

Dall Sheep Management Report and Plan, Game Management Unit 13B, 20A, and 20D, Delta Controlled Use Area:

Report Period 1 July 2016–30 June 2021 and

Plan Period 1 July 2021–30 June 2026

Robert Schmidt



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

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Cover Photo: Group of 18 Dall sheep rams photographed during an aerial survey within the Delta Controlled Use Area in the Alaska Range mountains. ©2018 ADF&G. Photo by Robert Schmidt.

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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 Game Management Units 13B, 20A, and 20D (the eastern Alaska Range area near Delta Junction), 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

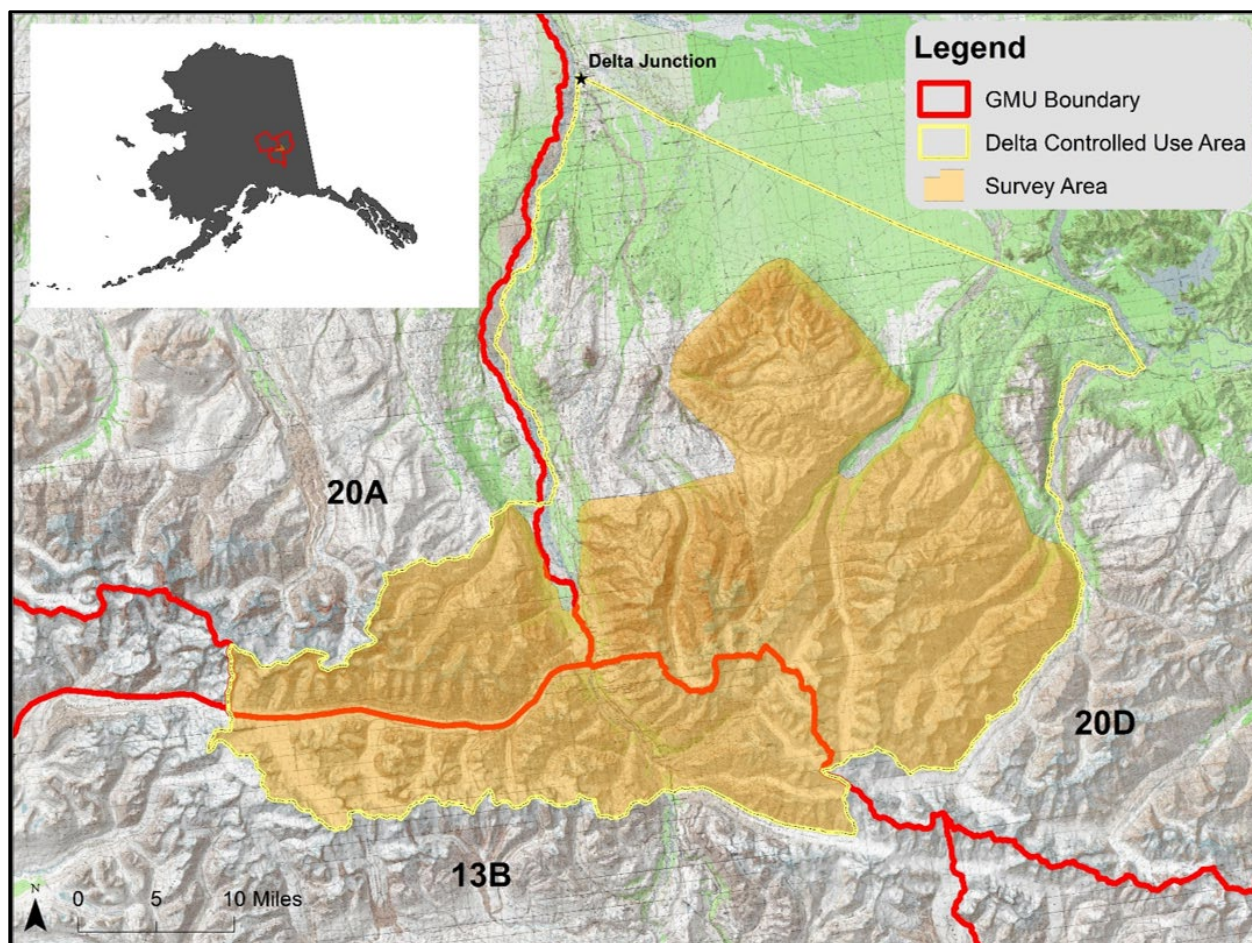
The Delta Controlled Use Area (DCUA) encompasses 1,569 mi² in Interior Alaska, in the eastern Alaska Range mountains. The DCUA falls mostly within Unit 20D but also overlaps with portions of Unit 20A west of the Delta River and Unit 13B south of Black Rapids Glacier (Fig. 1). Most of the available sheep habitat is on State of Alaska lands, except for 2 small parcels of military training land: Black Rapids Training Area and Whistler Creek Training Area. The community of Delta Junction lies north of the Alaska Range, and major river drainages include the Delta River, Jarvis Creek, Gerstle River, Little Gerstle River, and Johnson River. Maps of the Delta Junction Area boundaries and special management are available on the ADF&G website.¹ 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 Units 13B, 20A, and 20D (The Eastern Alaska Range Area Near Delta Junction)

