Species Management Report and Plan ADF&G/DWC/SMR&P–2018–35

Dall Sheep Management Report and Plan, Game Management Units 19B and 19C:

Report Period 1 July 2011–30 June 2016, and

Plan Period 1 July 2016–30 June 2021

Joshua M. Peirce

2018

Alaska Department of Fish and Game Division of Wildlife Conservation

Dall Sheep Management Report and Plan, Game Management Units 19B and 19C:

Report Period 1 July 2011–30 June 2016, and

Plan Period 1 July 2016–30 June 2021

PREPARED BY:

Joshua M. Peirce
Wildlife Biologist III

APPROVED BY:

Doreen I. Parker McNeill
Management Coordinator

REVIEWED BY:

Laura A. McCarthy
Publications Specialist II

Alaska Department of Fish and Game
Division of Wildlife Conservation
PO Box 115526
Juneau, AK 99811-5526

Funding for survey and inventory project 6.0 was provided through the Federal Aid in Wildlife Restoration grant program. Hunters are important founders of the modern wildlife conservation movement. They, along with trappers and sport shooters, provided funding for this publication through payment of federal taxes on firearms, ammunition, and archery equipment, and through state hunting license and tag fees.

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.

Species management reports and plans are available via the Alaska Department of Fish and Game's website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game, Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: 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).

This document, published as a PDF only, should be cited as:

Peirce, J. M. 2018. Dall sheep management report and plan, Game Management Units 19B and 19C: Report period 1 July 2011–30 June 2016, and plan period 1 July 2016–30 June 2021. Alaska Department of Fish and Game, Species Management Report and Plan ADF&G/DWC/SMR&P-2018-35, Juneau.

Contents

List of Figures

List of Tables

♦ ♦ ♦

Purpose of this Report

This report provides a record of survey and inventory management activities for Dall sheep (*Ovis dalli*) in Units 19B and 19C 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).

I. RY11–RY15 Management Report

Management Area

This report covers the Alaska Range within Units 19B and 19C. This includes the drainages of the Kuskokwim River upstream of and including the Stony River drainage.

Summary of Status, Trend, Management Activities, and History of Dall Sheep in Units 19B and 19C

Units 19B and 19C are popular Dall sheep hunting areas for both resident and nonresident hunters. This area is not road-accessible but is relatively close to Alaska's largest population centers. In addition, the area is also open to hunting using a harvest ticket. This combination attracts large numbers of hunters to Unit 19C where crowding is a common complaint.

Aerial surveys have been conducted in Unit 19C, where 97% of the sheep harvest occurs. The sheep population was believed to be stable from the late 1970s to the mid-1980s (Shepherd 1980; Pegau 1985), but the current public perception is that sheep numbers are lower than in the past and that occupancy has contracted. However, only extrapolated population estimates exist and there are limited trend composition surveys from which to make comparisons. Many of the management questions related to harvestable surplus and population size identified by Whitman (1989) still exist.

Aircraft transportation dominates access to the area. Nonresident sheep hunters are required to hire a guide or hunt with a resident relative throughout Alaska and a large number of guide operations offer sheep hunts. Sealing of sheep has been required since fall 2004.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

Direction in the Dall sheep management plan (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 Unit 19 Dall sheep management reports. The plan portion of this document contains the future management plan for sheep in the Unit 19.

GOAL

G1. Provide an opportunity for sustainable harvest of Dall sheep rams similar to average historic levels.

CODIFIED OBJECTIVE

Amounts Reasonably Necessary for Subsistence Uses

C1. Unit 19 has a positive customary and traditional use finding for sheep, as determined by the Board of Game, with amounts reasonably necessary for subsistence uses of 1–5 sheep.

Intensive Management

None.

MANAGEMENT OBJECTIVE

M1. Using a full-curl harvest strategy, maintain harvest of rams averaging ≥8 years old.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Assess population trend and composition through annual aerial surveys.

Data Needs

Trend and composition data allow us to monitor sheep populations in the area.

