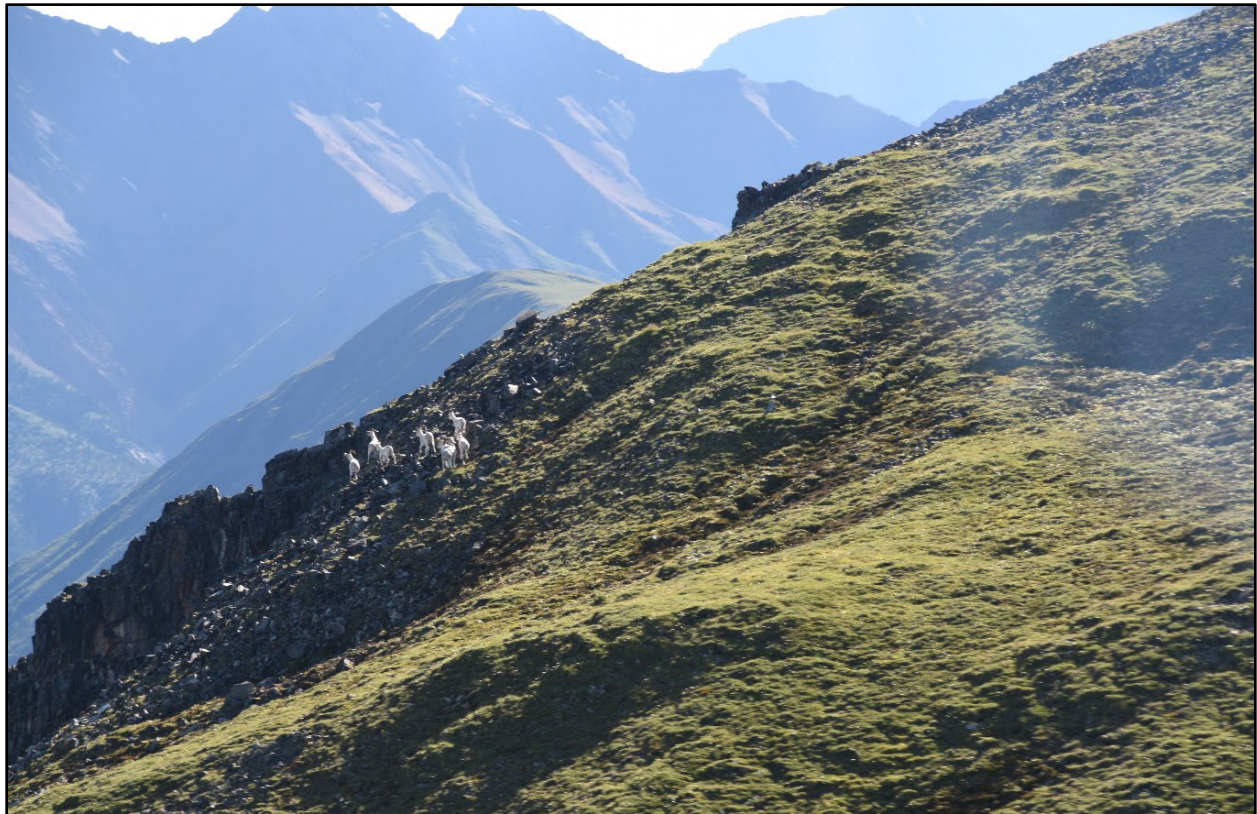


## **Dall Sheep Management Report and Plan, Game Management Unit 12, Mentasta, Nutzotin, and Northern Wrangell Mountains:**

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

**Jeffrey J. Wells**



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

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

Species management reports and plans are available via the Alaska Department of Fish and Game's public website ([www.adfg.alaska.gov](http://www.adfg.alaska.gov)) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: [dfg.dwc.publications@alaska.gov](mailto:dfg.dwc.publications@alaska.gov). The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services ([www.arlis.org](http://www.arlis.org)). To subscribe to email announcements regarding new technical publications from the Alaska Department of Fish and Game, Division of Wildlife Conservation please use the following link: <http://list.state.ak.us/mailman/listinfo/adfgwildlifereport>.

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**Cover Photo:** Dall sheep rams observed during an aerial survey within the Mentasta, Nutzotin, and northern Wrangell mountains. ©2017 ADF&G. Photo by Jeff Wells.

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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 12 (Mentasta, Nutzotin, and Wrangell Mountains) .....	1
Management Direction.....	3
Existing Wildlife Management Plans .....	3
Goals .....	3
Codified Objectives .....	3
Amounts Reasonably Necessary for Subsistence Uses .....	3
Intensive Management .....	3
Management Objectives.....	3
Management Activities .....	4
1. Population Status and Trend .....	4
2. Mortality-Harvest Monitoring and Regulations.....	8
3. Habitat Assessment-Enhancement.....	12
Nonregulatory Management Problems or Needs .....	12
Data Recording and Archiving .....	12
Agreements .....	12
Permitting.....	12
Conclusions and Management Recommendations .....	12
II. Project Review and RY21–RY25 Plan .....	13
Review of Management Direction .....	13
Management Direction.....	13
Goals .....	13
Codified Objectives .....	13
Amounts Reasonably Necessary for Subsistence Uses .....	13
Intensive Management .....	13
Management Objectives.....	14
Review of Management Activities.....	14
1. Population Status and Trend .....	14
2. Mortality-Harvest Monitoring .....	14
3. Habitat Assessment-Enhancement.....	14
Nonregulatory Management Problems or Needs .....	15
Data Recording and Archiving .....	15
Agreements .....	15
Permitting.....	15
References Cited .....	15

