

## **Dall Sheep Management Report and Plan, Game Management Units 24, 25A, 26B, and 26C:**

Report Period 1 July 2011–30 June 2016, and  
Plan Period 1 July 2016–30 June 2021

**Jason R. Caikoski**





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Plan Period 1 July 2016–30 June 2021

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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 website.

This species management report and plan was reviewed and approved for publication by Doreen I Parker McNeill, Region III Management Coordinator for the Division of Wildlife Conservation, Fairbanks.

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## Contents

Purpose of this Report.....	1
I. RY11–RY15 Management Report .....	1
Management Area .....	1
Summary of Status, Trend, Management Activities, and History of Dall Sheep in the Central and Eastern Brooks Range .....	1
Management Direction.....	2
Existing Wildlife Management Plans .....	2
Goals .....	2
Codified Objectives .....	3
Amounts Reasonably Necessary for Subsistence Uses.....	3
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 .....	7
Nonregulatory Management Problems or Needs .....	9
Data Recording and Archiving .....	9
Agreements .....	9
Permitting.....	9
Conclusions and Management Recommendations .....	9
II. Project Review and RY16–RY20 .....	9
Review of Management Direction .....	9
Management Direction .....	9
Goals .....	9
Codified Objectives .....	10
Amounts Reasonably Necessary for Subsistence Uses.....	10
Intensive Management .....	10
Management Objectives .....	10
Review of Management Activities .....	11
1. Population Status and Trend .....	11
2. Mortality–Harvest Monitoring.....	11
3. Habitat Assessment–Enhancement .....	11
Nonregulatory Management Problems or Needs .....	12
Data Recording and Archiving .....	12
Agreements .....	12
Permitting.....	12
References Cited .....	12

## List of Figures

Figure 1. Aerial Dall sheep survey area in western Unit 24A and eastern Unit 25A, Northeast Alaska. ....	4
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## List of Tables

Table 1. Total sheep observed and sheep composition in western Unit 24A and eastern Unit 25A, Northeast Alaska, 2002–2016. ....	6
Table 2. Reported number of hunters and harvest in the central and eastern Brooks Range for Units 23, 24B, 26A (combined), 25A, 26B, and 26C, Northeast Alaska, regulatory years <sup>a</sup> 2011–2015.....	8
Table 3. Reported sheep harvest for registration permit hunt RS595, Northeast Alaska, regulatory years <sup>a</sup> 2011–2015.....	8



## **Purpose of this Report**

This report provides a record of survey and inventory management activities for Dall sheep (*Ovis dalli*) in Units 24, 25A, 26B, and 26C (central and eastern Brooks Range) for the previous 5 regulatory years (RY; RY11–RY15) and plans for survey and inventory management activities in the 5 years following the end of that period (RY16–RY20). A regulatory year begins 1 July and ends 30 June (e.g., RY11 = 1 July 2011–30 June 2012). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts but is also provided to the public to inform them of wildlife management activities. In 2016 the Alaska Department of Fish and Game’s (ADF&G) Division of Wildlife Conservation (DWC) launched this 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 Dall sheep management reports of survey and inventory activities that were previously produced every 3 years and supersedes the 1976 draft Alaska wildlife management plans (ADF&G 1976). Prior to RY12, separate management reports were written for the central Brooks Range and eastern Brooks Range. This report and the RY16–RY20 operational plan combine both report areas.

## **I. RY11–RY15 Management Report**

### **Management Area**

The central Brooks Range comprises portions of Units 23, 24A, 24B, and 26A. It includes the drainages of the upper Noatak, Killik, Chandler, and Koyukuk rivers, encompassing the Schwatka and Endicott mountains. Within western Unit 24, sheep in Gates of the Arctic National Park and Preserve (GAAR) are managed under federal law. Federal subsistence hunting regulations have applied in GAAR since 1991. GAAR lands (11,966 mi<sup>2</sup>) compose 56% of the total area (21,300 mi<sup>2</sup>) in the central Brooks Range report area.