Methods

Beginning in 2008, aerial trend and composition surveys were conducted in suitable sheep habitat in June, using 2 PA-18 aircraft. Surveys were flown during periods of calm air and were terminated as turbulence developed. We flew along contours at altitudes of 300–700 feet above ground level at airspeeds of 60–80 mph. Sheep were counted and classified as legal rams (full curl or larger), sublegal rams, ewe-like sheep, and lambs. The ewe-like category included adult ewes, all yearlings, and young rams (≤½-curl horns) not distinguishable from ewes. Data from

these areas were pooled each year. Prior to 2008 trend surveys were also flown, while the exact location of these surveys is unknown (the maps burned in the 2006 office fire), they were primarily flown in Unit 19C.

Results and Discussion

Survey data which are representative of Unit 19C exist back to 1972. While the methods and areas varied between years, large sample sizes were found in most years, and the historic data has some informative value. Not all results were reported; Table 1 shows the information available.

Beginning in 2008 we reestablished surveys in Unit 19C. Due to low ceilings we were not able to conduct any surveys in 2011 or 2012; however, surveys have been successfully completed since then (Table 1).

The lamb:ewe-like ratio in 2013 was the lowest recorded since surveys began in 1972 (Table 1). The ewe-like category was also very low that year (Table 1), which was likely due to poor yearling survival. We experienced a significant icing event in January 2013 as well as a late spring in May. This combination of weather events may have had a negative impact on ewe-like sheep and lambs. Our survey in 2017 documented the highest percentage of lambs since 1994 (Table 1).

The percentage of legal rams identified appears to have declined from the 1990s, however it has remained fairly consistent since 2003 at 5% (Table 1). However, there is no level of precision associated with these surveys.

Recommendations for Activity 1.1

Continue.

Table 1. Unit 19 Dall sheep composition counts, Interior Alaska, 1972–2017.

Date	Area (mi^2)	Survey time (hr)	Rams						Ewe-likes[b]		Lambs		Lambs:100 Ewes	Unk	Total sheep
			Full curl (%)[a]		<Full curl (%)[a]		Total (%)[a]		(%)		(%)				
Jun 1972		20											25:100		875
Jul 1973							55	(15)	218	(61)	82	(23)	38:100		355
Jun–Jul 1974							81	(9)	634	(69)	176	(19)	28:100	24	915
1975													41:100		224
1976													35:100		329
Jul 1977		5											48:100		678
Jul 1978							154	(15)	636	(62)	230	(23)	36:100		1,020
1984		2.6											45:100		485
Jul 1994	479	14.1	72	(9)	141	(17)	213	(26)	443	(54)	169	(20)	38:100	2	827
Jul 1995	598	21.4	107	(8)	190	(14)	297	(22)	826	(60)	249	(18)	30:100	11	1,383
Jul 1997	877	23.6	129	(9)	239	(17)	368	(26)	838	(59)	226	(16)	27:100	0	1,432
Aug 1998	386	14.8	49	(8)	172	(26)	221	(34)	341	(52)	92	(14)	27:100	0	654
Jun 2002	486	20.4	15	(2)	192	(22)	207	(24)	511	(59)	147	(17)	29:100	8	873
Jun 2003	417	14.4	30	(5)	228	(34)	258	(39)	295	(45)	108	(16)	37:100	1	662
Jun 2008	435	17.1	50	(8)	130	(20)	180	(28)	382	(60)	78	(12)	20:100	0	640
Jun 2009	315	14.3	23	(4)	162	(25)	185	(29)	361	(56)	100	(16)	28:100	0	646
Jun 2010	575	24.4	72	(4)	380	(21)	452	(25)	1,040	(56)	353	(19)	34:100	0	1,845
Jun 2013	465	23.0	61	(7)	225	(26)	286	(32)	503	(57)	94	(11)	19:100	0	883
Jun 2014	453	20.8	55	(5)	319	(27)	374	(32)	639	(54)	168	(14)	26:100	0	1,181
Jun 2015	453	19.7	46	(5)	255	(26)	301	(31)	499	(52)	167	(17)	33:100	0	967
Jun 2016	453	19.7	53	(5)	202	(19)	255	(24)	593	(57)	195	(19)	33:100	0	1,043
Jun 2017	453	21.4	60	(5)	283	(22)	343	(26)	697	(53)	266	(20)	38:100	0	1,306

[a] Percent is calculated based on the number of total sheep.

[b] Ewe-likes includes adult ewes, all yearlings, and young rams not distinguishable from ewes.

2. Mortality–Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor harvest by hunters and assess age of the harvest through harvest reports and horn sealing.