## List of Figures

Figure 1. Aerial Dall sheep survey units within the Mentasta, Nutzotin, and northern Wrangell mountains, Interior Alaska, regulatory years 2016–2020. ....	2
Figure 2. Reported annual Dall sheep ram state harvest during regulatory years 1991–2020 within the Unit 12 portion of the Mentasta, Nutzotin, and northern Wrangell Mountains, Interior Alaska. ....	11

## List of Tables

Table 1. Dall sheep aerial composition counts within the Mentasta, Nutzotin, and northern Wrangell mountains, Interior Alaska, summers 2016–2020. ....	7
Table 2. Dall sheep hunter residency and success, Unit 12, Interior Alaska, regulatory years 2016–2020. ....	10
Table 3. Dall sheep harvest, Unit 12, Interior Alaska, regulatory years 2016–2020. ....	11

## List of Appendices

Appendix A. Aerial Dall sheep survey form for surveys conducted within the Mentasta, Nutzotin, and northern Wrangell mountains, Interior Alaska, during 2016–2020. ....	17
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## **Purpose of this Report**

This report provides a record of survey and inventory management activities for Dall sheep (*Ovis dalli*) in portions of Game Management Unit 12 (Mentasta, Nutzotin, and northern Wrangell Mountains) during the 5 regulatory years 2016–2020, along with plans for the next 5 regulatory years 2021–2025. A regulatory year (RY) begins on 1 July and ends on 30 June (e.g., RY16 = 1 July 2016–30 June 2017). This report is primarily produced to provide agency staff with data and analysis to help guide and record agency efforts. It is also made available to the public to inform them about wildlife management activities. The Alaska Department of Fish and Game’s (ADF&G, the department) Division of Wildlife Conservation (DWC, the division) publishes these reports on a 5-year cycle to document trends and describe potential changes in data collection activities for Dall sheep.

