

Dall Sheep Management Report and Plan, Game Management Unit 14A, Chugach Range:

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

Tim C. Peltier



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Plan Period 1 July 2016–30 June 2021

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This species management report and plan was reviewed and approved for publication by Todd Rinaldi, Management Coordinator for Region IV for the Division of Wildlife Conservation.

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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 the Chugach Mountain Range area of Unit 14A for the 5 regulatory years 2011–2015 and plans for survey and inventory management activities in the 5 regulatory years 2016–2020. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY11 = 1 July 2011–30 June 2012). This report is produced primarily to provide the department’s staff with data and analysis to help guide and record its own efforts; it is also provided to the public to inform it of wildlife management activities. The Alaska Department of Fish and Game’s (ADF&G) Division of Wildlife Conservation (DWC) launched this 5-year report type to more efficiently report on trends and describe potential changes in data collection activities. It replaces the Dall sheep management report of survey and inventory activities that was previously produced every 3 years.

I. RY11–RY15 Management Report

Management Area

The Chugach Mountain Range (Chugach Range, the Chugach) is located in Southcentral Alaska. It is approximately 250 miles long and 60 miles wide. The portion of the range that is managed by DWC’s Palmer office is located in Unit 14A just outside of Palmer, Alaska. The area is bound from the northwest by the Matanuska River, from the south by the Knik River and Knik Glacier, and from the east by the boundary with Unit 13D. Dall sheep primarily use the alpine areas of the Chugach. Their winter range is characterized by wind swept hillsides that allow for grazing on frozen grasses and sedges. They have also been found occasionally on mineral licks near the Knik River flats close to escape terrain. For the purposes of conducting aerial surveys the unit has been subdivided into 7 count areas (CA). Of these 7 areas, the easternmost CA rarely has Dall sheep observed and is more suitable mountain goat (*Oreamnos americanus*) habitat. The total area of the remaining portion of the survey area is 435 mi² or approximately 1,127 km².

Summary of Status, Trend, Management Activities, and History of Dall Sheep in Unit 14A, Chugach Range

Dall sheep are recognized as an integral part of the ecosystem throughout alpine and subalpine areas in Unit 14A and are managed to provide for a wide variety of human uses and values including hunting, photography, viewing, and scientific research (ADF&G 2002). Sheep harvest has been limited to adult rams in the portion of the Chugach Mountains in Unit 14A. From 1967 through 1978, sheep were managed under a ¾-curl horn minimum size regulation, and from 1979 through 1988 they were managed under a ⅞-curl horn minimum size regulation. Beginning in 1989 hunters could harvest only full-curl rams (Rinaldi 2014).

Sheep harvest data have been collected from hunter harvest reports since 1967. Beginning in RY04 hunters were required to have harvested sheep sealed by ADF&G or Alaska Department of Public Safety (DPS) staff. This led to improved data collection and compliance with regulations. The average annual harvest between RY88 and RY06 was 23 rams.

Increasing guided hunting pressure through the 1990s and 2000s became apparent by a trend in higher proportions of nonresident hunters and increased nonresident hunter success. The average harvest by nonresident hunters was 5 sheep annually RY00–RY99, and 10 sheep annually RY00–RY06. Due to the increase in harvest pressure, complaints of overcrowding, and a decrease in overall sheep numbers, the sheep hunt in Unit 14A, Chugach Range was converted to a draw permit system in 2008.

When Unit 14A, Chugach Range went from a general season harvest structure to a draw hunt structure the bag limit also was changed from rams that had a full 360° of horn growth (“full-curl”) or were at least 8 years old to ‘any ram’ regardless of age or degree of horn curl. There were 2 different reasons for this change. First, there are fewer concerns for law enforcement for an any ram bag limit since taking a sheep that is less than full curl, providing it is male, is perfectly legal. This is seen as a benefit both to law enforcement, because of the reduced effort on their part, and to hunters who may be nervous or inexperienced and concerned about taking ‘legal’ sheep. Second, annual harvest of full curl rams during the general season hunt had been close to or occasionally greater than the number of full curl rams seen in the latest survey. On average, more than 80% of the number of sheep judged to be full curl in the summer survey were taken that fall. This led to concerns by managers that full curl rams were being harvested within the first year or two after becoming legal, leading to a situation where fast-growing rams were being harvested quickly, thereby skewing the ram population over time to those that grew horns more slowly.