The eastern Brooks Range comprises the portion of Unit 24A within and east of the Dalton Highway corridor management area, Unit 25A, Unit 26B, and Unit 26C (49,600 mi<sup>2</sup>). Major drainages within the eastern Brooks Range include the Bettles, Chandalar, Sheenjek, Coleen, Kongakut, Hulahula, Canning, and Ivishak rivers. Most Dall sheep habitat in Units 25A, 26B, and 26C is within the Arctic National Wildlife Refuge.

### **Summary of Status, Trend, Management Activities, and History of Dall Sheep in the Central and Eastern Brooks Range**

Most Dall sheep surveys conducted within the central Brooks Range occurred within GAAR and varied in size and type. During the early to mid-1970s, the population was thought to be low (Whitten 1997). Surveys conducted during the 1980s and 1990s suggested that the population increased between 1982 and 1984, was stable during 1984 through 1987, and declined dramatically by 1996 (Singer 1984; Whitten 1997; Brubaker and Whitten 1998). During the late 1980s and early 1990s, lamb recruitment was low following several winters of heavy snowfalls.

Prior to expansion of GAAR in 1981, all of Unit 24 and those portions of Units 23 and 26A included in this report were open to general sheep hunting (Lenart 2002). The average annual total harvest (reported and estimated unreported) was 50 rams. The take by Nunamiut hunters (inland Inupiat Eskimos) was unknown but estimated to be  $\leq 50$  per year (Osborne 1996). During the 1980s, hunting regulations for this area changed substantially and general sheep hunting was closed in GAAR (park portions). Harvest in the state general hunt has been low (4–18 rams) since 1992 (Hollis 2011). This was probably partially due to the low density of sheep on state land and because a majority of the best sheep habitat is in GAAR, where hunting is restricted to local residents under federal regulations.

In the eastern Brooks Range, Heimer (1985) estimated there were 13,000 sheep in 1985. In Unit 26C the population subsequently declined by approximately 40% in the Hulahula drainage and similar declines appeared to have occurred in other areas in the eastern Brooks Range. The most likely cause of the decline was severe weather, which reduced recruitment and may have increased predation. Although few surveys have been conducted in most areas, available survey and harvest data and observations by hunters indicate that populations have stabilized at lower levels since the late 1990s (Caikoski 2011, 2014).

Consumptive use of Dall sheep in the eastern Brooks Range increased during the 1980s but subsequently declined as a result of the decline in sheep numbers during the 1990s. However, the opportunity to hunt sheep remains important to resident and nonresident hunters and the eastern Brooks Range has remained a popular area for sheep hunting. Hunter success rates in the eastern Brooks Range have been among the highest anywhere in the state. The number of hunters and harvest of sheep in the eastern Brooks Range has recently accounted for as much as 20% of statewide sheep hunters and 30% of statewide sheep harvest (Caikoski 2011, 2014).

## **Management Direction**

### **EXISTING WILDLIFE MANAGEMENT PLANS**

Direction in the *Alaska Wildlife Management Plans: Arctic Alaska* (ADF&G 1976) has been modified by Alaska Board of Game regulatory actions over the years. Management direction has been documented in the central and eastern Dall sheep management reports of survey and inventory activities.

The plan section of this document outlines future management plans for Dall sheep in the central and eastern Brooks Range during RY16–RY20.

### **GOALS**

During RY11–RY15, the central and eastern Brooks Range Dall sheep management goals were as follows:

- G1. Protect, maintain, and enhance the Dall sheep population and its habitat in concert with other components of the ecosystem.
- G2. Provide for continued general season harvest and subsistence use of Dall sheep.



- G3. Provide an opportunity to hunt Dall sheep under aesthetically pleasing conditions.
- G4. Provide an opportunity to view and photograph Dall sheep.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

- C1. Units 23, 24, 25A, and 26 have a customary and traditional use finding for Dall sheep, as determined by the Alaska Board of Game, with an amounts reasonably necessary for subsistence (ANS) of 75–125 sheep (note that the ANS determination includes units and subunits outside of this report area).