## **I. RY16–RY20 Management Report**

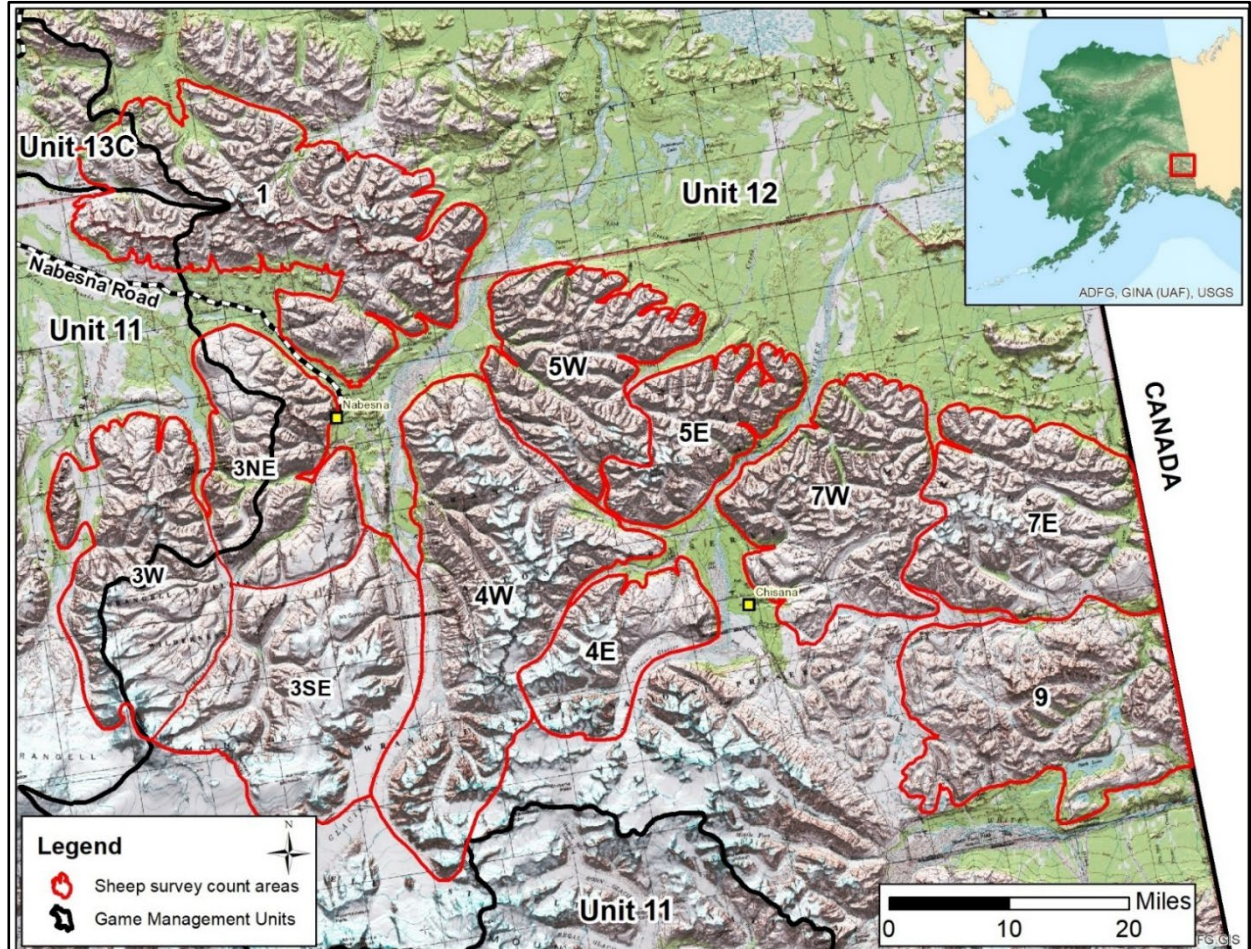
### **Management Area**

The Mentasta, Nutzotin, and northern Wrangell (MNW) mountains encompass approximately 4,500 mi<sup>2</sup> of sheep habitat in east-central Alaska and are centered on approximately lat 62°6'N and long 142°7'W. The management area is generally bounded by the U.S.-Canada border to the east, the Tetlin flats to the north, and the Unit 12 boundary to the south and west (although count areas 1 and 3 include portions of Units 11 and 13C; Fig. 1). Most of the area is within Wrangell-St. Elias National Park and Preserve, although portions of the area are owned by the Tetlin National Wildlife Refuge, the State of Alaska, and Tetlin Native Corporation. Major drainages within the area include the Chisana, Nabesna, and White rivers. Elevations range from 2,000 feet in the lowland areas to >8,000 feet at the highest peaks. Tree line varies but typically occurs at 3,000–4,000 feet. Lowland areas are dominated by spruce forest, and higher elevations are dominated by shrub communities, subalpine and alpine tundra, and large swaths of glaciated areas. 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.

### **Summary of Status, Trend, Management Activities, and History of Dall Sheep in Unit 12 (Mentasta, Nutzotin, and Wrangell Mountains)**

The abundance of Dall sheep and the relative size of the ram component of the population have driven the management strategy for the MNW Dall sheep population since the 1970s. Dall sheep in the MNW mountains live at relatively high densities, mostly in rugged, glaciated habitats. Although Dall sheep are generally relatively abundant for the area, rams in the MNW sheep population have horns that are smaller than average compared to other sheep populations in Alaska. In a study that compared horn growth qualities of Dall sheep rams inhabiting 18 areas within 7 mountain ranges in Alaska, rams in the MNW mountains had the fourteenth highest quality index value, which was based on a variety of factors including horn volume, maximum sustained growth, and diameter of curl (Heimer and Smith 1975). Based upon the relative

abundance of sheep and smaller-than-average horn size, the management strategy for this area since the mid-1970s has been to provide the greatest opportunity to participate in hunting sheep (Kelleyhouse and Heimer 1989). Additional information on the early history of the MNW sheep population can be found in Kelleyhouse and Heimer (1989).



Produced by ADF&G, 2022 using ArcGIS™ software (Esri, Redlands, California); base map source: ADFG, GINA (UAF), USGS, ADFG GIS.  
**Figure 1. Aerial Dall sheep survey units within the Mentasta, Nutzotin, and northern Wrangell mountains, Interior Alaska, regulatory years 2016–2020.**

Periodic aerial sheep surveys within portions of the MNW mountains began in 1949, conducted by the U.S. Fish and Wildlife Service and National Park Service (NPS), when 34 sheep count areas (CAs) were designated within the Wrangell Mountains (11 of the CAs include portions of the MNW mountains; Fig. 1). Since statehood in 1959, ADF&G has also conducted periodic aerial sheep surveys. The most recent comprehensive single-year survey of the MNW mountains took place in 1981, when approximately 7,600 sheep were observed (CA 1 was not surveyed and CA 3 included the Unit 12 portion only; unpublished data, ADF&G, Tok, Alaska). Since then, periodic surveys have continued for the CAs included within the MNW mountains, with more surveys conducted during the 2010s compared to the prior decades. Terwilliger (2005) summarized the 1949–2002 survey data and described the population trend as generally stable, and survey data collected during 2003–2015 also suggested a generally stable trend within areas that were surveyed more than 2 times.

State sheep harvest within the Unit 12 portion of the MNW mountains has been limited to rams with full-curl or larger horns and a 6-week season (10 August–20 September) since RY84. The total number of sheep hunters has varied from a high of nearly 500 in the early 1990s to a low of approximately 250 during the early 2010s. Ram harvest has varied similarly, with harvest numbers in the upper 60s and low 70s in the early 2010s, compared to a high near 275 sheep in the early 1990s.