Whether or not trophy hunting has a negative impact on the size of secondary sexual characteristics such as horn size is debatable (Harris et al. 2002; Coltman et al. 2003; Loehr et al. 2007, Festa-Bianchet et al. 2014). Few actual studies that examine the relationship between trophy hunting and selective pressure exist, therefore due to slow generation time of ungulates, computer simulations have been used to model the effects of trophy selection on inherited traits (Thelen 1991; Hundertmark et al. 1993; Strickland et al. 2001). Modelling and the few studies available show that there is potential for a negative impact on trophy size; however, the impacts would take several generations to manifest and there are other confounding factors. Horn growth can be influenced by nutrition (Hoefs and Nowlan 1997), weather (Loehr et al. 2010), and density dependent factors (Jorgenson et al. 1993, 1998). The potential positive effects on horn size by changing the harvest strategy from full-curl to any ram could take decades to become evident.

Historically, 14A sheep surveys have been inconsistently funded and conducted when adequate funding, appropriate weather, and staff were available (Schwanke et al. 2008). The first formal sheep surveys in the unit were completed in 1973 (Didrickson and McIlroy 1978). Recently, increased effort has been made to fly on a more frequent and consistent basis; this has resulted in partial or complete surveys in 9 of the past 10 years.

The population declined throughout the Chugach Mountains during the early 2000s due to several years of severe snow and ice conditions; in particular, the winter of 2003–2004 was characterized by deep snow and may have had a profound effect in decreasing sheep survival (Coltrane 2005). Sporadic surveys completed in Unit 14A, Chugach Range after the winter of 2003–2004 suggest that there was a population reduction during the mid-2000s.

Management Direction

EXISTING WILDLIFE MANAGEMENT PLANS

Plans specific to Dall sheep in Unit 14A, Chugach Range were incorporated under the “Nelchina Basin Sheep Management Plan” (ADF&G 1976, pages 100–101). This plan has been modified by Board of Game regulatory actions over the years and changes to approach have been recorded in periodic Dall sheep management reports.

GOALS

- Provide the opportunity to hunt sheep under aesthetically pleasing conditions.

CODIFIED OBJECTIVES

None.

Amounts Reasonably Necessary for Subsistence Uses

Not applicable.

Intensive Management

Sheep are not designated as an intensive management species in the state of Alaska. Intensive management predator control programs implemented for moose or caribou may affect predation levels on sheep.

MANAGEMENT OBJECTIVES

- The harvest objective for the Unit 14A portion of the Chugach Range is to harvest at least 20 rams annually.
- Provide a quality sheep hunting experience and opportunity to take a trophy ram while maintaining the genetic diversity of the population.

MANAGEMENT ACTIVITIES

Assessing population status and trends, monitoring harvest and mortality, and assessing habitat conditions are integral components of management of Dall sheep in Unit 14A, Chugach Range. Survey and inventory (S&I) management activities used to monitor the population in Unit 14A, Chugach Range are described below.

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial surveys in count areas (CAs) to determine population size, sex and age composition, productivity, and trends.

Data Needs

Dall sheep abundance is a basis from which sustainable harvest may be estimated and provides a density context for interpreting nutritional condition relative to habitat conditions. Sex and age composition information can be used to determine appropriate harvest levels as well as recruitment into the population. Sex and age ratio data may also be used to model population structure and trends.

Methods

Aerial surveys using fixed-wing aircraft are intended to provide a minimum count of sheep in the Unit 14A, Chugach Range, as well as the sex and age composition of the sheep population (Fig. 1; Appendix A). Surveys flown in established count areas also allow for comparisons across years and aid staff in setting appropriate permit levels. Pilot-observer teams fly count areas following elevational contours and record sheep individuals and groups observed. Aerial surveys are planned to be completed annually or biennially as time and funding allowed. Surveys are conducted when most of the previous winter's snow had melted – prior to the sheep hunting season (August 10). In most years this occurs in July.