Data Needs

Annual summaries of harvest are necessary to understand harvest in relation to our management objective, subsistence, and sustained yield. Analysis of harvest data also informs department recommendations to the Alaska Board of Game.

Methods

We used mandatory harvest report data for both harvest ticket and permit hunts, and data collected during the mandatory horn sealing process. We used queries of a harvest database accessible through ADF&G's internal database to construct summaries of reported harvest. Successful hunters in all hunts are required to have the horns sealed within 30 days of the date of kill at an ADF&G office. During the sealing process, a uniquely numbered aluminum plug is placed in the horn, the sheep is aged, a broken determination (both, 1, or neither horns broken) is made, and measurements (including total length and base circumference) are taken. If timely harvest reports are not received, hunters receive up to 2 reminder letters, an e-mail (if an email address was provided by the hunter), and in some situations, a telephone call.

Season and Bag Limit

During RY11–RY15, resident and nonresident sheep hunters were allowed to hunt during 10 August–20 September with a bag limit of 1 ram with full-curl or larger horns, or at least 8 years of age, or with both horns broken. The full-curl regulation has been in effect since RY89. Beginning in RY14, a registration hunt was opened for 1 sheep with ¾-curl horn or smaller; excluding broomed rams, lambs, and ewes with lambs during 1 October–30 April.

Sheep hunting regulations for Units 19B and 19C during RY11–RY15 can be found in the Alaska hunting regulations booklets (ADF&G 2011, 2012, 2013, 2014, 2015). Current regulations can be found on ADF&G's website at http://www.adfg.alaska.gov/index.cfm?adfg=wildliferegulations.hunting.

Harvest by Hunters

Average annual reported harvest of sheep in Units 19B and 19C was 90 rams taken by hunters using harvest tickets during the full-curl ram hunts during RY11–RY15 (Table 2). This is higher than the average reported harvest of 68 rams during RY01–RY10, but still lower than the high average harvest of 106 during RY91–RY00.

During RY11–RY15, the average horn length of rams harvested during the harvest ticket season was 35.4 inches and the average age of rams harvested was 8.6 years (Table 2). In general, average horn length and age of harvested rams is influenced by the full-curl regulation because most rams become full-curl at 6–8 years of age and usually have a horn length ≥34 inches

(Heimer and Smith 1975). The number of rams harvested with horns ≥40 inches varied from a low of 1 in RY13 to a high of 7 during RY12 (Table 2).

The total number of hunters in Units 19B and 19C during harvest ticket hunts for full-curl rams averaged 171 during RY11–RY15 (Tables 3A and 3B) with a steady increase in hunters in Unit 19C during RY11–RY15 (Table 3B). The average number of hunters (171) during RY11–RY15 is higher than the average number of hunters (136) during RY01–RY10, but still lower than the average of 193 hunters per year during RY91–RY00.

Sheep harvested during the winter registration hunt included 2 sheep (both ewes) in RY14 and 4 sheep (2 ewes and 2 rams) in RY15.

Hunter Residency and Success

Unit 19B had few hunters, most of whom were residents (Table 3A). Nonresidents outnumbered resident hunters in Unit 19C during most of RY11–RY15. However, there has been a steady increase in resident participation and in RY15 there were more resident hunters than nonresidents (Table 3B). Nonresidents continue to be much more successful than residents in 19C and harvest 71% of all sheep, versus 29% harvested by residents (Table 3B). Success rates for nonresidents were likely higher than those for resident hunters because nonresidents typically were accompanied by guides.

Additional harvest information for specific hunt types, harvest success, harvest chronology, and transportation are available to the public for hunt planning on ADF&G's website https://secure.wildlife.alaska.gov/index.cfm?adfg=harvest.main

Harvest Chronology

As in previous reporting periods, most of the sheep harvest in Units 19B and 19C in the fall harvest ticket hunt occurred during the first week of the 6-week season (Table 4). During RY11–RY15, an average of 47% of the harvest occurred during 10–16 August and over half the sheep were harvested by the end of the second week.

Transport Methods

Most sheep hunters in the fall got to where they started hunting using an aircraft for access during RY11–RY15 (Table 5). There are no villages or roads in Units 19B and 19C. While other methods of transportation were reported, they are secondary to aircraft access and nearly all hunters arrive in these units via airplane (with the exception of the winter hunt, and a few boat hunters).