## **Management Direction**

### **EXISTING WILDLIFE MANAGEMENT PLANS**

Direction in the *Alaska Wildlife Management Plans: Interior Alaska* (ADF&G 1976) has been reviewed and modified through public comments, department recommendations, and Alaska Board of Game actions over the years. A record of these changes can be found in the MNW Dall sheep species management reports.

### **GOALS**

During RY16–RY20, the MNW Dall sheep management goals were as follows:

- G1. Maintain a harvestable population of Dall sheep that fluctuates within historical limits of abundance and the carrying capacity of their habitat.
- G2. Provide the greatest level of sustainable annual opportunity to participate in hunting Dall sheep.

### **CODIFIED OBJECTIVES**

#### Amounts Reasonably Necessary for Subsistence Uses

The Alaska Board of Game has not made a customary and traditional use finding for the MNW Dall sheep population.

#### Intensive Management

The MNW sheep population has not been identified as an intensive management population by the Board of Game.

### **MANAGEMENT OBJECTIVES**

During RY16–RY20, there was one management objective for the MNW Dall sheep population:

- M1. Maintain an average horn size on 8-year-old harvested rams of  $\geq 34$  inches.

## 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 used for two primary purposes. The first is an estimate of the harvestable surplus to evaluate management goal G1. Secondly, the survey data is essential for general long-term monitoring of the population and to inform the public—including hunters, advisory committees, and the Board of Game—of the population status and potential trends.

#### *Methods*

ADF&G biologists conducted aerial population abundance (minimum count) and composition surveys in portions of the MNW mountains during RY16–RY20 within sheep CAs originally delineated in 1949 (Fig. 1). Beginning in RY14, we focused survey efforts within CAs 1 and 9 by alternating between these CAs every other year (when funds were available) and surveying the remaining CAs as time and funding allowed. All surveys were flown in Piper PA-18 Super Cubs during mid-June through early August, when snow cover in the alpine is typically at or near its lowest level (outside of the hunting season). Surveys were usually conducted in the early morning or late evening to avoid turbulence and were not conducted when cloud cover obscured portions of sheep habitat.

Survey crews consisted of a pilot and an observer seated behind the pilot. All the pilots were experienced with Dall sheep surveys, while observer experience levels varied. The flight path technique varied by pilot-observer team; 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 count area and to observe as many of the sheep within the unit as possible. When we observed sheep, we recorded the group size, location (latitude and longitude), 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 (Appendix A). We took photographs (using a Nikon D810) of some of the groups to aid in determining the overall number and composition. No sightability correction factor was estimated during the RY16–RY20 surveys; therefore, the total number of sheep observed represents a minimum count estimate.

In addition to the minimum count surveys we conducted, NPS conducted minimum count and distance sampling surveys within portions of the MNW mountains during RY16–RY20.

#### 2016

We conducted aerial surveys in CA 9 on 15–16 June and CA 1 on 15 and 27 July. Survey conditions on all days were good to excellent, with clear skies to partial cloud cover and light winds. Despite the survey within CA 9 taking place earlier in the season than normal, little snow

remained within the area except on portions surrounding Wiki Peak, and primarily on the north-facing slopes. Poor weather conditions within CA 1 between 15 and 27 July prevented a quicker completion of the survey. Although sheep movement between the areas surveyed on 15 versus 27 July is possible, the area surveyed on 15 July was bounded by drainages where few sheep are typically located, which hopefully reduced the chances of sheep being either double-counted or missed. The CA 9 survey was paid for by a local hunting guide, although the survey was conducted by a contract pilot experienced with sheep surveys and an ADF&G observer. The remainder of the surveys were paid for by ADF&G. The total flight and survey times for CA 9 were 8.9 and 5.1 hours, respectively, and for CA 1 the times were 14.9 and 12.1 hours, respectively.

In addition, NPS completed a survey of CA 5E on 29 July. Survey conditions were excellent with partial cloud cover and light winds, and total survey time was approximately 3.8 hours (J. A. Putera, Wildlife Biologist, Glennallen, NPS, personal communication, 2017). NPS also conducted an aerial survey using distance sampling following specified transects within CAs 3 and 4W on 19 and 27 July (Rattenbury et al. 2018).

## 2017

We conducted aerial surveys in CA 9 on 19 July and CA 3 on 22–23 July. The CA 3 survey was completed through a cooperative effort between the Tok and Glennallen ADF&G offices. Survey conditions within CA 9 were excellent with clear skies and light winds, although the low sun angle created difficult search conditions in some areas during the early portion of the survey. Very little snow remained within the survey area. Due to a miscommunication between the 2 survey planes, a small portion north of Francis Creek was missed during the survey (16 sheep were located within this area during the 2016 survey). Survey conditions within CA 3 were generally excellent with light winds and clear skies, although winds picked up slightly for the last half hour of the survey on the second day. Very little snow remained within the survey area. The total flight and survey times for CA 9 were 11.4 and 5.9 hours, respectively, and for CA 3 were 24.3 and 18.8 hours, respectively.

In addition, NPS completed a survey of CA 7E on 6 August. Survey conditions were good with light winds and partial cloud cover, but with a high level of light intensity. The total survey time was 4.3 hours (J. A. Putera, Wildlife Biologist, Glennallen, NPS, personal communication, 2017).