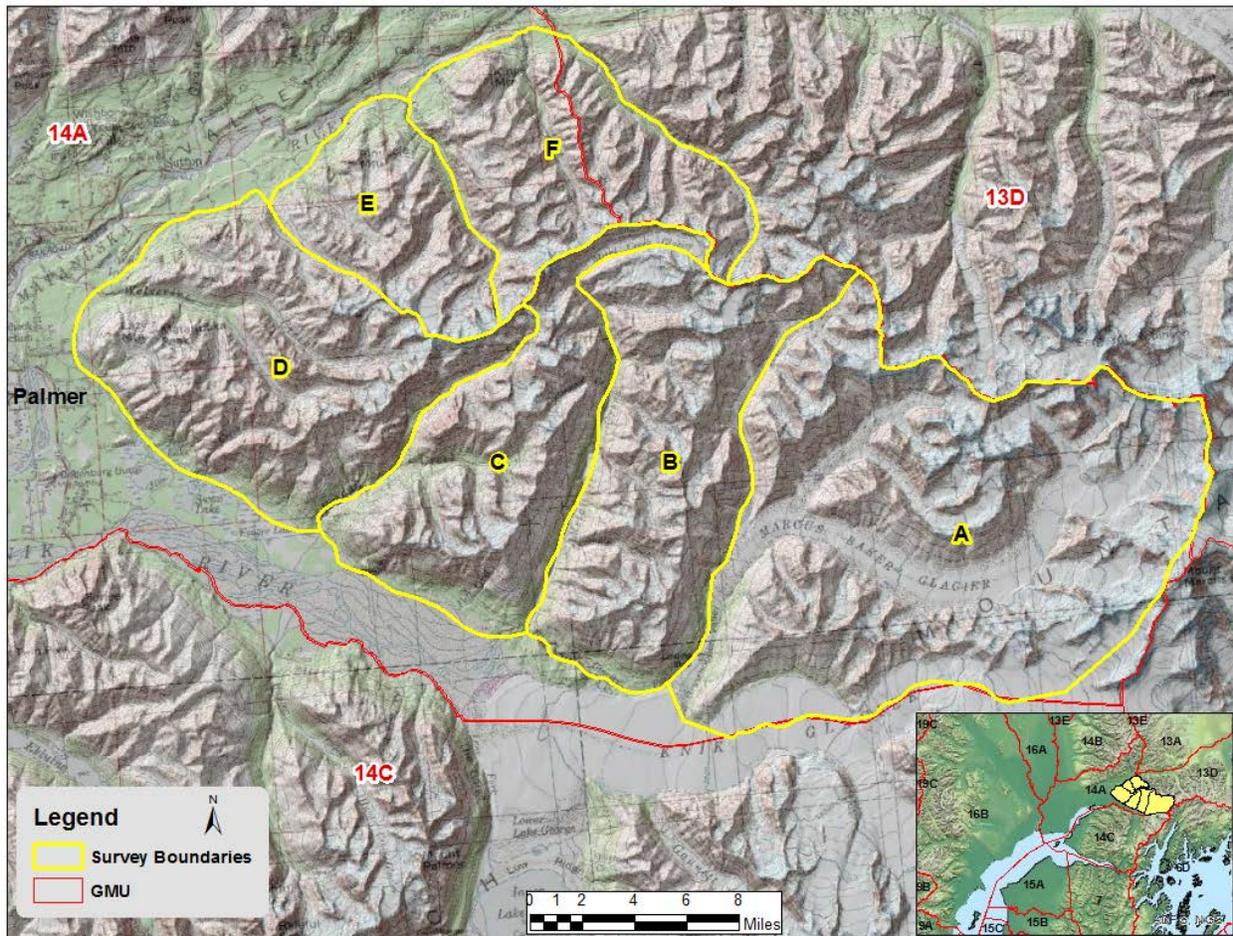


Figure 1. Map of Unit 14A, Chugach Range, Alaska sheep and goat survey boundaries.

Results and Discussion

The Unit 14A, Chugach Range sheep population appears to be relatively stable at approximately 600–800 sheep. Surveys were conducted annually during the reporting period with the exception of 2015. The 2011 survey was incomplete due to poor weather conditions (Table 1).

Table 1. Unit 14A, Chugach Range, Alaska sheep composition surveys and estimated population size, 2011–2015.

Regulatory year	Full curl (%) ^a	Rams < full curl	Ewes ^b	Lambs (%) ^c	Total sheep observed	Estimated Population size
2011 ^d	14 (10)	127	302	103 (19)	546	–
2012	16 (9)	161	329	59 (10)	565	600–700
2013	11 (7)	157	320	65 (12)	553	600–700
2014	13 (8)	159	328	90 (15)	590	650–750
2015 ^e	–	–	–	–	–	–

^a Does not include an unknown number of legal rams at least eight years old with less than full curl horns or with both horn tips broken. Percent full-curl is calculated as a proportion of total rams.

^b Ewes include yearlings of both sexes and rams of ¼ curl or less.

^c Percent lambs is calculated as a proportion of the total sheep observed.

^d Partial survey conducted.

^e No survey conducted.

Recommendations for Activity 1.1.