### Intensive Management

None.

## **MANAGEMENT OBJECTIVES**

During RY11–RY15, the central and eastern Brooks Range Dall sheep management objectives were as follows:

- M1. Provide maximum opportunity to hunt Dall 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. Population composition and trend (minimum count/abundance).

#### *Data Needs*

Minimum count population data and composition estimates are used for 2 primary purposes. The first is to inform the public, including hunters, advisory committees, and the board, of the population status and potential trends. The second is for general long-term monitoring of the population.

#### *Methods*

Aerial population composition and trend surveys were conducted in most years in a portion of eastern Unit 24A and western Unit 25A. The 800 mi<sup>2</sup> survey area consists of the drainages south of the North Fork Chandalar River, west of Chandalar Lake, and east of Gates of the Arctic National Park and Preserve (GAAR; Figure 1). Drainages within the survey area include Mathews, Big Spruce, Sheep, Robert, Phoebe, Willow, Geroe, Baby, and Quartz creeks along with portions of the Dalton Highway corridor management area.

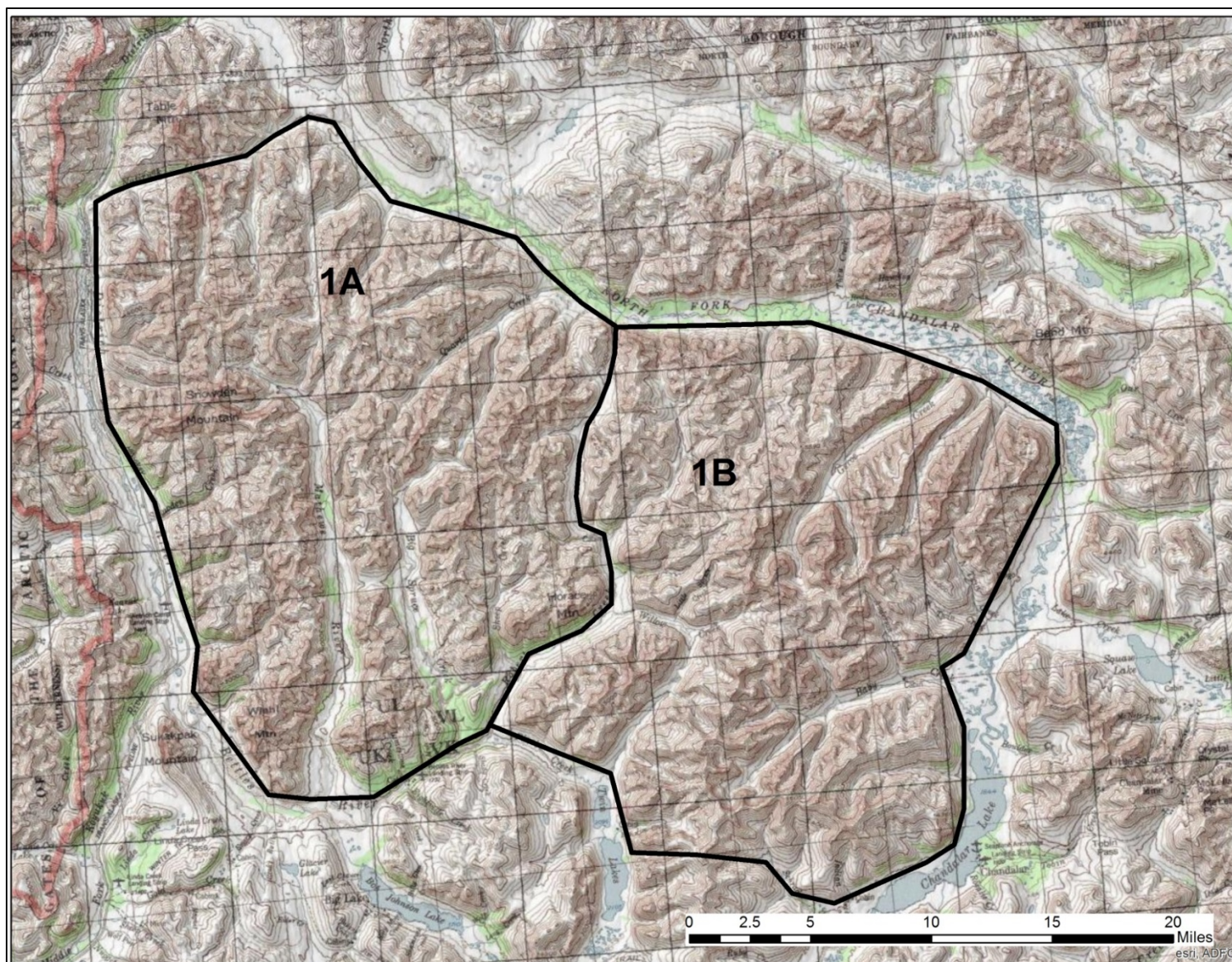


Figure 1. Aerial Dall sheep survey area in western Unit 24A and eastern Unit 25A, Northeast Alaska.

The survey is flown using Piper PA-18 Super Cubs and experienced sheep survey pilots and observers during late June through early August. Typically, elevation contours were flown in all available sheep habitat within the survey area and observed sheep were classified as lamb, ewe-like, or ram. Rams were further classified by horn size as legal for harvest (full curl or larger, including rams with both horns broken) or sublegal. Ewe-like sheep included adult females plus yearlings and 2-year-olds of both sexes that could not be distinguished from ewes. GPS location data are recorded for each group sighting.