Providing the opportunity to hunt Dall sheep under aesthetically pleasing conditions is the current consumptive-use goal for this species in the DCUA. This goal has remained unchanged since the ADF&G management plans for Dall sheep (ADF&G 1976) were written. The objectives of harvest and quality hunting experience were formally selected as consumptive-use guidelines during the public planning project of the mid-1970s (ADF&G 1976).

Hunting seasons for Dall sheep and legal harvest have become increasingly restrictive in the eastern Alaska Range, where the DCUA is located. As hunting pressure increased, Dall's sheep conservation required more active management. As this process evolved, hunters began to demand assurance of certain types of hunting experiences. The DCUA, formerly known as the Delta Management Area, was the first attempt to meet these demands.

¹ The website is available at this link: <http://www.adfg.alaska.gov/index.cfm?adfg=maps.main>.



Source: Map produced by ADF&G using ArcGIS™ software (Esri, Redlands, California). Base map sources: ADFG, GINA (UAF), USGS, ADFG GIS.

Figure 1. Map showing the boundaries of the Delta Controlled Use Area and Dall sheep survey area in Interior Alaska, overlapping some portions of Game Management Units 13B, 20A, and 20D, regulatory years 2016–2020.

The Delta Management Area was established prior to the 1971 hunting season to provide sheep hunters with high-quality, walk-in hunting opportunities free from competition with other modes of transportation. Regulations initially prohibited the use of motorized vehicles and pack animals to transport hunters, hunting gear, or game during the first 15 days of the 10 August–20 September hunting season. After 25 August, hunting access by mechanized transport and pack animals was permitted. The bag limit was 1 ram with $\frac{3}{4}$ -curl or larger horns.

Designating the Delta Management Area as a walk-in-only area successfully provided a walk-in-only hunting opportunity but failed to reduce harvest to the desired level or to provide high-quality hunting experiences. Rams in the Delta Management Area remained under heavy hunting pressure, resulting in excessive harvest, reduced horn size, and intense competition among hunters for available rams. In 1977, when the desired harvest objective was 40 rams, hunters harvested 78 rams (Larson 1979).

To achieve the goal and objectives established in 1976 (ADF&G 1976), sheep hunting in the Delta Management Area was restricted by drawing permit in 1978. Sixty permits were issued for a 10–25 August walk-in season, and 60 permits were issued for a 26 August–20 September open-access season. The bag limit was 1 ram with $\frac{3}{4}$ -curl or larger horns. As expected, the permit hunt reduced hunting pressure, and the harvest was reduced from 78 rams in 1977 to 31 rams in 1978. However, average horn size also decreased to an all-time low of 31.2 inches (Larson 1980).

In 1979, the minimum horn size for legal sheep in the Delta Management Area was increased from $\frac{3}{4}$ -curl to $\frac{7}{8}$ -curl. The $\frac{7}{8}$ -curl regulation did not affect the number of rams harvested in the Delta Management Area, but average horn size increased from 31.2 inches in 1978 to 34.6 inches in 1979 (Larson 1979).

The Delta Management Area was renamed the Delta Controlled Use Area (DCUA) in 1981 to more accurately reflect its classification as a controlled use area rather than a management area. In 1982, the number of drawing permits issued increased to 75 for each portion of the drawing permit hunt.

In 1984, the minimum horn size for legal sheep was raised from $\frac{7}{8}$ -curl to full curl. The season and bag limit in the DCUA have not changed since 1984, except in 1985, when Tier II subsistence regulations were adopted for that year only. Since the full-curl regulation was adopted, the DCUA sheep population and harvest have remained stable, with natural fluctuations.