Sheep harvested in Unit 19C during the winter registration hunt were all taken by residents with a snowmachine.

Other Mortality

Winter weather, nutritional status, and predation are all potential sources of mortality, but the effects of these are unknown in this area.

Table 2. Units 19B and 19C Dall sheep harvest, horn length, and age, Interior Alaska, regulatory years[a] 2011–2015.

Regulatory year	Rams harvested	$\bar{x}$ Horn length (inches) of rams	Rams harvested ≥40 inches	$\bar{x}$ Age (yr)
2011	82	35.4	3	8.8
2012	87	35.6	7	8.8
2013	93	34.9	1	8.5
2014	90[b]	35.3	5	8.5
2015	98[c]	35.6	4	8.4

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).
[b] Two additional sheep were taken during the winter season.
[c] Four additional sheep were taken during the winter season.

Table 3A. Unit 19B Dall sheep hunter residency and success, Interior Alaska, regulatory years[a] 2011–2015.

Regulatory year	Successful				Unsuccessful				Total hunters
	Resident	Nonresident	Unk	Total (%)	Resident	Nonresident	Unk	Total (%)	
2011	1	0	0	1 (56)	1	0	0	1 (44)	2
2012	2	0	0	2 (61)	4	0	0	4 (39)	6
2013	1	1	0	2 (54)	3	1	0	4 (46)	6
2014	3	0	0	3 (48)	2	0	0	2 (52)	5
2015	4	0	0	4 (51)	1	1	0	2 (49)	6

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).

Table 3B. Unit 19C sheep hunter residency and success, Interior Alaska, regulatory years[a] 2011–2015.

Regulatory year	Successful				Unsuccessful				Total hunters
	Resident	Nonresident	Unk	Total (%)	Resident	Nonresident	Unk	Total (%)	
2011	11	70	0	81 (56)	50	14	0	64 (44)	145
2012	24	61	0	85 (61)	38	17	0	55 (39)	140
2013	27	63	1	91 (54)	44	32	0	76 (46)	167
2014	32	57	0	89 (48)	58	39	0	97 (52)	186
2015	35	63	0	98 (51)	69	25	0	94 (49)	192

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).

Table 4. Units 19B and 19C Dall sheep percent harvest chronology by week, Interior Alaska, regulatory years[a] 2011–2015.

Regulatory year	Harvest chronology by week (%)							
	8/10–8/16	8/17–8/23	8/24–8/30	8/31–9/6	9/7–9/13	9/14–9/20	Unk	*n*
2011	31 (38)	11 (13)	16 (20)	13 (16)	8 (10)	3 (4)	0 (0)	82
2012	39 (45)	17 (20)	7 (8)	7 (8)	12 (14)	5 (6)	0 (0)	87
2013	46 (49)	10 (11)	12 (13)	8 (9)	6 (6)	9 (10)	2 (2)	93
2014	41 (46)	10 (11)	12 (13)	9 (10)	10 (11)	8 (9)	0 (0)	90[b]
2015	54 (55)	14 (14)	3 (3)	14 (14)	7 (7)	6 (6)	0 (0)	98[c]

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).

[b] Two additional sheep were taken during the winter season.

[c] Four additional sheep were taken during the winter season.

Table 5. Units 19B and 19C sheep hunting percent by transport method, Interior Alaska, regulatory years[a] 2011–2015.

Regulatory year	Hunting by transport method (%)																n
	Airplane		Horse		Boat		4-wheeler		Snowmachine		ORV		Highway vehicle		Unk		
2011	134	(91)	2	(1)	1	(0)	4	(3)	0	(0)	5	(3)	1	(0)	0	(1)	147
2012	129	(88)	0	(0)	1	(0)	2	(1)	0	(0)	6	(4)	0	(0)	8	(5)	146
2013	140	(81)	3	(2)	0	(0)	11	(6)	0	(0)	9	(5)	1	(0)	9	(5)	173
2014	158	(83)	2	(1)	1	(0)	8	(4)	8	(4)	5	(3)	1	(0)	8	(4)	191
2015	165	(83)	1	(0)	2	(1)	10	(5)	5	(3)	7	(4)	0	(0)	8	(4)	198

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2011 = 1 July 2011–30 June 2012).

