years 1983–2020.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor and analyze harvest data (objective M2).

Data Needs

Harvest data are useful to assess our management objective to allow hunters the opportunity to harvest mature rams. In addition, harvest data are important to inform the public, including hunters, advisory committees, and the Alaska Board of Game, of hunter and harvest numbers.

Methods

We estimate annual harvest from mandatory harvest ticket report cards and through the mandatory horn sealing process. Successful hunters are required to have the horns sealed within 30 days of the date of kill at an ADF&G office. During the sealing process, we place a uniquely numbered aluminum plug in the horn, age the sheep, make a broken determination (both, 1, or neither horns broken), and measure the horns (including total length and base circumference). Additional horn measurements were collected from rams that were harvested during RY16–RY18 and sealed in Anchorage, Fairbanks, or Palmer as part of a statewide research project assessing horn morphometrics (Wendling et al. 2019). If timely harvest ticket reports were not received, hunters who provided contact information received a reminder email and/or letter. Mandatory sealing was implemented in RY06; horn and age data prior to RY06 was determined by hunters and obtained from harvest ticket report cards.

Season and Bag Limit

Beginning in RY16, a youth sheep hunt was open to resident and nonresident youth with season dates of 1–5 August. The general sheep hunting season for residents and nonresidents was 10 August–20 September. For both hunts, hunters were required to have a general sheep harvest ticket and the bag limit was 1 ram (every year for residents and every 4 years for nonresidents) with a full-curl or larger horn, or with both horns broken (broomed), or at least 8-years old. For the youth hunt, the bag limit counted against the youth and the accompanying adult.

Results and Discussion

Harvest by Hunters-Trappers

Reported sheep harvest in 20A for RY16–RY20 averaged 104 rams per year (Table 2), of which an average of 4 (range 2–10) were harvested during the youth hunt portion of the season. However, the reported harvest during this period was not stable; the sheep harvest decreased from 139 in RY16 to 66 in RY20. This decline in harvest is consistent with our conclusion, based upon our minimum count surveys, that the population declined. Nevertheless, the average reported harvest for this 5-year period was similar to the RY11–RY15 and RY06–RY10 annual averages, which for both periods was 99 rams per year. Similarly, the average number of hunters per year during RY16–RY20 (284 per year) was similar to the previous 5-year average of 263 per year. In general, harvest (and hunter numbers) reached a low in the 1990s, likely due to the decreased sheep population at the time, and slowly increased to reach a peak in RY16 before declining through RY20 (Fig. 3). Other than the addition of the 5-day youth hunt in RY16, hunting seasons and bag limits generally remained the same throughout this entire period.

Average horn length and age of harvested rams increased during RY16–RY20 compared to the prior reporting period, while the proportion of rams with large horns (≥ 40 inches) and proportion that were sublegal decreased. The average horn length 34.9 inches and the average age 8.8 years old (Table 2), compared to 34.4 inches and 8.4 years old, respectively, during RY11–RY15. The proportion of harvested rams with horns ≥ 40 inches was 0.6% during RY16–RY20 compared to 1.2% during RY11–RY15. Similarly, the proportion of harvested rams aged 10 years or older was 30% during RY16–RY20 compared to 20% during the previous reporting period. Lastly, the proportion of harvested rams that were sublegal during RY16–RY20 was 1.8%, which is lower than the previous 5-year proportion of 3.9%.

Table 2. Unit 20A Dall sheep harvest, central Alaska Range, regulatory years 2016–2020.

Regulatory year	Youth season harvest	General season harvest	Total rams harvested	Average horn length	Average age
2016	2	137	139	34.9	8.5
2017	10	98	108	35.0	8.8
2018	5	106	111	35.3	8.8
2019	2	95	97	34.4	8.9
2020	2	64	66	34.9	9.3