## 2018

We conducted an aerial survey in CA 1 on 18 July. Survey conditions were excellent with light winds and clear to partly cloudy skies. There was a dusting of fresh snow above ~5000 feet, but this fresh snow melted by mid-morning. Snow from the previous winter remained within portions of the survey area, especially on north-facing slopes, and survey crews observed that the snow coverage seemed greater than average. Total flight and survey times were 16.9 and 14.0 hours, respectively.

In addition, NPS completed a survey of CA 7W on 31 July and 1 August. Survey conditions were excellent: weather conditions ranged from overcast to clear skies and winds were calm. Snow cover was estimated to be about average (J. A. Putera, Wildlife Biologist, Glennallen, NPS, personal communication, 2018). NPS also conducted an aerial survey using distance

sampling following specified transects within CAs 3 and 4W during 18–20 July (MacCluskie 2018).

## 2019

We conducted an aerial survey in CA 9 on 31 July. Survey conditions were excellent with clear to partly cloudy skies and light winds. Very little snow remained within the survey area, although a slight dusting from 30 July remained in limited areas at high altitudes. Total flight and survey times were 10.5 and 5.4 hours, respectively.

NPS conducted an aerial survey using distance sampling following specified transects within CAs 3 and 4W during 19–21 July (Deacy 2019).

## 2020

Due to reduced budgets, we did not conduct any sheep surveys within the MNW mountains. NPS conducted an aerial survey using distance sampling following specified transects within CAs 3 and 4W during 18–23 July (Deacy and Schertz 2020).

### *Results and Discussion*

The sheep population trend within the MNW mountains specific to this reporting period is difficult to assess because few count areas were surveyed more than 1 time during the 5-year period. However, within the areas surveyed more than 1 time, the apparent population trends varied from slightly decreasing to slightly increasing. Within CA 1, 19% fewer sheep were observed during 2018 compared to 2016, and the lamb-to-ewe ratio of 10:100 during 2018 was much lower than the long-term average (Table 1). Conversely, the estimated number of sheep within CAs 3 and 4W, which were surveyed by NPS during 2016 and 2017–2020, was relatively stable. In further contrast, 38% more sheep were observed in CA 9 in 2019 compared to 2016, and the number of sheep observed in 2019 was the second highest number since the first entire survey of CA 9 in 1962. The high number of sheep observed during the 2019 survey of CA 9 was likely in part due to high lamb numbers during the preceding years, particularly during 2015–2017 (no survey was conducted in 2018), when lamb-to-ewe ratios were all >40:100 (Table 1; 2016–2017). Although the number of sheep observed during minimum count surveys provides a relative index to population trend, caution must be used when interpreting these trends because factors such as sheep movements and sightability are typically not accounted for during minimum count surveys.

The management goal to maintain a harvestable population of Dall sheep, fluctuating within historical limits of abundance and the carrying capacity of their habitat, was likely met during RY16–RY20. The total number of sheep observed in all CAs surveyed during RY16–RY20 fell within the bounds of what was observed during past surveys. This means the population was likely within the historical limits of abundance, in addition to likely remaining within the carrying capacity of their habitat, although we did not specifically collect information to assess carrying capacity during this reporting period.

### *Recommendations for Activity 1.1.*

Continue.

**Table 1. Dall sheep aerial composition counts within the Mentasta, Nutzotin, and northern Wrangell mountains, Interior Alaska, summers 2016–2020.**

Count area	Year	Legal rams <sup>a</sup>	Sublegal rams <sup>b</sup>	Total rams	Ewes <sup>c</sup>	Lambs	Unknown sheep	Total without rams	Total sheep	Legal rams: 100 ewes	Sublegal rams: 100 ewes	Total rams: 100 ewes	Lambs: 100 ewes	Lambs % of total
1	2016	54	228	282	555	123	0	678	960	10	44	54	22	13
	2018	37	205	242	492	50	0	542	784	7	42	49	10	6
3 <sup>d</sup>	2017	80	501	581	1386	490	0	1876	2457	6	36	42	35	20
3NE	2017	19	139	158	462	143	0	605	763	4	30	34	31	19
3W	2017	27	152	179	424	129	0	553	732	6	36	42	30	18
3SE	2017	34	210	244	500	218	0	718	962	7	42	49	44	23
5E	2016 <sup>e</sup>	22	88	110	183	54	0	237	347	12	48	60	30	16
7W	2018 <sup>e</sup>	24	114	138	343	69	1	412	551	7	33	40	20	13
7E	2017 <sup>e</sup>	24	95	119	154	68	0	222	341	16	62	77	44	20
9	2016	19	142	161	375	152	0	527	688	5	38	43	41	22
	2017	28	130	158	475	206	0	681	839	6	27	33	43	24
	2019	19	238	257	543	148	0	691	948	3	44	47	27	16

<sup>a</sup> Legal rams were rams with full curl or larger horns.

<sup>b</sup> Sublegal rams were rams with greater than ¼-curl but less than full-curl horns.