The size of the DCUA was reduced in July 1992 to exclude a portion of non-sheep habitat between the Richardson Highway and the Delta River. This area of non-sheep habitat was popular for small-game hunting, but the DCUA access restrictions complicated hunting in the area and confused hunters. This area was again included in the DCUA beginning in 2002 to facilitate management of the Macomb caribou herd; however, access restrictions applied only to big-game hunters. Hunters have been pleased with the quality of the hunt in the DCUA, and the area has been meeting its management objectives.

With the ease of access to sheep within the DCUA, the area provides an excellent opportunity for nonconsumptive uses, such as wildlife photography of sheep.

Management Direction

ADF&G will continue to manage the DCUA sheep population for both consumptive and nonconsumptive uses to allow for maximum human use. Management will include disease screening, population abundance surveys, and harvest monitoring.

EXISTING WILDLIFE MANAGEMENT PLANS

Management direction for DCUA Dall sheep was outlined in the draft wildlife management plans (ADF&G 1976), which were reviewed and modified over the years in response to public comments, staff recommendations, and Board of Game actions. A record of these changes is available in the division's management report series. The plan portion of this report presents the current management plan for Dall sheep in the DCUA.

GOALS

- G1. Provide aesthetically pleasing hunting conditions.
- G2. Maintain a harvestable population of Dall sheep that fluctuates within historical limits of abundance and the carrying capacity of DCUA habitat.
- G3. Maintain sheep abundance sufficient to allow for nonconsumptive uses.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

Much of the DCUA lies within the Fairbanks Nonsubsistence Use Area, and there is no customary and traditional use finding or amounts reasonably necessary for subsistence uses in that area. Additionally, the customary and traditional use finding for Dall sheep in the portion of the DCUA outside the Fairbanks Nonsubsistence Use Area is negative.

Intensive Management

The DCUA Dall sheep population is not in an intensive management program.

MANAGEMENT OBJECTIVES

- M1. Manage for a population of approximately 1,800 sheep.
- M2. Manage for a mean annual harvest of at least 35 full-curl rams with a mean horn length of more than 36 inches.
- M3. Manage for the mean age of harvested rams exceeding 8 years.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum counts and composition of Dall sheep to evaluate population status and trend (M1).

Data Needs

Annual minimum counts of sheep are needed to evaluate whether the management objective of maintaining a population of approximately 1,800 sheep has been met. In addition, minimum counts provide composition data that can be used to evaluate the proportion of legal rams and lambs on the landscape during summer.

Methods

All available sheep habitat (approximately 1,039 mi²) in the DCUA is surveyed annually, when weather and funding allow, using a minimum-count aerial survey. Surveys are flown in a Piper

PA-18 Super Cub between late June and late July. Surveys are timed to avoid turbulence by conducting flights in the early morning or late evening. Survey altitude is 300–700 ft above ground level. Data and search times are recorded in reference to major drainages. Sheep are classified as lambs, rams $\geq \frac{1}{2}$ curl, and others (including ewes and rams $\leq \frac{1}{2}$ curl). Full-curl rams are noted when possible. Photographs may be taken of aggregations that are difficult to observe from the air (e.g., in steep canyons, too windy, etc.) and are used to verify horn classification.

Results and Discussion

Regulatory Year 2016

A partial survey of the DCUA was completed between 13 July and 5 August 2016, totaling 30.1 hours of survey time. Areas not surveyed west of Delta included the south side of Pillsbury drainage, the south side of Black Rapids drainage, and all areas south of Black Rapids Glacier to the southern border of the DCUA (Augustana Creek). Areas east of the Delta River that were not surveyed included the west-facing drainages between Castner and Suzy Q creeks. The estimated amount of habitat not surveyed was about 5%.

Poor weather conditions in the Alaska Range (wind and low ceilings) throughout July limited flying to only 7 days, and of these, only 3 had exceptional survey weather. Surveys were conducted on 13 July, 14 July, 15 July, 17 July, 26 July, 1 August, and 5 August. Very little snow remained within the survey area. Although it took nearly a month to complete the surveys, the likelihood of sheep movements between survey units, which would result in double-counting of sheep, was likely low. Each day, staff ended the survey at a natural place where sheep were unlikely to move across on a consistent basis. These same methods have been used for many years with the same pilot and during the same timeframe.