Modify as follows:

Survey accuracy may be improved by incorporating the use of digital single-lens reflex cameras (DSLR) for group size and age class determination. Currently, groups of sheep are marked with GPS waypoints and their position noted on the worksheets. By taking photographs of groups of sheep, and noting the photo number and corresponding waypoint, staff could verify the group size recorded. In addition, photos of males with various horn classes may be used as a training aid for new observers and improve consistency between observers. The 14A Chugach sheep population garners a lot of attention from sheep hunters all over the state and from outside of Alaska. Population surveys should be conducted on a biennial basis in order to have accurate, current information on which to base permit levels and to have a better understanding of long-term trends in the Dall sheep population fluctuations throughout Southcentral Alaska. A biometrician should be consulted to determine which adjustments in the sampling scheme should be done to address the high variance of the results that cannot be explained by modelling the population (See Plan Section Activity 1.2)

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor Dall sheep mortality through field observations, sealing, hunter harvest reports, contact with hunters, and reports of other causes of mortality.

Data Needs

Monitoring, collecting, and analyzing harvest data are critical for sustained yield management. Information collected from harvest reports and through the sealing process can inform management decisions regarding season length, permit levels, and appropriate methods of take.

Methods

Dall sheep hunting efforts in Unit 14A, Chugach Range are recorded through the permits submitted by individual hunters participating in the draw hunt. The information is supplemented with data gathered when successful hunters present their horns for sealing to area ADF&G offices.

Season and Bag Limit

Dall sheep hunting in Unit 14A, Chugach Range is based on a permit system of hunting with few hunters drawn relative to the number of applicants for available permits. Nonresidents are limited to 10% of the available permits for the unit. The hunt area is divided into 3 separate hunt areas (Fig. 2). The area is further divided by 2 periods for hunting; 10 August–25 August and 26 August–20 September. Under this draw hunt the bag limit is any 1 ram.

<u>State Hunts</u>	<u>Bag Limit</u>	<u>Early Seasons</u>	<u>Late Seasons</u>
<i>Metal Creek</i>			
Residents	Any 1 ram	DS170	DS175
Nonresidents	Any 1 ram every 4 years	DS270	DS275
<i>Friday Creek</i>			
Residents	Any 1 ram	DS180	DS185
Nonresidents	Any 1 ram every 4 years	DS280	DS285
<i>Carpenter Creek</i>			
Residents	Any 1 ram	DS190	DS195
Nonresidents	Any 1 ram every 4 years	DS290	DS295