<sup>c</sup> The ewe classification also includes yearlings of both sexes and rams of ¼-curl or smaller horns.

<sup>d</sup> Count area 3 was composed of sub-count areas 3NE, 3W, and 3SE.

<sup>e</sup> Survey was conducted by the National Park Service.

## 2. Mortality-Harvest Monitoring and Regulations

### ACTIVITY 2.1. Monitor and analyze harvest data (Objective M1).

#### *Data Needs*

Harvest data are necessary to determine the average horn size of harvested rams and ascertain whether the management objective was achieved.

#### *Methods*

Annual harvest is estimated from mandatory harvest report cards and through the mandatory horn sealing process. Successful hunters are required to have sheep horns sealed at an ADF&G office within 30 days after the date of kill. During the sealing process, a uniquely numbered aluminum plug is placed in the horn, the sheep's age is estimated, horn measurements are collected (including total length and base circumference), and a broken determination is made (both, 1, or neither horns broken). 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 reports are not received, the department sends reminder emails and letters to hunters who provided contact information.

For the Unit 12 federal elder sheep hunt (permit FS1201), the number of federally qualified subsistence hunters and reported harvest was obtained from NPS staff. Rams harvested under the FS1201 permit are not required to be sealed; therefore, horn and age data were not available for these sheep.

#### *Season and Bag Limit*

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

The Unit 12 federal subsistence elder sheep hunt (permit FS1201) was open to federally qualified subsistence hunters aged 60 or older within the Unit 12 portion of Wrangell-St. Elias National Park and Preserve. The bag limit for this hunt was the same as the state hunts described above, and the season dates were 1 August–20 October.

#### *Results and Discussion*

##### Harvest by Hunters

Reported state harvest during RY16–RY20 averaged 120 rams per year (range 96–137; Table 2), of which an average of 3 (range 2–6) were harvested during the youth hunt portion of the season. In addition, a total of 3 rams were harvested under the federal FS1201 permit (Table 2). The average annual state harvest during this reporting period was greater than the RY11–RY15 and

RY06–RY10 annual averages of 84 and 109, respectively. Ram harvests under state seasons have fluctuated in the past with patterns of increases and decreases, but in general, the harvest has declined since RY91 (Fig. 2), and to a lesser degree the number of hunters has also decreased, even though state seasons and bag limits have stayed the same (except for the addition of the youth season in RY16).

Average horn length, the proportion of rams with large horns ( $\geq 40$  inches), and the average age of harvested rams increased during RY16–RY20 compared to the prior reporting period, while the proportion of sublegal rams decreased. Mean horn length was 35.0 inches (Table 3) compared to 34.7 inches during RY11–RY15. Mean horn length on 8-year-old rams was 34.9 inches, which met the management objective to maintain an average horn size on 8-year-old rams of  $\geq 34$  inches. The proportion of harvested rams with horns  $\geq 40$  inches was 2.9% during RY16–RY20, which is over twice the proportion during the previous reporting period (1.2%) and is the highest proportion during any 5-year reporting period over the past 30 years. The average age of harvested rams was 8.5-years old (Table 3) compared to 7.8-years old during the prior reporting period. Similarly, the proportion of harvested rams aged 10-years or older was 25% during RY16–RY20 compared to 12% during the previous reporting period. Last, the proportion of harvested rams that were sublegal during RY16–RY20 was 2.5%, which is much lower than the previous 5-year proportion of 7.2%.

#### Hunter Residency and Success

Mean annual success rate during RY16–RY20 was 34% (Table 2), which is similar to the RY11–RY15 and RY06–RY10 mean annual success rates of 32% and 36%, respectively. Nonresident annual success rates averaged 64% compared to the annual average resident success rate of 30%.

The average number of hunters per year during RY16–RY20 was 354, which is greater than the previous 5-year annual average of 263 hunters and is the greatest annual average number of hunters in a 5-year period since RY91–RY95. Nonresidents composed 10% of the hunters and took 19% of the sheep harvested during RY16–RY20.

#### Harvest Chronology

Similar to prior reporting periods, most of the harvest during RY16–RY20 occurred during the first (43%) and second (16%) weeks of the general season.