A total of 1,260 sheep were observed, including 246 lambs, 287 rams $\geq \frac{1}{2}$ curl and less than full curl, 64 full-curl rams, and 663 other sheep (ewes and rams $< \frac{1}{2}$ curl; Table 1). The composition of identified sheep included 20% lambs, 23% rams $\geq \frac{1}{2}$ curl, and 5% full-curl rams.

Table 1. Dall sheep aerial survey data with percentage of rams, Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Regulatory year	Full-curl rams	$\geq 1/2$ -curl rams	Total rams	Percent rams			Lambs	Other sheep ^a	Unknown sex	Total sheep
				Full curl (%)	Small (%)	Total (%)				
2016 ^b	64	287	351	18	82	28	246	663	0	1,260
2017	62	272	334	19	81	26	272	691	2	1,299
2018	61	208	269	23	77	27	82	630	4	985
2019	59	255	314	19	81	22	340	766	0	1,420
2020	51	205	256	20	80	27	134	560	1	951

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D.

^a Other sheep include ewes and rams with $< \frac{1}{2}$ curl.

^b The 2016 survey was incomplete due to poor flying conditions; therefore, the counts for this regulatory year are incomplete.

Regulatory Year 2017

A complete aerial minimum-count survey of all available Dall sheep habitat in the DCUA was conducted 5–20 July 2017, totaling 36.3 hours of survey time. A total of 1,299 sheep were observed, including 272 lambs, 272 rams $\geq \frac{1}{2}$ curl and less than full curl, 62 full-curl rams, 691 other sheep (ewes and rams $< \frac{1}{2}$ curl), and 2 unidentified sheep (Table 1). Composition of identified sheep from the observed data included 21% lambs, 21% rams $\geq \frac{1}{2}$ curl and less than full curl, and 5% full-curl rams.

The total number of sheep observed during the 2017 survey (Table 1) was similar to the average number of sheep observed during the previous reporting period. The number of lambs observed (272 lambs; Table 1) was one of the highest recorded in the DCUA in at least 10 years. The total number of ewes and rams has remained stable. Overall, the high numbers of sheep and the high proportion of lambs in 2017 were likely contributed to by several subsequent mild winters following the notably hard winter of 2013, as well as the issuance of fewer draw permits and lower harvests in the past few seasons.

Regulatory Year 2018

A complete aerial minimum-count survey of all available Dall sheep habitat in the DCUA was conducted 17–30 July 2018, totaling 35.4 hours of survey time. A total of 985 sheep were observed, including 82 lambs, 208 rams $\geq \frac{1}{2}$ curl and less than full curl, 61 full-curl rams, 630 other sheep (ewes and rams $< \frac{1}{2}$ curl), and 4 unidentified sheep (Table 1). Composition of identified sheep from the observed data included 8% lambs, 21% rams $\geq \frac{1}{2}$ curl and less than full curl, and 6% full-curl rams. The winter and spring of 2017–2018 were characterized by deep, heavy snow, followed by a wet late spring. Although adult sheep appeared not to have been severely affected, lamb production and survival may have been negatively affected, based on the few lambs observed compared with prior surveys.

Regulatory Year 2019

A complete aerial minimum-count survey of all available Dall sheep habitat in the DCUA was conducted 25 June–3 July 2019, totaling 39.4 hours of survey time. A total of 1,420 sheep were observed, including 340 lambs, 255 rams $\geq \frac{1}{2}$ curl and less than full curl, 59 full-curl rams, and 766 other sheep (ewes and rams $< \frac{1}{2}$ curl; Table 1). The composition of identified sheep from the observed data included 24% lambs, 18% rams $\geq \frac{1}{2}$ curl and less than full curl, and 4% full-curl rams.

The 1,420 sheep observed in the 2019 survey showed a considerable increase over the 985 sheep observed in 2018 (Table 1) and were the highest number of sheep observed in the DCUA since 2012. The 340 lambs observed in 2019 were also a considerable increase from the 82 lambs observed in 2018 (Table 1); further, the 2019 survey documented the highest number of lambs ever observed in a DCUA survey. Ram numbers were near the long-term average or slightly above. Ewe numbers were slightly higher than in the last several years.

Regulatory Year 2020

A complete aerial minimum-count survey of all available Dall sheep habitat in the DCUA was conducted 1–18 July 2020, totaling 43.8 hours of survey time. A total of 951 sheep were observed, including 134 lambs, 205 rams $\geq \frac{1}{2}$ curl and less than full curl, 51 full-curl rams, 560 other sheep (ewes and rams $< \frac{1}{2}$ curl), and 1 unidentified sheep (Table 1). Composition of identified sheep from the observed data included 14% lambs, 22% rams $\geq \frac{1}{2}$ curl and less than full curl, and 5% full-curl rams.