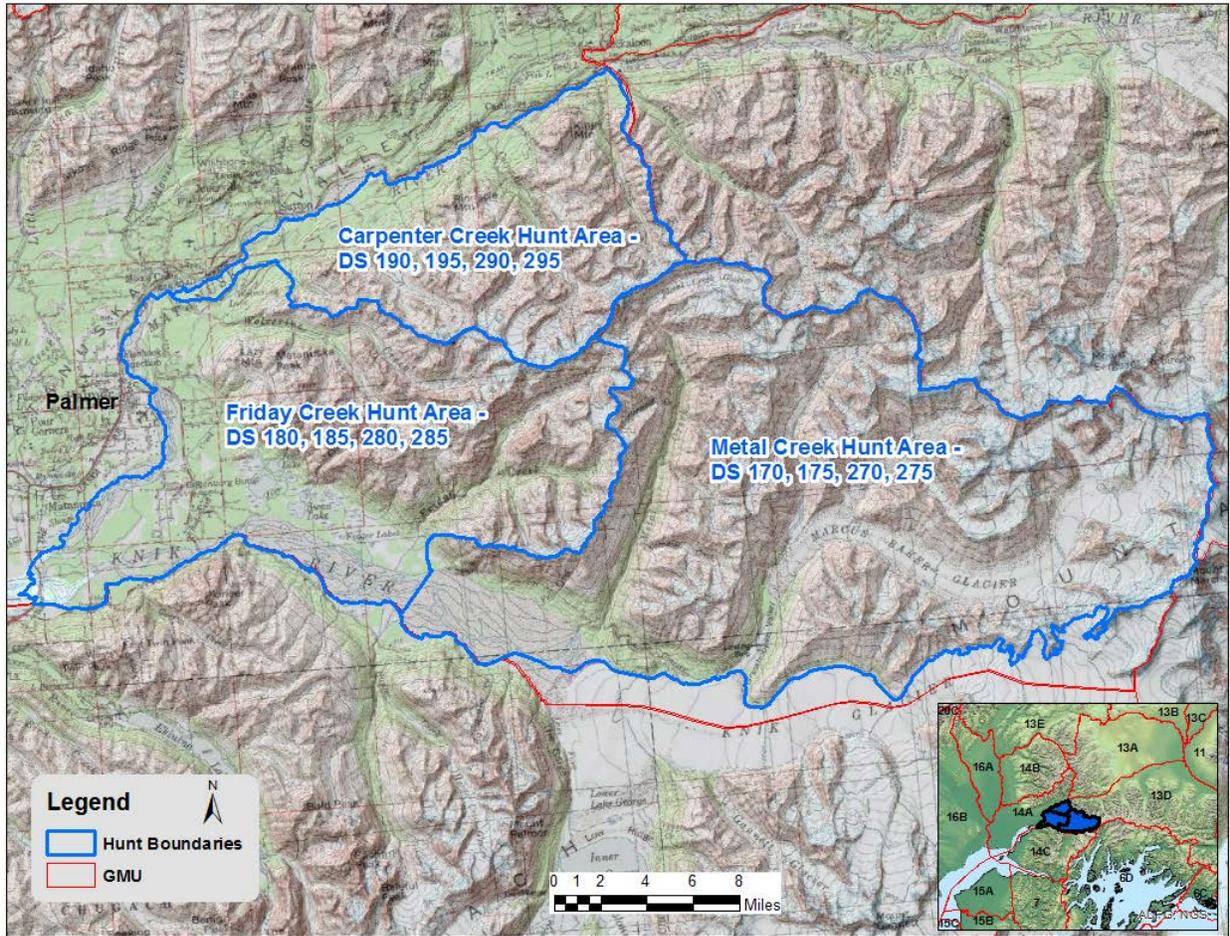


Figure 2. Map of Unit 14A, Chugach Range, Alaska sheep draw hunt boundaries.

Results and Discussion

Hunter Harvest

Hunter harvest averaged 16.6 rams per year during the reporting period (RY11–RY15; Table 2). This number is much lower than the 27.6 average during RY03–RY07, the last 5 years of general season full curl management in the unit. This lower level of harvest is the direct consequence of limiting the number of hunters—especially nonresident hunters—that may participate in the hunt under the current draw permit system.

The average annual horn size during RY11–RY15 was 32.7 inches, which is less than the 36-inch average for the previous 5 years of full curl management. The average annual percent of rams taken over 40 inches was 5.6% compared to 5.3% for RY03–RY07 (Table 2).

Table 2. Unit 14A, Chugach Range, Alaska sheep harvest, regulatory years^a 2011–2015.

Regulatory year	Rams	Average horn length (inches) ^b	% \geq 40 inches	Ewes	Total sheep
2011	14	35.0	0	0	14
2012	12	32.2	0	0	12
2013	18	30.6	11	0	18
2014	17	33.4	17	0	17
2015	22	32.5	0	0	22

^a A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

^b Includes only rams for which horn length was reported.

DWC staff anticipated that harvest characteristics such as average horn size and average age of rams harvested would decrease when the bag limit was changed from full curl to any ram. Other states and provinces that have had similar changes to their hunt structure noticed that these decreases were offset over time with gradual increases in both parameters. At this point in time there appear to be increases in both average horn length and average age of sheep harvested (Fig. 3).

Permit Hunts

The Board of Game changed the hunt structure for the Unit 14A, Chugach Range in the spring of 2007 from a general harvest to a draw hunt system and authorized up to 100 permits for the hunt. The department has been slowly increasing the number of permits available since this change. Forty permits were issued annually RY08–RY11, 52 permits were issued in RY12, and 75 permits have been issued annually since RY13.

On average, 68% of the hunters who won a draw hunt permit for 14A Chugach Range RY11–RY15 actually participated in the hunt and 35% of those participating hunters were successful. There is much variation in the number of participants and the success rate of participants on an annual basis, however the idea that 2/3 of draw permits are used and 1/3 of those are successful can be useful in planning future permit levels.

Hunter Residency and Success

Local residents took an annual average of 63% of the harvest during the reporting period (Table 3). However, since Anchorage and most Matanuska Valley residents are considered local for purposes of this report, the trend is to be expected. Non-residents are required to hunt either with a guide or with a relative who is at least second-degree kindred of an Alaska resident 19 years or older. Nonresidents who participate in the hunt have a greater likelihood of success due to the guide requirement and the efficacy of guides operating in the area.