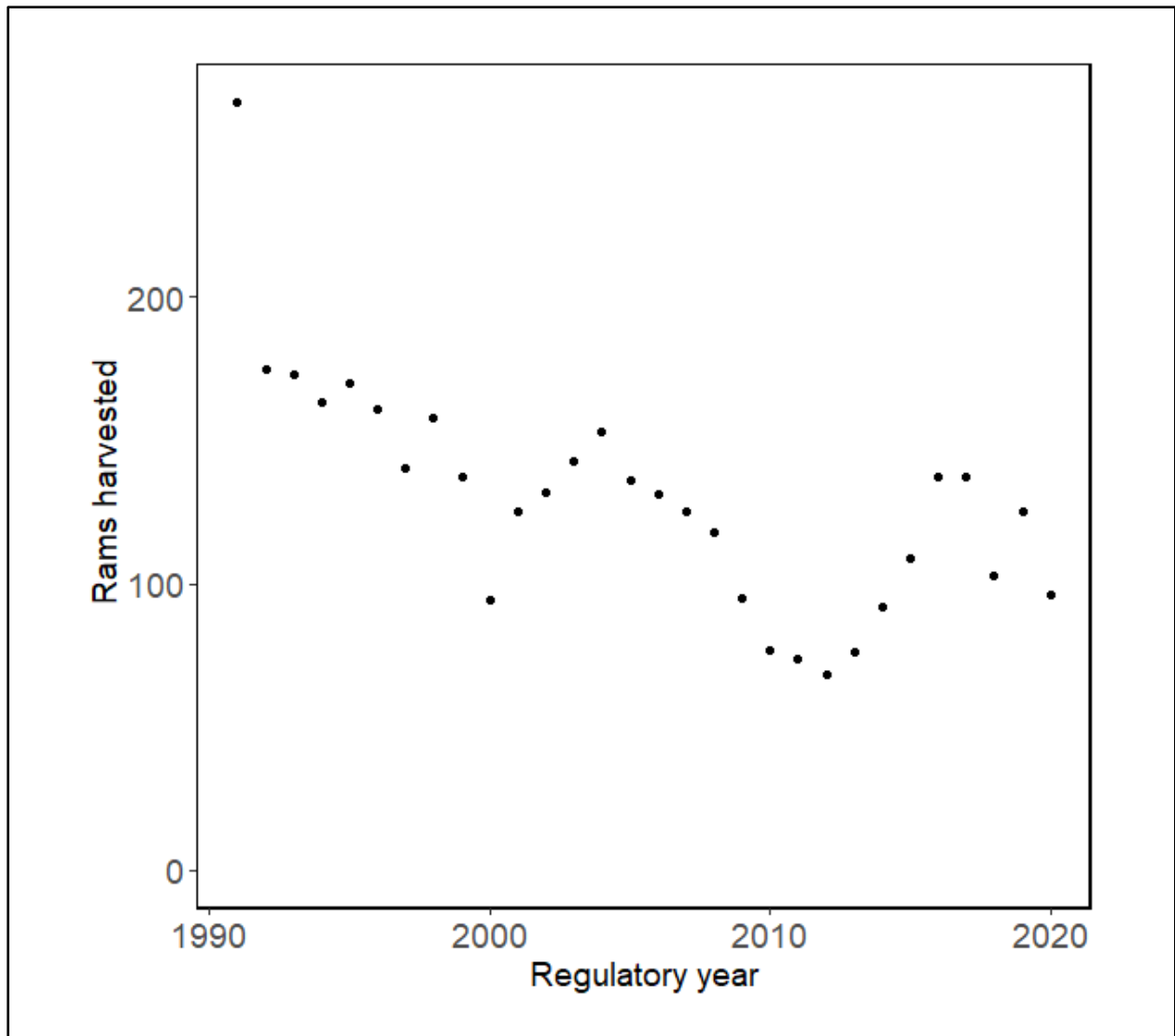
#### Transport Methods

Similar to prior reporting periods, the type of transportation used by most successful hunters during RY16–RY20 was airplanes (49%) followed by highway vehicles (18%) and 4-wheelers (13%). The largest change in transportation use for successful hunters compared to previous reporting periods was the use of horses, which composed 4% of the transportation used by successful hunters during RY16–RY20 compared to 13% and 22% during RY11–RY15 and RY06–RY10, respectively. Historically, most of the hunters that used horses were guided hunters, and the reduction in the use of horses for transportation during this reporting period likely reflects several changes in the guides operating within the MNW mountains.

**Table 2. Dall sheep hunter residency and success, Unit 12, Interior Alaska, regulatory years 2016–2020.**

Regulatory year	State general season								Total hunters	% Success	Federal hunt	
	Successful hunters				Unsuccessful hunters						Sheep harvested	Hunters
	Resident	Nonresident	Unknown <sup>a</sup>	Total	Resident	Nonresident	Unknown <sup>a</sup>	Total				
2016	113	23	1	137	195	5	0	200	337	41	1	6
2017	114	20	3	137	208	12	1	221	358	38	1	4
2018	74	29	0	103	211	13	1	225	328	31	0	8
2019	99	26	0	125	214	13	0	227	352	36	0	6
2020	76	17	3	96	273	24	0	297	393	24	1	4

<sup>a</sup> Hunters with unknown resident status.



**Figure 2. Reported annual Dall sheep ram state harvest during regulatory years 1991–2020 within the Unit 12 portion of the Mentasta, Nutzotin, and northern Wrangell Mountains, Interior Alaska.**

**Table 3. Dall sheep harvest, Unit 12, Interior Alaska, regulatory years 2016–2020.**

Regulatory year	Total rams harvested <sup>a</sup>	Rams measured	Average horn length	Average age
2016	137	137	35.3	8.2
2017	137	137	34.9	8.7
2018	103	103	35.1	8.5
2019	125	123	35.2	8.9
2020	96	96	34.6	8.4

<sup>a</sup> Total rams harvested with the state general sheep harvest ticket.

None.

*Recommendations for Activity 2.1.*

Continue.