The 951 sheep observed during the 2020 survey (Table 1) were below the long-term average but comparable to other years when winters were characterized by deep snow that persisted long into spring. The number of lambs observed (134 lambs) in 2020 (Table 1) was similar to other years, and ram numbers were also near the long-term average. Ewe numbers were slightly below average compared with the last few years, but higher than the low in 2013. Sheep numbers were higher on the east side of the survey area, except around the Johnson River, than on the west side of the survey area.

The number of sheep observed across the entire DCUA was similar across all years during RY16–RY20. Numbers appear to be slightly decreasing due to the poor 2013 lamb cohort and some recent above-average snowfall winters, which likely reduced survival, particularly among lambs.

Recommendations for Activity 1.1

Continue aerial sheep surveys to determine minimum counts for the DCUA sheep population and to evaluate the management objective of approximately 1,800 sheep. Continue collecting composition data to evaluate trends in the number of legal rams and the proportion of lambs in the population.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor Dall sheep harvest through hunter contacts, permit reports, and horn sealing data (M2 and M3).

Data Needs

Harvest and horn measurement data are necessary to determine whether the management objectives of 1) managing for a mean annual harvest of at least 35 full-curl rams with a mean horn length of more than 36 inches (M2) and 2) managing for a mean age of harvested rams exceeding 8 years (M3) are met.

Methods

Drawing permit hunters are required to report their hunt activities and to have ADF&G personnel seal and measure the horns of harvested rams. Horn measurements are taken with a steel tape measure or other inflexible measuring tape. The length of the horn is measured by beginning the measurement where the horn comes out of the skull, laying the tape along the outer surface of the horn, and following it to the tip of the horn. The circumference of the horn is measured at the base of the horn, as close to the skull as possible. Harvest and sealing data are stored and

summarized from the department database housed on the Wildlife Information Network (WinfoNet) server. Data are analyzed to determine hunter success, residency, and effort; ram horn size; hunt location; transportation type; and other information. Data are summarized by regulatory year.

Season and Bag Limit

Dall sheep hunting regulations for the DCUA during RY16–RY20 are available in the *Alaska Hunting Regulations* booklet. Current regulations can be found on the ADF&G website.²

The DCUA sheep hunting season was open from 10 August through 20 September and was split into 2 drawing-permit hunts, DS203 and DS204. For DS203, the season was 10–25 August. Motorized vehicles and pack animals were not permitted for the transport of big game hunters, hunting gear, or big game within the DCUA. Vehicle travel was permitted only on the Richardson Highway and at designated air strips within DCUA boundaries. For DS204, the season was from 26 August to 20 September, with no access restrictions. Each permit hunt had a bag limit of 1 full-curl ram. Up to 75 permits were issued for each of the 2 hunts. Residents were not eligible to receive the same permit for 2 consecutive years, but they could harvest a sheep in consecutive years if one were under a DS203 permit and the other under a DS204 permit. Nonresidents could harvest only 1 sheep every 4 regulatory years.

Results and Discussion

Harvest by Hunters

The DCUA combined harvest for hunts DS203 and DS204 met the harvest objective of a mean annual harvest of 35 full-curl rams in RY16–RY20, averaging 45 sheep per year. The annual mean horn length for all sheep taken during RY16–RY20, averaging 35.5 inches, was below the 36-inch objective each year except in RY18. The mean age of all sheep taken in the DCUA met the management objective of older than 8 years each year during RY16–RY20, with an annual mean age ranging from 8.2 to 9 years (Table 2).

Permit Hunts

The DCUA sheep permits (DS203 and DS204) remained very popular; ADF&G received between 4,000 and 9,000 permit applications per year during the reporting period (Table 3). Starting in RY17, the Board of Game increased the number of times applicants could apply for an individual hunt from 1 to a maximum of 6.

Hunter Residency and Success

Most DCUA hunters were Alaska residents, with an annual average of 4 nonresident hunters (4%) during RY16–RY20 (Table 4). Nonresidents, as a group, had the same success rate as residents. The annual average success rate for both groups during RY16–RY20 for DS203 and DS204 was 42%.

² The website is available at this link: <http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting>.