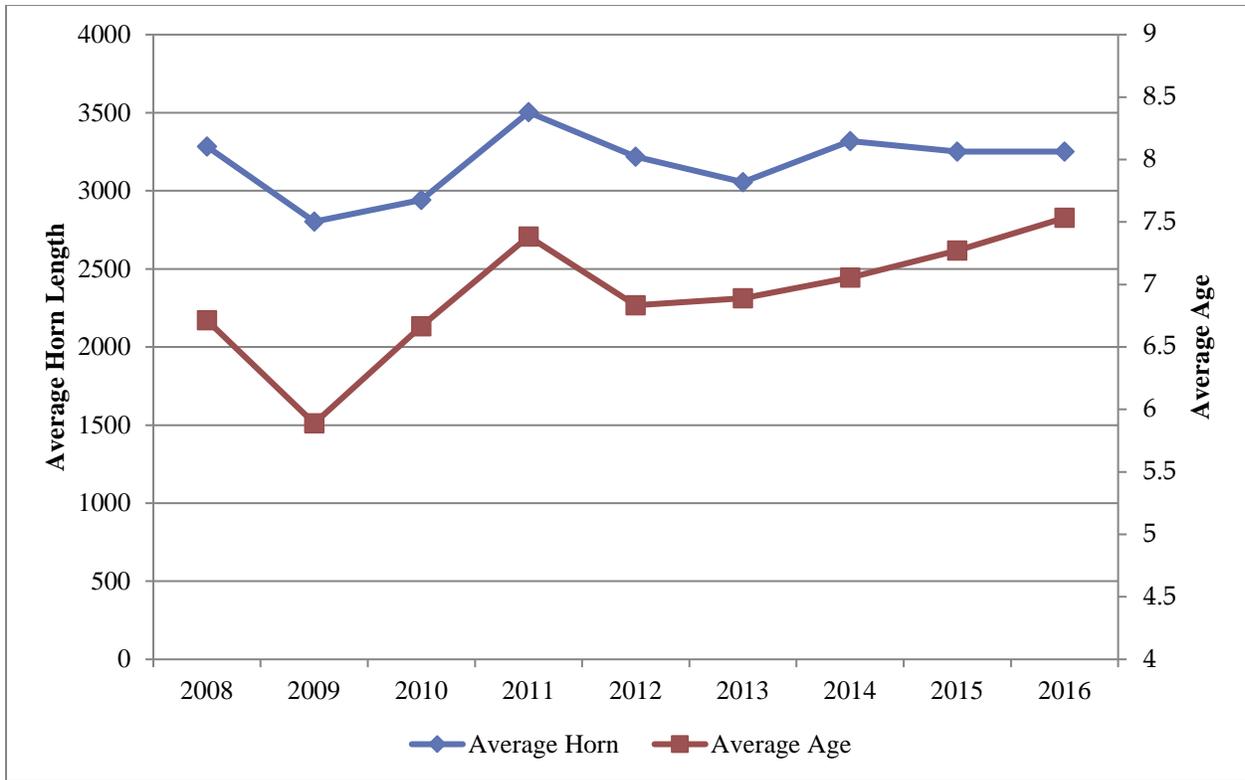


Figure 3. Average length of the longest horn and average age of sheep harvested in Unit 14A, Chugach Range, Alaska, regulatory years^a 2002–2016.

^a A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

Table 3. Unit 14A, Chugach Range sheep hunter residency and success, regulatory years^a 2011–2015.

Reg. year	Successful				Unsuccessful				Total
	Local resident ^b	Non-local resident	Non-resident	Total (%)	Local resident ^a	Non-local resident	Non-resident	Total (%)	
2011	8	2	4	14 (33)	23	3	2	28 (67)	42
2012	9	1	2	12 (28)	29	0	2	31 (72)	43
2013	8	4	6	18(46)	19	2	0	21(54)	39
2014	9	4	4	17(33)	29	4	2	35(67)	52
2015	18	1	3	22(42)	23	5	2	30(58)	52

^a A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

^b Local residents refers to those who reside in Game Management Unit 14.

Harvest Chronology.

Despite splitting the season into 2 periods, an annual average of 48% of rams taken in the unit were taken within the first 7 days of the season RY11–RY15 (Table 4).

Table 4. Unit 14A, Chugach Range, Alaska sheep harvest chronology percentage by harvest period, regulatory years^a 2011 through 2015.

Regulatory Year	Harvest periods						<i>n</i>
	8/10–8/16	8/17–8/23	8/24–8/30	8/31–9/6	9/7–9/13	9/14–9/20	
2011	36	14	14	14	14	8	14
2012	58	8	18	8	8	0	12
2013	50	6	22	11	6	5	18
2014	60	0	28	6	6	0	17
2015	41	9	32	14	0	4	22

^a A regulatory year begins 1 July and ends 30 June, e.g., regulatory year 2011 = 1 July 2011–30 June 2012.

Transport Methods. Most successful hunters reported using airplanes or all-terrain vehicles (ATVs) to access their hunting areas and this has been the pattern for the more than 10 years (Table 5). Analysis of the harvest data shows that, in general, hunters who access the area by aircraft take larger sheep than hunters who access the area by other means.

Table 5. Unit 14A, Chugach Range, Alaska sheep harvest percentage by transport method, regulatory years^a 2011–2015.