### 3. Habitat Assessment-Enhancement

No habitat assessment or enhancement activities occurred for MNW Dall sheep during RY16–RY20 and none are planned for RY21–RY25.

## **NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS**

Due to inadequate funding, we did not conduct any sheep surveys within the MNW mountains during RY20–RY21. Although this has yet to directly affect sheep management within the area due to the full-curl harvest regulation, restoration of survey funding is warranted during the next report period. The MNW mountains are a highly sought-after area for sheep hunters, and survey information is important to inform the public—including hunters, advisory committees, and the Board of Game—of the population status and potential trends. Furthermore, periodic surveys are important for general long-term monitoring of the population.

### Data Recording and Archiving

- All electronic files such as survey memos, reports, survey data, and maps are located on the Tok server. All hard copy data sheets, paper files, etc. are stored in the file cabinet in the conference room in the Tok office.
- Electronic copies of survey memos, survey data, and maps are stored in the Wildlife Information Network (WinfoNet) data archive; Project Title: Tok Sheep | Primary Region: Region III.

### Agreements

ADF&G has a data sharing agreement with Wrangell-St. Elias National Park and Preserve to provide harvest data for a variety of species, including sheep, for Units 11 and 12 for RY90–RY20.

### Permitting

None.

## **Conclusions and Management Recommendations**

The management goal to maintain a harvestable population of Dall sheep, fluctuating within historical limits of abundance and the carrying capacity of their habitat, was likely met during RY16–RY20. The aerial surveys that ADF&G and NPS conducted during this reporting period

suggest that the MNW mountains Dall sheep population was likely relatively stable with some localized decreases and increases in the population.

The management objective to maintain an average horn size on 8-year-old harvested rams of  $\geq 34$  inches was met during RY16–RY20. Overall mean horn length was greater during this report period compared to RY11–RY15 but has otherwise been relatively stable for more than 25 years. Similarly, the annual average number of hunters and harvest increased during this report period compared to RY11–RY15, while success rates were comparable to prior reporting periods. Overall, the 5-day youth season and 40-day general season likely meet the intent of the management goal to provide the greatest level of sustainable opportunity to participate in hunting Dall sheep within the MNW mountains.

## II. Project Review and RY21–RY25 Plan

### Review of Management Direction

#### MANAGEMENT DIRECTION

Unless directed otherwise by the Board of Game or public stakeholders, the RY16–RY20 management direction and goals for Dall sheep in the MNW mountains will remain unchanged for RY21–RY25.

#### GOALS

- G1. Maintain a harvestable population of Dall sheep that fluctuates within historical limits of abundance and the carrying capacity of their habitat.
- G2. Provide the greatest level of sustainable annual opportunity to participate in hunting Dall sheep.

#### CODIFIED OBJECTIVES

##### Amounts Reasonably Necessary for Subsistence Uses

The Board of Game has not made a customary and traditional use finding for the MNW sheep population.

##### Intensive Management

The MNW sheep population has not been identified as an intensive management population by the Board of Game.

## MANAGEMENT OBJECTIVES

M1. Maintain an average horn size on 8-year-old harvested rams of  $\geq 34$  inches.

- This objective will be considered to be met if the average horn size of 8-year-old rams during RY21–RY24, as measured during the mandatory sealing process, is  $\geq 34$  inches.
- The primary purpose of this management objective is to provide a benchmark (34 inches) to compare horn length over subsequent years. Changes in horn length could result from changes in the ram population, which relates to the management goal to provide the greatest level of sustainable annual opportunity to participate in hunting Dall sheep.

## 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 change from prior reporting period. Survey data will be used to estimate the harvestable surplus, in order to evaluate management goal G1, and for general long-term monitoring of the population. Data will also be used to inform the public of population status and trends.

#### *Methods*

Aerial survey methods will be the same as those described in the report section for RY16–RY20. The goal is to survey count areas 1 and 9 biennially on alternating years and to survey the remaining count areas as funding allows.

### 2. Mortality-Harvest Monitoring

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

#### *Data Needs*

No change from prior reporting period. Harvest data are necessary to determine the average horn size of harvested rams and assess whether the management objective is achieved.

#### *Methods*

No change from prior reporting period.

### 3. Habitat Assessment-Enhancement

No habitat assessment or enhancement activities are planned for MNW Dall sheep in RY21–RY25.

## NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No change from prior reporting period—survey funding should be pursued for the remainder of this reporting period.

### Data Recording and Archiving

#### *Recording*

- Dall sheep survey form (Appendix A)
- ArcGIS version 10.6 (store and analyze spatial data)

#### *Archiving*

- Harvest data will be stored on the WinfoNet server and archived under *Harvest Information*.
- All electronic files such as survey memos, reports, survey data, and maps will be located on the Tok server. All hard copy data sheets, paper files, etc. will be stored in the file cabinet in the conference room in the Tok office.
- Electronic copies of survey memos, survey data, and maps will also be stored in the WinfoNet data archive; Project Title: Tok Sheep | Primary Region: Region III.

### Agreements

The data sharing agreement between ADF&G and Wrangell-St. Elias National Park and Preserve expired at the end of RY20 and has not been renewed.

### Permitting

None.

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