Table 2. Dall sheep harvest data by permit hunt, Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Hunt	Regulatory year	Permits issued	Did not hunt (%)	Successful hunters (%)	Ram harvest	$\bar{x}$ horn length (inches) ^a	$\bar{x}$ age (years) ^a
DS203	2016	65	29	46	21	35.3	8.5
	2017	70	23	52	28	34.9	8.7
	2018	70	14	35	21	36.4	9.2
	2019	70	20	43	23	36.3	8.8
	2020	70	29	33	16	34.2	8.2
DS204	2016	64	30	44	20	36.4	8.5
	2017	70	20	48	27	35.7	8.9
	2018	70	30	45	22	36.1	8.8
	2019	70	13	51	31	35.1	9.1
	2020	70	24	32	16	34.4	8.1
Total for all hunts	2016	129	29	47	41	35.8	8.6
	2017	140	21	51	55	35.4	8.8
	2018	140	22	40	43	36.4	8.9
	2019	140	17	47	54	35.6	9.0
	2020	140	26	31	32	34.5	8.2

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D.

^a $\bar{x}$ represents the sample mean.

Table 3. Number of applications received for hunts DS203 (restricted access) and DS204 (unrestricted access), Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Regulatory year	Hunt DS203	Hunt DS204	Total applications
2016	1,988	2,216	4,204
2017	3,752	3,870	7,622
2018	3,677	3,658	7,335
2019	3,814	3,647	7,461
2020	4,461	4,962	9,423

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D.

Harvest Chronology

Historically, the largest percentage of the harvest generally occurred during the first 7 days of each DS203 and DS204 hunting seasons; however, during RY16–RY20, harvest was more evenly distributed throughout the DS204 hunt period, though it remained highest during the first 7 days (Table 5).

Table 4. Dall sheep hunter residency and success, Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Hunt	Regulatory year	Successful				Unsuccessful				Total hunters
		Local resident	Nonlocal resident	Non-resident	Total (%)	Local resident	Nonlocal resident	Non-resident	Total (%)	
DS203	2016	3	17	1	46	4	20	1	54	46
	2017	1	26	1	52	1	25	0	48	54
	2018	0	19	2	35	5	31	3	65	60
	2019	2	19	2	41	0	32	1	59	56
	2020	3	12	1	32	3	30	1	68	50
DS204	2016	0	20	0	44	2	23	0	56	45
	2017	3	24	0	48	3	23	3	52	56
	2018	1	21	0	45	4	21	2	55	49
	2019	3	27	1	51	2	28	0	49	61
	2020	2	14	0	30	2	34	1	70	53
Total for all hunts	2016	3	37	1	45	6	43	1	55	91
	2017	4	50	1	50	4	48	3	50	110
	2018	1	40	2	39	9	52	5	61	109
	2019	5	46	3	46	2	60	1	54	117
	2020	5	26	1	31	5	64	2	69	103

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D. A local resident is a hunter who resides in Unit 20D; a nonlocal resident is a hunter who resides in Alaska outside Unit 20D; and a nonresident is a hunter who resides outside Alaska.

Table 5. Dall sheep harvest chronology percentage by month and day, Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Hunt	Regulatory year	Percent harvest by month and day						n
		8/10–8/16	8/17–8/23	8/24–8/30	8/31–9/6	9/7–9/13	9/14–9/20	
DS203 ^a	2016	95	5	0	–	–	–	21
	2017	82	14	4	–	–	–	28
	2018	71	29	0	–	–	–	21
	2019	87	13	0	–	–	–	23
	2020	81	19	0	–	–	–	16
DS204 ^b	2016	–	–	40	25	5	30	20
	2017	–	–	44	33	8	15	27
	2018	–	–	42	18	22	18	22
	2019	–	–	55	23	13	9	31
	2020	–	–	50	25	19	6	16
Total for all hunts	2016	49	2	20	12	2	15	41
	2017	42	7	24	16	4	7	55
	2018	35	14	21	9	12	9	43
	2019	37	6	32	13	7	5	54
	2020	41	9	25	13	9	3	32

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D.

^a Season open 10–25 August.

^b Season open 26 August–20 September.

Transport Methods

No changes in mode of transportation were observed during RY16–RY20. Highway vehicles were the most common mode of transportation during the DS203 hunt (Table 6) because most hunters walked into the hunt area from the Richardson or Alaska highways due to access restrictions. Aircraft were used along the Johnson River during the DS203 hunt. Airplanes, 3- or 4-wheelers, and highway vehicles were most commonly used during the DS204 hunt (Table 6).