Alaska Board of Game Actions and Emergency Orders

Beginning in RY14, the Board of Game authorized a limited winter registration hunt for resident hunters in Unit 19C. A legal sheep was defined as ¾-curl or smaller, excluding rams with both tips broken, lambs, and ewes accompanied by lambs. Aircraft are not allowed, and hunters are required to call in to receive a hunt period to avoid overharvest.

No emergency orders were issued during RY11–RY15.

Recommendations for Activity 2.1

Continue.

3. Habitat Assessment–Enhancement

None.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

The effects of weather, nutritional status, habitat, survival, ram to ewe ratios, parturition, and recruitment of sheep in Unit 19B and 19C are poorly understood. Further research to address these questions would add insight to sheep management in the area.

Data Recording and Archiving

- Harvest data are stored in a database housed on ADF&G's Wildlife Information Network (WinfoNet) internal server (http://winfonet.alaska.gov/index.cfm).
- Field data sheets for surveys, memos, and location data are stored on the WinfoNet server under Data Archives/McGrath Area Office.
- Hard copies and electronic data and files such as survey memos and reports are also located in files and on the computer in the McGrath Area office.

Agreements

None.

Permitting

None.

Conclusions and Management Recommendations

The number of guide–outfitters operating in Units 19B and 19C was unrestricted during RY11–RY15. Hunter reports of crowding in Unit 19C are common and we receive complaints from resident hunters and guides. Complaints in Unit 19C include crowding and guides aggressively dominating the early part of the season and disrupting other people's hunts. It appears the quality of the sheep hunting experience is being affected in a negative way by these conditions. The Board of Game has received a number of proposals in recent years requesting some sort of

preference for resident hunters. To address these proposals, the Board of Game requested a survey of sheep hunters be initiated to look for common themes as well as possible solutions. Results of this survey can be found at http://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/mgt_rpts/14_sheep_hunter_survey_report.pdf.

The Big Game Commercial Services Board, which oversees guide, outfitter, and transporter activities, is currently considering regulations to create exclusive guide use areas that would limit the amount of guided hunting in these areas. We will monitor this process to see if any solutions emerge to alleviate this allocation issue.

The number of lambs declined sharply in 2013, likely related to weather events including a particularly late spring. We will continue to attempt composition surveys annually; however, weather and funding do not permit us to fly every year. Also, methods to estimate statistical precision, e.g., by utilizing double-count methods (Whitten 1997) are not used because they are cost prohibitive. Therefore, the unknown precision of these data limits our ability to interpret them.

Harvest report data show an average of 171 hunters in the fall harvest ticket hunt during RY11–RY15. Hunters interviewed by Alaska Wildlife Troopers and ADF&G staff during sealing have complained of hunter crowding. While the current level of hunting pressure is still below the average of 193 hunters per year during RY91–RY00, there has been a steady increase in the number of hunters since RY01. Also, during the 1990s hunters were not required to bring sheep horns to be sealed. Therefore, complaints may not have been registered because they did not encounter agency personnel.

Average annual fall harvest during RY11–RY15 was lower than in the 1990s (90 versus 106), but there has been a steady increase in harvest since RY01.

The first plan for sheep in this area was drafted in 1976. In this plan Units 19B and 19C were identified to provide an opportunity to hunt under aesthetically pleasing conditions, not to provide the greatest opportunity to participate in hunting, as some areas were (Fig. 1). Over the years management in Unit 19B and 19C changed from the original goal because “aesthetically pleasing conditions” was considered too subjective. Currently with a harvest ticket and a full-curl regulation, Units 19B and 19C now closely model the management goal to provide the greatest opportunity to participate in hunting. Because of user conflicts regulatory changes to address hunt quality are recommended, and the goal to hunt under aesthetically pleasing, uncrowded conditions will be added for the next report period.

We met our management objective of maintaining a harvest of rams averaging ≥8 years old during RY11–RY15 with an average age of 8.6 years. We also met the objective to maintain a winter harvest of fewer than 10 sheep since this season began in RY14. We also met our management goal to provide an opportunity for sustainable harvest of Dall sheep rams similar to average historic levels.