Regulatory year	Percent of harvest							<i>n</i>
	Airplane	Horse	Boat	ATV	ORV	Highway vehicle	Unknown	
2011	79	0	0	7	0	0	14	14
2012	67	8	0	25	0	0	0	12
2013	72	0	0	22	0	0	6	18
2014	83	0	0	17	0	0	0	17
2015	55	0	0	23	9	13	0	22

^a 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

None.

Recommendations for Activity 2.1.

Continue.

3. Habitat Assessment–Enhancement

There were no habitat assessment or enhancement activities during RY11–RY15.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- Harvest data and copies of sealing forms are stored on an internal database housed on a server (<http://winfonet.alaska.gov/index.cfm>).
- Field data sheets are scanned and housed on the network server in the Palmer Area Biologist office (O:\WC\Palmer Area Office Folder\Species\Sheep\Scanned Archive Files) and stored in file folders located in the Palmer Assistant Area Biologist’s office.

Agreements

None

Permitting

None

Conclusions and Management Recommendations

As mentioned by Rinaldi (2014), the draw hunt and any ram bag limit were established to aid in achieving the management objective of providing a quality sheep hunting experience with opportunity to take a trophy ram while maintaining the genetic diversity of the population. Because any changes that result from this newer harvest strategy will take years to manifest in the sheep population, we recommend keeping the draw hunt and any-ram bag limit in place for a sufficient period of time to evaluate these changes. Public acceptance of the draw hunt and the any-ram bag limit will also need to be maintained to avoid regulatory changes.

The sheep population and harvests will be closely monitored to evaluate the trophy ram potential in Unit 14A, Chugach Range. The collection of horn morphometric data which began in the Palmer office in 2007 should continue to determine whether the any-ram bag limit will be successful in diversifying the ram age classes and to document changes in horn characteristics that result from the new harvest strategy.

The management harvest goal of 20 sheep annually should be evaluated for feasibility given that this static goal has remained in place throughout fluctuations in the sheep population. Having a harvest goal based on a number that is independent of population size or hunting pressure is arbitrary at best, since it does not incorporate modelling of the population to determine sustainability of such a harvest goal. If harvest objectives are to be part of the Unit 14A,

Chugach Range strategy they should incorporate the current estimated population, the historical harvest, and/or percent success rate, and be informed with input from current research and the sheep hunting public.

II. Project Review and RY16–RY20 Plan

Review of Management Direction

MANAGEMENT DIRECTION

Management direction will remain largely the same through RY20, with slight modifications as noted below.

GOALS

The existing goal will be retained:

- Provide the opportunity to hunt sheep under aesthetically pleasing conditions.

A new goal is added for RY15–RY20:

- Determine appropriate harvest levels to shape future management direction.

CODIFIED OBJECTIVES

None.

Amount Reasonably Necessary for Subsistence Uses

None.

Intensive Management

Sheep are not designated as an intensive management species in the state of Alaska. Intensive management predator control programs implemented for moose or caribou may affect predation levels on sheep.

MANAGEMENT OBJECTIVES

The primary objective will be retained:

- Provide a quality sheep hunting experience and opportunity to take a trophy ram, while maintaining the genetic diversity of the population.

However, the previous objective of harvesting 20 rams annually has been modified for RY16–RY20:

- The harvest objective for the Unit 14A portion of the Chugach Range is for a ram harvest that is no more than 8% of the 3-year average estimated number of rams in the population based on 3 years of aerial survey data. Permit levels will be adjusted to meet the quota; however, total permits within each of the 3 subareas may be weighted based on the number of full-curl rams in each area—few or no full curl rams observed during the surveys would result in fewer permits available for that subarea.

Harvest strategies that do not account for fluctuations in the population can be problematic and possibly detrimental to the population. The management strategy for the Unit 14A, Chugach Range since 2007 has been to harvest a minimum of 20 sheep annually. In the past 20 years there have been only 2 occasions when more than 20 full curl rams were observed during aerial surveys, thus a management strategy that depended upon harvesting 20 sheep with a restriction of harvesting only full curl rams would result in a high harvest of full curl sheep.

This situation was ameliorated in 2007 by changing the bag limit to any ram; however, a suitable harvest objective needed to be developed in order to account for population fluctuations. Several options were suggested and considered during development of the new harvest objective identified above.

Valdez and Krausman (1999) suggested a harvest structure that would ensure that at least 40 rams per 100 ewe-like sheep from surveys conducted before the hunting season were available for breeding. In the case of 14A Chugach Range, if a minimum of 40 rams:100 ewe-likes must remain on the mountain, then that means a 10-survey average of 189 rams and 383 ewe-likes would require a minimum of 153 rams remain after the season and the most we could harvest would be 36 rams. However, when the results of individual surveys are analyzed, the actual number of surplus rams varies from -32 to 88 rams available for harvest. Basing a harvest quota on the ram to ewe-like ratio would be difficult to achieve on a regular basis and could be difficult to manage appropriately.