## *Results*

### RY11

A population composition and trend survey was not conducted due to poor flying conditions caused by weather.

### RY12

A population composition and trend survey was conducted during 9–12 July 2012 (S. Arthur, Wildlife Biologist, ADF&G, Brooks Range Dall sheep survey memorandum, 10 August 2012, Fairbanks). A total of 1,738 sheep were observed. Composition of observed sheep consisted of 1,153 ewe-likes, 212 lambs, 343 sublegal rams, and 30 legal rams. The lamb:ewe-like ratio was 18 lambs:100 ewe-likes and the percent of legal rams compared to total adult sheep was 2% (Table 1). Total survey time was 20 hours, 54 minutes.

### RY13

A population composition and trend survey was not conducted due to poor flying conditions caused by weather.

### RY14

A population composition and trend survey was conducted during 8–10 July 2014 (J. Caikoski, Wildlife Biologist, ADF&G, central Brooks Range Dall sheep survey memorandum, 28 August 2014, Fairbanks). A total of 827 sheep were observed. Composition of observed sheep consisted of 541 ewe-likes, 13 lambs, 233 sublegal rams, and 40 legal rams. The lamb:ewe-like ratio was 2 lambs:100 ewe-likes and the percent of legal rams compared to total adult sheep was 4.9% (Table 1). Total survey time was 20 hours, 35 minutes.

### RY15

A population composition and trend survey was conducted during 13–14 July 2015 (J. Caikoski, Wildlife Biologist, ADF&G, central Brooks Range Dall sheep survey memorandum, 29 August 2015, Fairbanks). A total of 1,172 sheep were observed. Composition of observed sheep consisted of 656 ewe-likes, 180 lambs, 303 sublegal rams, and 32 legal rams (Table 1). The lamb:ewe-like ratio was 27 lambs:100 ewe-likes and the percent of legal rams compared to total adult sheep was 3.2% (Table 1). Total survey time was 18 hours, 56 minutes.