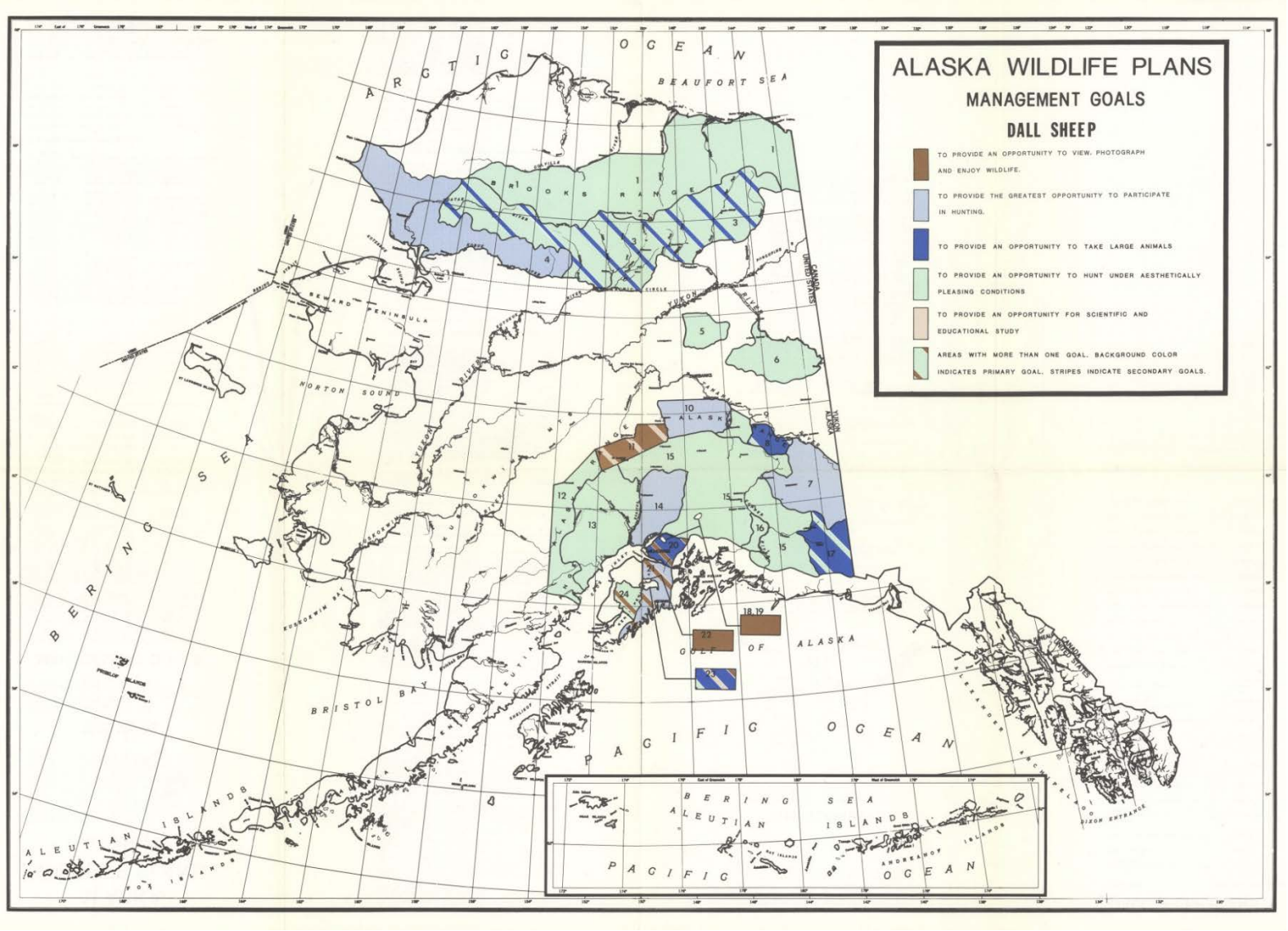

Figure 1. Alaska Dall sheep management goals map, 1976.

II. Project Review and RY16–RY20 Plan

Review of Management Direction

MANAGEMENT DIRECTION

The RY11–RY15 management direction and goal for Units 19B and 19C were generally appropriate; however, the goals will be altered slightly for RY16–RY20.

GOALS

Specifically, the goals for the RY16–RY20 reporting period will be to

G1. Provide for subsistence opportunity.

G2. Provide an opportunity for sustainable harvest of Dall sheep rams similar to average historic levels.