A second approach to determining an appropriate harvest objective for Dall sheep uses a given percentage of the population or a subset of the population as the basis for a quota. For example, in the Ruby Mountains of the Yukon Territory, harvest was 2% to 3% of the population. Harvesting at this rate did not lead to a population decline, a change in the sex ratio or a lowering of life expectancy (Hoefs and Barichello 1984). Using the results of the 10-year survey averages, the harvest quota based on 3% of the total population would be 21 rams, and 3% of the adult population would be 17 rams. Using only the adult segment of the population would not be as influenced by the failure of a specific lambing season as using the total population. The state of Nevada went to any ram management in 1996 and uses a quota based on 8% of the total rams not to exceed 50% of the estimated number of mature rams 6 years of age or older (Nevada Department of Conservation and Natural Resources 2001). Analysis from the Unit 14A Chugach area showed a 12% annual ram harvest among all age classes in the 10 years preceding the initiation of the draw hunt, and an 8% harvest of rams of all age classes once the draw began in 2007.

The department will be interested in public feedback about the new approach and will evaluate its effectiveness.

1. Population Status and Trend

Aerial surveys (Activity 1.1.) will continue RY16–RY20 and a new effort will be undertaken to make use of digital SLR cameras (Activity 1.2).

ACTIVITY 1.1. Conduct aerial inventory and sex and age composition surveys in the unit to determine population size, composition, productivity, and trends.

Data Needs

Dall sheep abundance is a basis from which sustainable harvest may be estimated and provides a density context for interpreting nutritional condition relative to habitat conditions. Sex and age composition information can be used to determine appropriate harvest levels and recruitment into the population. Sex and age ratio data may also be used to model population structure and trends.

Methods

Aerial surveys will be conducted biennially as weather and time constraints create conflicts with survey requirements for the Talkeetna and the Alaska ranges. Surveys need to be conducted when most of the previous winter's snow has melted and prior to the sheep hunting season (August 10). In most years this occurs in July.

ACTIVITY 1.2 Use digital SLR cameras to verify sex and age groups of sheep and as a training technique for survey observers.

Data Needs

Dall sheep surveys are conducted in mountainous terrain where views of the individual animals or groups can be fleeting. Sex and age composition of the herd is valuable information for the purposes of determining trends and the potential future harvest for the area. Getting accurate information of ram horn classes can prove valuable for setting future permit levels. Clear photographs of individuals and groups can be used as a training aid for biologists and technicians who may be new to aerial sheep surveys and can validate information collected at the time of the survey.

Methods

Experienced pilot observer teams conducting sheep surveys will use digital cameras with sufficient pixel size, focal length, and speed priority to collect clear photographs of sheep individuals and groups. A separate data sheet will be developed to match photo number with geographic waypoint. Photographs may be checked against previously recorded waypoints for groups of sheep to determine the accuracy of the initial count and to determine if there are any trends that can be identified and corrected in future surveys. If a systematic problem with accuracy of group counts is identified, staff biologists may work with research staff and biometricians to develop a sight bias correction model. In addition, given that staff turnover requires the training and development of junior staff in survey methodology, the photographs collected will serve as a training aid so that new staff can develop the ability to accurately identify ram age classes and quickly age and sex large groups of sheep.

2. Mortality–Harvest Monitoring

ACTIVITY 2.1. Monitor harvest through harvest and sealing records.

Data Needs

Dall sheep harvest data are necessary to annually assess trends in harvest, corroborate anecdotal or incidental observations and survey results, and ensure that the population is not being harvested in excess of sustained yield.

Methods

Harvested Dall sheep will continue to be sealed and acquired information will be entered and stored in WinfoNet. Sealing data will be queried and analyzed annually or more frequently as needed to determine appropriate harvest levels and to examine how harvest strategies affect age structure and horn size.

3. Habitat Assessment–Enhancement

No habitat assessment or enhancement activities are planned for RY16–RY20.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Data Recording and Archiving

- Harvest data and copies of sealing forms are stored on an internal database housed on a server, ADF&G’s Wildlife Information Network (WinfoNet; <http://winfonet.alaska.gov/index.cfm>).
- Field data sheets are scanned and housed on the network server in the Palmer Area Biologist office (O:\WC\Palmer Area Office Folder\Species\Sheep\Scanned Archive Files) and stored in file folders located in the Palmer Assistant Area Biologist’s office.

Agreements

None.

Permitting

None.

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