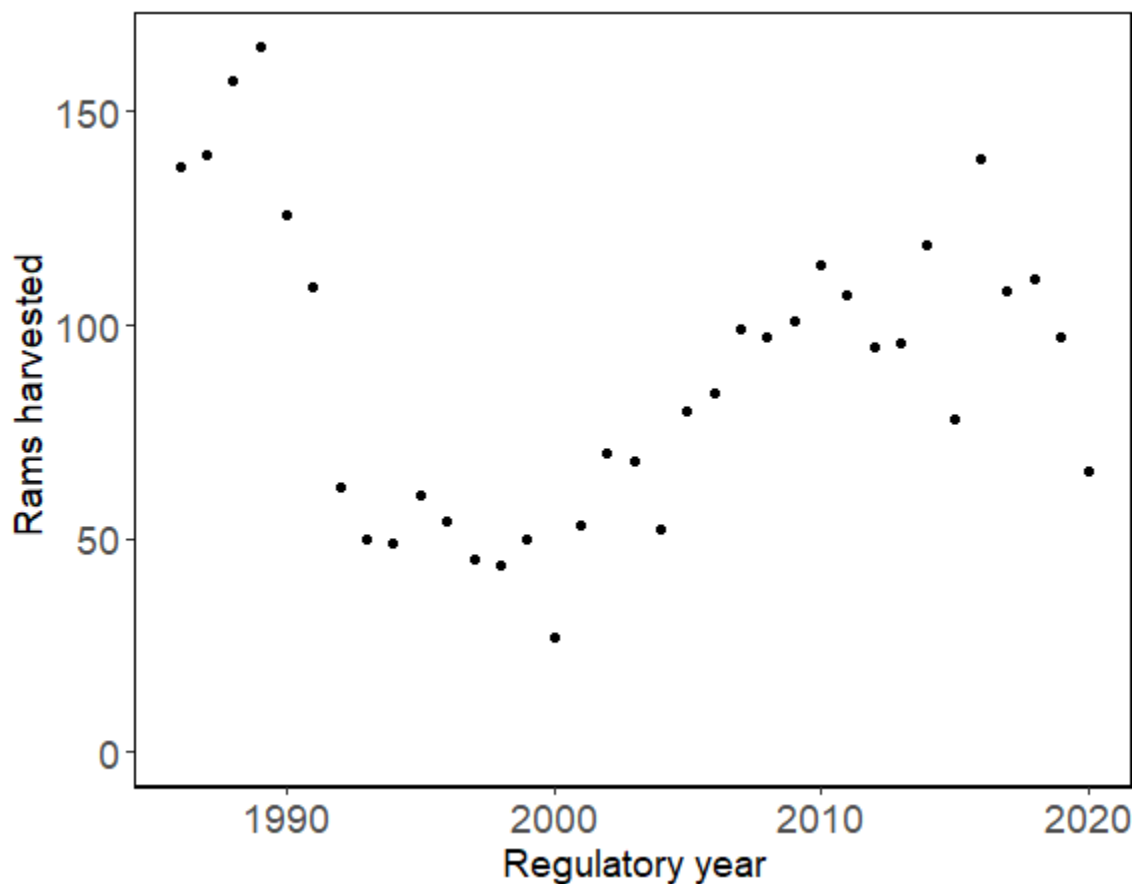


Figure 3. Reported annual Dall sheep ram harvest during regulatory years 1986–2020 within Unit 20A, central Alaska Range.

Hunter Residency and Success

During RY16–RY20, residents composed 74% of the hunters and harvested 50% of the rams taken, while nonresidents composed 26% of the hunters and harvested the other 50% of the rams taken (Table 3). Average annual success rate was 36% (Table 3), which is similar to the RY11–RY15 average of 38%. However, success rates declined within this reporting period from 46% in RY16, which is one of the highest success rates recorded in the past 30 years, to 26% in RY20, which is well below average. Nonresident annual success rates averaged 69% compared to the annual average resident success rate of 24%.

Table 3. Dall sheep hunter (youth and general season) residency and success, Unit 20A, central Alaska Range, regulatory years 2016–2020.

Regulatory year	Successful				Unsuccessful				Total hunters
	Resident	Nonresident	Unknown	Total (%)	Resident	Nonresident	Unknown	Total	
2016	80	58	1	139 (46)	142	19	0	161	300
2017	53	54	1	108 (36)	171	21	1	193	301
2018	47	63	1	111 (39)	158	18	0	176	287
2019	55	42	0	97 (34)	153	32	0	185	282
2020	25	41	0	66 (26)	163	22	0	185	251

Harvest Chronology

Similar to prior reporting periods, most of the harvest during RY16–RY20 occurred during the first (41%) and second (19%) weeks of the general season, while only 3% of the harvest occurred during the final week of the season.

Transport Methods

Similar to prior reporting periods, the type of transportation used by most successful hunters during RY16–RY20 was airplanes (42%) followed by horses (21%), 4-wheelers (17%), highway vehicles (i.e., hunters walking in from highways; 10%), and off-road vehicles (6%).

Alaska Board of Game Actions and Emergency Orders

The Alaska Board of Game did not take any actions specific to Unit 20A sheep during RY16–RY20. However, the board passed 2 statewide proposals in spring 2016 that affected Unit 20A, and these went into effect beginning in RY16. First, a youth-only season was established during 1–5 August. The youth season is for resident and nonresident youths (11–17 years of age), although the youth must be accompanied in the field by a resident hunter 21 years of age and older. For successful youth hunters, the harvest counts against the bag limit of both the youth and the accompanying adult. Second, the bag limit for youth and adult nonresident hunters was changed from 1 ram with full-curl horn or larger every year to 1 ram with full-curl horn or larger every 4 years.

Recommendations for Activity 2.1.

Continue to monitor harvest by harvest ticket reports and sealing records.