## RY16 (outside of report period)

A population composition and trend survey was conducted during 23–24 July 2016 (J. Caikoski, Wildlife Biologist, ADF&G, central Brooks Range Dall sheep survey memorandum, 24 October 2016, Fairbanks). A total of 1,396 sheep were observed. Composition of observed sheep consisted of 815 ewe-likes, 175 lambs, 338 sublegal rams, and 66 legal rams (Table 1). The lamb:ewe-like ratio was 24 lambs:100 ewe-likes, and the percent of legal rams compared to total adult sheep was 5.4% (Table 1). Total survey time was 15 hours, 35 minutes.

**Table 1. Total sheep observed and sheep composition in western Unit 24A and eastern Unit 25A, Northeast Alaska, 2002–2016.**

Year	Total sheep	“Ewe-likes” <sup>a</sup>	Lambs	Sublegal rams	Legal rams	Unknown rams	Lamb:100 ewe-likes <sup>a</sup>	% Legal rams <sup>b</sup>	Survey time (hr:min)
2002	1,539	884	221	380	50	4	25	3.8	14:05
2003	989	621	114	207	34	13	18	3.9	11:32
2004	1,460	908	180	320	43	9	20	3.4	16:41
2005	1,099	636	214	203	42	4	34	4.8	15:10
2006	1,517	857	224	313	46	77	26	3.8	17:30
2007	1,310	779	332	152	47	0	43	4.8	18:07
2009	1,535	911	295	298	31	0	32	2.5	21:38
2012	1,738	1,153	212	343	30	0	18	2.0	20:54
2014	827	541	13	233	40	0	2	4.9	20:35
2015	1,172	656	180	303	32	1	27	3.2	18:56
Mean <sup>c</sup>	1,319	795	199	275	40	11	25	3.5	17:30
2016	1,396	815	175	338	66	2	24	5.4	15:35

<sup>a</sup> Ewe-likes include adult female sheep, yearlings of both sexes, and some 2-year-old rams.

<sup>b</sup> Percent legal rams is the proportion of legal rams compared to total adult population.

<sup>c</sup> Mean is for years 2002–2015.

## *Discussion*

Population size for the eastern Brooks Range is unknown. However, we use count data of the total sheep observed during aerial surveys conducted in the upper Chandalar–upper Bettles drainages as an index to trend in abundance and composition over time for this geographic area. These surveys do not estimate abundance, survey specific detection rates (sightability correction), or account for emigration and immigration between survey years. Therefore, detecting small or moderate changes in population size or composition is not possible. However, dramatic changes in sheep abundance and composition compared to the long-term observations are likely detectable.

A survey conducted in 2014 indicated that total sheep abundance declined compared to the previous survey conducted in 2012 and the long-term mean, likely as a result of decreased ewe survival and poor lamb productivity and survival (Table 1). Surveys in 2015 and 2016 suggest that sheep numbers recovered to levels similar to what has been observed since 2002 (Table 1).



### *Recommendations for Activity 1.1*

Continue.

- Utilize memos to archive details of future surveys to reduce detail in methods and results sections of management reports.

## 2. Mortality–Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor and analyze harvest data.

### *Data Needs*

Harvest data are necessary to determine whether the management objective is achieved.

### *Methods*

We estimated total hunters, harvest, and success rates from general season and registration harvest reports that hunters are required to submit. Harvest data are stored and summarized from the database housed on ADF&G's Wildlife Information Network (WinfoNet) server (<https://winfonet.alaska.gov/index.cfm>).

### *Results and Discussion*

Total general season hunters and harvest declined during RY11–RY15 across all of the report area from 573 hunters who harvested 258 sheep in RY11 to 235 hunters who harvested 114 sheep in RY15 (Table 2). The decline in the number of hunters and harvest was observed for all subunits within the report area (Table 2). Success rates remained high and stable during RY11–RY15 and ranged 41–49%.

Participation and harvest by hunters using registration permit RS595 was low during RY11–RY15. An average of 6 hunters (range = 4–9) harvested 3 sheep (range = 0–7) annually (Table 3). Most sheep harvested were rams.