Table 6. Percentage of Dall sheep harvest by transport method, Delta Controlled Use Area, Interior Alaska, regulatory years 2016–2020.

Permit hunt	Regulatory year	Percent harvest by transport method ^a						<i>n</i>
		Airplane	Boat	3- or 4-wheeler	ORV ^b	Highway vehicle	Other	
DS203	2016	29	0	0	0	71	0	21
	2017	11	4	4	4	71	7	28
	2018	24	5	0	0	71	0	21
	2019	26	0	0	0	74	0	23
	2020	13	0	0	0	81	6	16
DS204	2016	25	5	45	15	10	0	20
	2017	35	12	38	4	12	0	26
	2018	32	0	45	0	18	0	22
	2019	32	3	52	3	10	0	31
	2020	56	0	31	6	6	0	16

Note: The Delta Controlled Use Area overlaps with portions of Units 13B, 20A, and 20D.

^a Totals may sum to greater or less than 100% due to rounding.

^b ORV stands for off-road vehicle.

Other Mortality

The carcass of an ewe was recovered from the Bear Creek drainage in May 2017 after hikers reported it. The ewe had been dead for approximately 48 hours and was therefore in very good condition. Lab results showed severe dental disease and old scarring from lungworm, along with some signs of pneumonia. No pathogens commonly found in domestic livestock were detected.

The carcass of a lamb was observed in Flood Creek during aerial surveys on 27 June 2019. A live ewe was also observed near the carcass. We retrieved the carcass by helicopter on 28 June. The lamb had been dead for just over 24 hours when it arrived at the lab. Lab results indicated that the lamb had not been suckling for an extended period of time. This was also a late-born lamb, based on the age of the umbilicus. Lab results were inconclusive as to whether the lamb died from a fall or starvation, possibly because the ewe stopped milk production prematurely. There were also some signs of pneumonia. No pathogens commonly found in domestic livestock were detected. Delta area staff will continue opportunistic disease surveillance of Dall sheep whenever possible.

A freshly killed lamb was observed in Granite Creek during the 2017 surveys and appeared to have been killed by predators. Overall predation rates on sheep in the DCUA are unknown.

Weather was not thought to have adversely affected the sheep population in the DCUA in most years during RY16–RY20. In 2013, however, weather likely contributed to a short-term

population decline. Because the 2013 lamb cohort was small, fewer legal sheep were available during this reporting period, and both harvest and success rates declined in some years.

Alaska Board of Game Actions and Emergency Orders

There were no Board of Game actions or emergency orders related to DCUA Dall sheep during RY16–RY20.

Recommendations for Activity 2.1.

Harvest data should continue to be collected through the mandatory sealing of Dall sheep to ensure that harvest levels, the age of harvested rams, and horn lengths meet management objectives.

3. Habitat Assessment-Enhancement

There were no habitat assessment or enhancement activities for Dall sheep in the DCUA during RY16–RY20.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Ongoing military activity within the DCUA is expected, particularly in the Black Rapids area, and military exercises may overlap with Dall sheep habitat. Meetings with the U.S. Army to assess the potential frequency, scope, duration, and locations of future military activities within the DCUA were held during RY16–RY20 to reduce conflicts. We will continue to coordinate with the U.S. Army to manage and reduce interactions between sheep and military operations.

Active mining occurred within the DCUA during RY16–RY20, but not in core sheep habitat. Ongoing and future mining development will be monitored to assess potential disturbance to sheep and their habitat.

As agriculture continues to develop in the Delta Junction Area, so does the risk of disease transmission between livestock and DCUA Dall sheep. Currently, no pack animals can be used during the nonmotorized portion of the DCUA hunt. The potential adverse effects of disease on wild sheep populations are a high priority among managers and the public. During RY16–RY20, nasal swabs were gathered from hunter-harvested DCUA sheep as part of a larger statewide effort to test for *Mycoplasma ovipneumoniae* (*M. ovi*). There have been no known Dall sheep mortalities linked to *M. ovi* within the DCUA. However, there have been documented cases of *M. ovi* in many Dall sheep and mountain goat (*Oreamnos americanus*) populations across Alaska. It is believed that the *M. ovi* strain in Alaska has been present in the environment for a long time and is not fatal, unlike the strain found in bighorn sheep (*Ovis canadensis*) in the Lower 48 (continental United States). A full report of the *M. ovi* study can be found in *Dall Sheep Hunters: Results of Nasal Swab Samples from Hunter-harvested Sheep* (ADF&G 2020). Emphasis will be placed on continued health monitoring of the DCUA sheep population by collecting samples from any known sheep mortalities and collecting hunter-harvested nasal swabs as needed. This will improve our knowledge of the presence of pathogens and increase our preparedness for disease management.