3. Habitat Assessment-Enhancement

No habitat assessment or enhancement activities occurred in Unit 20A during RY16–RY20.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

We did not identify any nonregulatory management problems or needs during this reporting period.

Data Recording and Archiving

- All electronic files, such as survey memos, reports, survey data, and maps are located on the Fairbanks server (S:\Fairbanks Area\Sheep\Unit 20A). All hard copy data sheets, paper files, etc. are stored in the file cabinet in room 118 of the Fairbanks office.
- Electronic copies of survey memos, survey data, and maps are stored in the Division of Wildlife Conservation's Wildlife Information Network (WinfoNet) data archive. Project Title: Fairbanks area | Unit 20A sheep | Primary Region: Region III.

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

During RY16–RY20, we likely met our management goal to maintain a harvestable population of Dall sheep fluctuating within historical limits of abundance. The aerial surveys that we conducted during this reporting period suggest that the Unit 20A sheep population was relatively stable during RY16–RY19 but declined by RY20, although it remained at levels observed in the past. Even with the decline, there was still a harvestable surplus of mature rams in the population, although similar to the decline in the population, harvest also decreased by RY20.

We achieved our second management objective for this reporting period, but we didn't collect data to assess our first management objective. During this reporting period, hunters had the opportunity to harvest a full-curl ram during the 5-day youth hunting period and the 6-week general hunting season, and the reported harvest of 139 rams in RY16 was the highest reported harvest since the early 1990s. Although reported harvest declined from RY16–RY20, we maintained the same hunting opportunity since harvest was restricted to full-curl rams. Therefore, we met the management objective to provide the opportunity for hunters to harvest mature rams during a general hunting season (M2). However, this management objective will be

changed for the next reporting period to a more specific and measurable objective. We did not collect data to assess our management objective to manage for a Dall sheep population of approximately 5,000 sheep (M1). McNay (1986) was one of the first to report that the Unit 20A sheep population was approximately 5,000 animals, and McNay (1989) clarified that this estimate was based upon a combination of a 1977 aerial survey, an assumed sightability range, and population growth between 1977 and 1987. Based upon this estimate, one of the Unit 20A sheep management objectives during most reporting periods since RY87 has been to maintain a sheep population of approximately 5,000 sheep. However, it is unclear how accurate the 1987 estimate of 5,000 sheep was, and data to assess the objective hasn't been collected since RY94, the last time a unitwide sheep survey was conducted. Therefore, given that we have no plans to conduct a unitwide survey in the near future, this objective will be removed for the next reporting period.

II. Project Review and RY21–RY25 Plan

Review of Management Direction

MANAGEMENT DIRECTION

The RY16–RY20 Unit 20A Dall sheep management direction, goals, and objectives were generally appropriate and have guided Unit 20A sheep management for decades. However, the goals and objectives will be altered slightly for RY21–RY25 to include goals and accompanying objectives that are more specific and measurable.

GOALS

- G1. Maintain a harvestable population of Dall sheep fluctuating within historical limits of abundance.
- G2. Provide the opportunity for hunters to harvest mature rams during a general hunting season.

Goal G1 is a carryover from previous reporting periods, while goal G2 was a management objective during R16–RY20 that was changed to a goal for this reporting period. G2 is better suited as a goal as opposed to an objective because it includes a long-term goal (the opportunity to harvest mature rams) but does not include specific and measurable outcomes.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game has not made a customary and traditional use finding for the Unit 20A sheep population.

Intensive Management

The Unit 20A sheep population has not been identified as an intensive management population by the Alaska Board of Game.

MANAGEMENT OBJECTIVES

M1. Using a full-curl harvest strategy within a general hunting season, maintain an average age of harvested rams of ≥ 8 years old.

This objective will be considered met if the average age of harvested rams during RY21–RY25, as assessed during the mandatory sealing process, is ≥ 8 years old. The primary purpose of this management objective is to provide a specific and measurable objective to achieve goal G2.

I removed the management objective to manage for a Dall sheep population of approximately 5,000 sheep for the RY21–RY25 reporting period because we do not have the capacity to collect data to assess the objective. In addition, even if there were data to suggest the population was below the 5,000 benchmark, we do not have scientifically reasonable and affordable management tools to alter sheep population dynamics to help achieve the objective, nor a method to assess habitat carrying capacity.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct population abundance (minimum count) and composition surveys (goal G1).

Data Needs

No changes from reporting period RY16–RY20.

Methods

No changes from reporting period RY16–RY20.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor and analyze harvest data (objective M1).

Data Needs

No changes from reporting period RY16–RY20, other than harvest data is necessary to assess our new management objective related to average horn size.

Methods

No changes from reporting period RY16–RY20.

3. Habitat Assessment-Enhancement

We have no plans for habitat assessment or enhancement activities during RY21–RY25.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

None.

Data Recording and Archiving

No changes from reporting period RY16–RY20.

Agreements

None.

Permitting

None.

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