Limited survey data and reports from hunters and guides suggest a significant decline in sheep abundance including a near complete failure of lamb recruitment occurred in 2013 and 2014 across the eastern Brooks Range. Although the magnitude and extent of the decline cannot be quantified due to limited survey data, a decline in the number of hunters and harvest likely reflect fewer total sheep.

### *Recommendations for Activity 2.1*

Continue.

## 3. Habitat Assessment–Enhancement

None.

**Table 2. Reported number of hunters and harvest in the central and eastern Brooks Range for Units 23, 24B, 26A (combined), 25A, 26B, and 26C, Northeast Alaska, regulatory years<sup>a</sup> 2011–2015.**

Regulatory year	Unit												
	23, 24B, 26A		24A		25A		26B		26C		Totals across all units		
	Hunters	Harvest	Hunters	Harvest	Hunters	Harvest	Hunters	Harvest	Hunters	Harvest	Hunters	Harvest	% Success
2011	26	11	58	16	155	89	183	55	151	87	573	258	45
2012	26	9	48	17	132	62	192	64	145	72	543	224	41
2013	23	2	52	17	139	67	176	35	156	78	407	199	49
2014	22	4	56	16	118	44	140	31	138	65	356	160	45
2015	12	3	47	10	101	40	84	16	92	45	235	114	49

<sup>a</sup> Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

**Table 3. Reported sheep harvest for registration permit hunt RS595, Northeast Alaska, regulatory years<sup>a</sup> 2011–2015.**

Regulatory year	Number of permits issued	Number reported hunted	Ram harvest	Ewe harvest
2011	16	7	3	0
2012	12	6	2	0
2013	8	4	4	0
2014	13	4	0	0
2015	18	9	5	2

<sup>a</sup> Regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

No nonregulatory management problems or needs were identified 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.
- All hard copy data sheets, paper files, etc. are found in the file cabinet in the NEAK area offices in Fairbanks.

### Agreements

None.

### Permitting

None.

## **CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS**

The codified objective for ANS was met because at least 75–125 sheep were available for customary and traditional uses. The management objectives to provide maximum opportunity to hunt sheep and provide opportunity for hunters to harvest mature rams during a general hunting season were met because the general full-curl season occurred in all years.

## **II. Project Review and RY16–RY20**

### **Review of Management Direction**

#### **MANAGEMENT DIRECTION**

There are no major changes in management direction for Units 24, 25A, 26B, or 26C. Management will focus on monitoring annual harvest data and conducting limited aerial surveys to ensure goals and objectives are met.

#### **GOALS**

The RY11–RY15 management goals G1 and G2 for the central and eastern Brooks Range were generally appropriate; however, these goals will be altered slightly for the next reporting period to reflect a management directive to provide the greatest sustainable sheep hunting opportunity recognizing that sheep abundance naturally fluctuates as a result of weather, habitat quality, and predation which can affect recruitment and survival. Goal G3 which provides for aesthetically pleasing hunting conditions was removed because this is a human value and should be addressed by the public and Board of Game. Goal G4 which provides an opportunity to view and

photograph sheep was removed because this is provided for year-round regardless of seasons and bag limits or surveys conducted by the department. The RY16–RY20 goals are as follows:

- G1. Maintain a harvestable population of Dall sheep fluctuating within the known historical limits of abundance.
- G2. Provide the greatest sustainable opportunity to participate in hunting Dall sheep, annually.

## **CODIFIED OBJECTIVES**

### Amounts Reasonably Necessary for Subsistence Uses

- C1. Units 23, 24, 25A, and 26: 75–125 sheep (note that the ANS determination includes units outside of this report area).

### Intensive Management

None.