Data Recording and Archiving

Harvest data are stored in an internal database on the department's WinfoNet server. All other electronic data and files, such as survey memos and reports, are stored on the Delta Area Biologist's computer and archived in WinfoNet. Field data sheets, paper files, hard copies, and similar documents are kept in the Delta Junction Area Biologist's office.

Agreements

There is a memorandum of understanding between U.S. Army Garrison Fort Wainwright, the U.S. Fish and Wildlife Service, and ADF&G regarding the Fort Wainwright Integrated Natural Resource Management Plan, dated 10 June 2013. This plan details what each agency is responsible for regarding wildlife management on Fort Wainwright lands.

Permitting

None.

Conclusions and Management Recommendations

The DCUA harvest and age objectives (M2 and M3) were met during RY16–RY20, but the horn length objective (M2) was not met. Average horn length in the total annual DCUA harvest has been below the objective since RY03, though it was just under the 36-inch objective at 35.5 inches during this reporting period. If this trend continues, it may be necessary to review the horn length objective and assess its applicability to the DCUA Dall sheep population. It is possible that the objective cannot be consistently met due to the prevalence of broken horns. Also, it is possible that rams from this population are not growing 36 inches in horn length in the amount of time it takes them to reach full-curl horn length, 8 years of age (legal harvest status), or both. Because hunters have not voiced concerns about shorter horn length, this objective will be monitored during RY21–RY25; no changes to the horn length objective will be suggested at this time. The Delta Fish and Game Advisory Committee and the public will be consulted if a change to the horn length objective is considered.

The DCUA minimum count was incomplete in RY16 due to poor flying conditions; therefore, counts for this regulatory year are incomplete. The entire DCUA was surveyed during RY17–RY20. RY18 and RY20 had counts of 985 and 951 sheep, respectively, while all other years had greater than 1,200 sheep observed (Table 1). The highest count occurred in RY19, with 1,420 sheep observed (Table 1). Because these surveys are considered minimum counts, the management objective of 1,800 sheep (M1) was likely close to being met in most years.

Minimum counts generated for RY16–RY20 averaged 1,183 sheep. This is slightly above the long-term minimum count average for the DCUA; therefore, the data suggest that the DCUA sheep population remained stable during the reporting period.

II. Project Review and RY21–RY25 Plan

Review of Management Direction

MANAGEMENT DIRECTION

ADF&G will manage the DCUA Dall sheep population to provide for human uses and ensure that sheep remain abundant and healthy throughout their historic range for uncrowded hunting opportunity, photography, viewing, listening, and scientific and educational purposes.

GOALS

The RY16–RY20 management goals for the DCUA were generally appropriate; therefore, the goals for RY21–RY25 will be very similar, as follows:

- G1. Provide for uncrowded hunting conditions.
- G2. Maintain a harvestable population of Dall sheep that fluctuates within historical limits of abundance and the carrying capacity of DCUA habitat.
- G3. Maintain sheep abundance sufficient to allow for nonconsumptive uses.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

None. No new codified objectives are expected for RY21–RY25.

Intensive Management

The DCUA sheep population is not expected to be in an intensive management program during RY21–RY25.

MANAGEMENT OBJECTIVES

The RY16–RY20 management objectives were generally appropriate; therefore, the RY21–RY25 objectives will be nearly the same, as follows:

- M1. Manage for a population of approximately 1,800 sheep.
- M2. Manage for a mean annual harvest of at least 35 full-curl rams with a mean horn length of more than 36 inches.
- M3. Manage for a mean age of harvested rams exceeding 8 years.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum counts of sheep and composition to evaluate population status and trend (M1).

Data Needs

No change from the RY16–RY20 reporting period.

Methods

No change from the RY16–RY20 reporting period.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor Dall sheep harvest through hunter contacts, permit reports, and sealing data (M2 and M3).

Data Needs

No change from the RY16–RY20 reporting period.

Methods

No change from the RY16–RY20 reporting period.

3. Habitat Assessment-Enhancement

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

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

No change from the RY16–RY20 reporting period.

Data Recording and Archiving

No change from the RY16–RY20 reporting period.

Agreements

No change from the RY16–RY20 reporting period.

Permitting

None.

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