G3. Provide an opportunity to hunt under aesthetically pleasing, uncrowded conditions.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

C1. Unit 19 has a positive customary and traditional use finding for sheep, as determined the Board of Game, with amounts reasonably necessary for subsistence uses of 1–5 sheep.

Intensive Management

None.

MANAGEMENT OBJECTIVES

The RY11–RY15 management objective for Units 19B and 19C was generally appropriate; however, an objective regarding the winter hunt will be added for RY16–RY20.

M1. Using a full-curl harvest strategy, maintain harvest of rams averaging ≥8 years old.

M2. Maintain a winter harvest of fewer than 10 sheep ¾-curl or less, excluding rams with both tips broken, lambs, and ewes accompanied by lambs.

REVIEW OF MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Assess population trend, and composition through annual aerial surveys.

Data Needs

The effects of weather, nutritional status, habitat, survival, ram to ewe ratios, parturition, and recruitment of sheep in Unit 19B and 19C are poorly understood. Further research to address these questions would add insight to sheep management in the area.

Methods

Work with regional sheep research biologist to evaluate ram:ewe ratios and lamb:ewe ratios.

2. Mortality–Harvest Monitoring

ACTIVITY 2.1. Monitor harvest by hunters and assess age of the harvest through harvest tickets and horn sealing.

Data Needs

No change from report.

Methods

Harvest data will be assessed using queries of the database accessible through WinfoNet. We will follow methods from the prior reporting period.

3. Habitat Assessment–Enhancement

None.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Same as the prior reporting period.

Data Recording and Archiving

Sheep survey data are located in files in the McGrath office. Historic data will be archived in the WinfoNet data archiving system as time permits.

Agreements

None.

Permitting

None.

References Cited

ADF&G (Alaska Department of Fish and Game). 1976. Alaska wildlife management plans: Interior Alaska (draft proposal; subsequently adopted by Alaska Board of Game). Division of Game, Federal Aid in Wildlife Restoration, Project W-17-R, Juneau.

ADF&G (Alaska Department of Fish and Game). 2011. 2011–2012 Alaska hunting regulations. No. 52. Division of Wildlife Conservation, Juneau.

ADF&G (Alaska Department of Fish and Game). 2012. 2012–2013 Alaska hunting regulations. No. 53. Division of Wildlife Conservation, Juneau.

ADF&G (Alaska Department of Fish and Game). 2013. 2013–2014 Alaska hunting regulations. No. 54. Division of Wildlife Conservation, Juneau.

ADF&G (Alaska Department of Fish and Game). 2014. 2014–2015 Alaska hunting regulations. No. 55. Division of Wildlife Conservation, Juneau.

ADF&G (Alaska Department of Fish and Game). 2015. 2015–2016 Alaska hunting regulations. No. 56. Division of Wildlife Conservation, Juneau.

Heimer, W. E., and A. C. Smith. 1975. Ram horn growth and population quality – Their significance to Dall sheep management in Alaska. Alaska Department of Fish and Game, Division of Game, Technical Bulletin No. 5, Juneau.

Pegau, R. E. 1985. Units 9, 16, 17, and 19 Dall sheep. Pages 5–7 [*In*] B. Townsend, editor. Dall sheep management report of survey–inventory activities 1 July 1984–30 June 1985. Alaska Department of Fish and Game, Division of Game, Federal Aid in Wildlife Restoration Job 6.0, Juneau.

Shepherd, P. E. K. 1980. Units 17 and 19 Dall sheep. Page 102 [*In*] R. A. Hinman, editor. Dall sheep management report of survey–inventory activities 1978–1979. Alaska Department of Fish and Game, Division of Game, Federal Aid in Wildlife Restoration Job 6.0, Juneau.

Whitman, J. S. 1989. Units 9, 16, 17, and 19 Dall sheep. Pages 6–14 [*In*] S. O. Morgan, editor. Dall sheep management report of survey–inventory activities 1 July 1987–30 June 1988. Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Job 6.0, Juneau.

Whitten, K. R. 1997. Estimating population and composition of Dall sheep in Alaska: Assessment of previously used methods and experimental implementation of new techniques. Alaska Department of Fish and Game, Division of Wildlife Conservation, Research Final Report, Federal Aid in Wildlife Restoration Study 6.11, Juneau.

♦ ♦ ♦


ALASKA
DEPARTMENT OF FISH AND GAME