## **MANAGEMENT OBJECTIVES**

The RY11–RY15 management objectives were to provide for maximum opportunity to hunt sheep. This management objective was removed because it is a goal and not a measureable objective. The management objectives for RY16–RY20 reflect the primary purposes for conducting composition and trend count surveys in the upper Chandalar drainage. In addition, a management objective to monitor annual success rate was added as an additional metric to evaluate trends in sheep abundance, particularly for rams legal for harvest under the full-curl regulation. It is based on the premise that success rate would decline when the abundance of legal rams decreases. Based on the assumption that the full-curl harvest strategy allows for sustained hunter opportunity and harvest, regardless of sheep abundance, this operational plan has no management objective for population size or composition.

- M1. Inform the public, advisory committees, and the Board of Game of the population composition, status, and trend in the upper Chandalar drainage survey area.
- M2. Maintain an annual sheep hunting success rate of  $\geq 35\%$ .

Below are the criteria we will use to determine whether management objectives were met during RY16–RY20:

- M1. Considered to be met if a survey is conducted and the public, advisory committees, or Board of Game are informed of the results.
- M2. Considered to be met if an annual success rate of  $\geq 35\%$  is observed in the harvest data. If 2 consecutive years of success rates fall below 35% then additional evaluation of sheep management in the area may be warranted.



## **REVIEW OF MANAGEMENT ACTIVITIES**

### **1. Population Status and Trend**

ACTIVITY 1. Population composition and trend. (objective M1)

#### *Data Needs*

No change from prior reporting period. Minimum count population composition and trend count data will be used to 1) inform the public, advisory committees and the Board of Game of population status and trends, and 2) for general long-term monitoring of the population.

#### *Methods*

An aerial population composition and trend survey will be conducted in a portion of eastern Unit 24A and western Unit 25A. The 800 mi<sup>2</sup> survey area consists of the drainages south of the North Fork Chandalar River, west of Chandalar Lake, and east of Gates of the Arctic National Park and Preserve (GAAR; Figure 1). Drainages within the survey area include Mathews, Big Spruce, Sheep, Robert, Phoebe, Willow, Geroe, Baby, and Quartz creeks along with portions of the Dalton Highway corridor management area.

The survey is flown using Piper PA-18 Super Cubs and experienced sheep survey pilots and observers during late June through early August. Typically, elevation contours are flown in all available sheep habitat within the survey area and observed sheep are classified as lamb, ewe-like, or ram. Rams are further classified by horn size as legal for harvest (full curl or larger, including rams with both horns broken) or sublegal. Ewe-like sheep included adult females plus yearlings and 2-year-olds of both sexes that could not be distinguished from ewes. GPS location data are recorded for each group sighting.

### **2. Mortality–Harvest Monitoring**

ACTIVITY 2. Monitor and analyze harvest data. (objective M2)

#### *Data Needs*

Total annual sheep hunters and harvest are necessary to assess whether the management objective is achieved. Harvest data will be analyzed from the database accessible through WinfoNet.

#### *Methods*

Annual hunter success rate will be calculated from reported harvest as the number of successful sheep hunters/total sheep hunters.

### **3. Habitat Assessment–Enhancement**

None.

## NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No nonregulatory management problems or needs are identified for the RY16–RY20 reporting period.

### Data Recording and Archiving

#### RECORDING

- Dall sheep survey form (archived in the WinfoNet Data Archive. Project Title: NEAK Sheep. Primary Region: Region III.
- ArcGIS version 10.3 (store and analyze spatial data).

#### ARCHIVING

- Harvest data will be stored on an internal database housed on ADF&G's Wildlife Information Network (WinfoNet) server (<https://winfonet.alaska.gov/index.cfm>) and archived in WinfoNet under Harvest Information.
- All electronic files such as survey memos, reports, survey data, and maps will be located on the Fairbanks server. All hard copy data sheets, paper files, etc. will be stored in the file cabinets located in the area biologist's office.
- In addition, electronic copies of survey memos, survey data, and maps will be stored in the WinfoNet Data Archive. Project Title: NEAK Sheep. Primary Region: Region III.

### Agreements

None.

### Permitting

None.

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