
CHAPTER 12: DALL SHEEP MANAGEMENT REPORT

From: 1 July 2010

To: 30 June 2013¹

LOCATION

GAME MANAGEMENT UNIT: Portions of 20B, 20F, and 25C (534 mi²)

GEOGRAPHICAL DESCRIPTION: White Mountains area

BACKGROUND

Dall sheep in the White Mountains provide opportunities to view and hunt sheep relatively close to Fairbanks with access by road, air, or boat. Historically, these sheep received little attention because the population is relatively small (200–600 sheep). However, hunter effort and harvest steadily increased beginning in 1980, and peaked in the late 1990s and early 2000s (Seaton 2008).

Survey data indicate this sheep population increased from the 1980s to 2000s (Seaton 2008). From the 1950s through the 1980s, surveys were infrequent, but have increased in frequency during the 1990s and 2000s (Table 1). The population was moderately high in 1970, declined through the early 1980s, then increased during the 1990s, and is currently stable or decreasing. Due to survey differences in area covered, date and intensity of survey, weather conditions, and pilots and observers, conclusions based on these data should be made with caution.

During surveys, the number of rams classified as legal to harvest during the hunting season generally decreased from 1970 to 1995, largely due to changes in the definition of legal rams. From 1970 to 1978, legal rams included those with $\frac{3}{4}$ -curl or larger horns; from 1979 to 1985, the legal minimum was $\frac{7}{8}$ curl; in 1986, the minimum was $\frac{7}{8}$ -curl in Unit 25 and full curl in Unit 20; and only full-curl rams have been legal throughout the area since 1987. Full-curl and $\frac{7}{8}$ -curl restrictions also allowed harvest of rams with both horns broken (sometimes referred to as broomed) or with 8 horn annuli present. During surveys, rams with both horns broken were considered legal for harvest.

The U.S. Fish and Wildlife Service conducted the first Dall sheep studies in the White Mountains during the 1950s (Gross 1963). During 1983–1988, the Bureau of Land Management (BLM) and the Alaska Department of Fish and Game (ADF&G) cooperated on a study of 10 radiocollared sheep to identify distribution, movements, and seasonal use areas (Durtsche et al. 1990). Dall sheep in the White Mountains were found in small, widely scattered groups

¹ At the discretion of the reporting biologist, this unit report may contain data collected outside the report period.

throughout approximately 534 mi² of alpine habitat in the vicinity of Victoria Mountain, Mount Schwatka, Mount Prindle, and Lime Peak (Rocky Mountain). Durtsche et al. (1990) speculated that these sheep may have a relatively unique gene pool because this area is geographically isolated from other sheep populations (ADF&G 1976).

Most Dall sheep habitat in the White Mountains lies within the White Mountains National Recreational Area (WMNRA) and the Steese National Conservation Area (SNCA). Both were established by the Alaska National Interest Lands Conservation Act in 1980 and are managed by BLM. Increasing public use as a result of development of trails, roads, public use shelters, and mineral exploration and development may cause concerns in the future regarding access to the sheep and could affect the aesthetics of sheep hunting in the area.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Maintain a harvestable population of Dall sheep.

MANAGEMENT OBJECTIVE

- Manage for the annual opportunity to harvest full-curl rams from a population of at least 250 Dall sheep.

METHODS

We conducted aerial surveys during summer 2011 and 2012 to estimate population size and composition. Observers classified sheep as lambs, ewes, sublegal rams, and legal rams. The ewe category included yearlings of both sexes and young rams that could not be distinguished from ewes. Rams were classified as legal (full curl or both horns broomed) or sublegal (less than full curl). Observers searched all available sheep habitat, including all alpine and subalpine habitat, by flying low-level (≤ 500 ft above ground level) contours and circles at 60–80 mph in Piper Super Cubs and an Aviat Husky. No survey was conducted in 2010 due to poor weather. The 2011 and 2012 surveys included Big Bend to Windy Gap, Windy Gap to Willow Creek, Cache Mountain, Lime Peak, Mount Prindle, Mount Schwatka, and Victoria Mountain. We attempted to survey all sheep habitat within this area however survey intensity and coverage usually varied depending on weather conditions and pilot–observer availability and experience. Because sheep in the White Mountains sometimes use habitat well away from escape terrain, including timber and shrub-covered areas near mineral licks, we assumed at least 15% of the overall population was not observed during surveys.

We monitored harvest through general harvest ticket report cards. Harvest data were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010 through 30 June 2011).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Based on minimum counts of 580 and 491 sheep observed in 2011 and 2012 respectively, we derived population estimates of 667 and 565 sheep in the White Mountains by adding a 15%

correction factor to account for sheep not observed during the surveys (Table 1). These population estimates are similar to estimates since the 1990s, except in 1999 when we observed more than 700 sheep.

Population Composition

The mean lamb:ewe ratio was 27:100 during 1970–2008. This ratio was lower during 2011 (25:100) and 2012 (19:100) (Table 1). The percentage of legal rams in the population has ranged 3–7% since the 1970s. Legal rams made up 3.6% of the total sheep counted during 2011 and 3.1% in 2012. Caution should be used in interpreting these composition data. Survey areas varied between years because weather often precluded complete coverage of the survey area each year. The area surveyed can affect composition data because ram groups and ewe–lamb groups often occupy different ranges during summer. In addition, survey date was an important factor because lamb mortality during summer affects lamb:ewe ratios, and because sheep are distributed differently during September–October compared to June–August. Finally, composition data underestimated true lamb:ewe and ram:ewe ratios because the ewe category likely contained some young rams that could not be distinguished from ewes.

Distribution and Movements

The seasonal movements and distribution of sheep described below were taken primarily from a study of 10 radiocollared sheep (Durtsche et al. 1990). Movement from wintering to lambing areas usually occurred between late May and mid-June, with most lambs born between 15 May and 30 May (earliest was 10 May). Movements to rutting areas usually occurred from late September to late October. Additional movements by rams to winter range occurred from late November through December.

Individual sheep typically associated themselves with one of several bands in the White Mountains. Bands tended to use discrete ranges most of the year, intermingling before and during rut, then returning to their traditional areas after rut. Bands of ewes and bands of rams often used the same ranges, although not at the same time. Rams shifted notably away from human access points during the sheep hunting season.

Although some mixing occurred, sheep were found in 2 core areas, Lime Peak–Mount Prindle and Victoria Mountain–Mount Schwatka.

Lime Peak–Mount Prindle. Rutting and wintering areas included Lime Peak, Vertical Angle Benchmark (VABM) Fossil (Fossil Peak), and the headwaters of Willow Creek. Ewes moved to lambing areas and summer ranges at the headwaters of Mascot Creek west of Lime Peak, and in the ridge complex around Mount Prindle. Sheep used mineral licks in upper Mascot Creek and Preacher Creek.

Victoria Mountain–Mount Schwatka. During winter, sheep inhabited Victoria Mountain and the ridges north and east of Mount Schwatka. Lambing occurred on Victoria Mountain and the ridge complex in upper Jefferson Creek, upper Big Creek, and Mount Schwatka. Sheep used mineral licks in the headwaters of Jefferson Creek and along Victoria Creek north of Victoria Mountain. The major rutting area for this region seemed to be east of Mount Schwatka and north of Victoria Mountain.

MORTALITY

Harvest

Season and Bag Limit. The sheep hunting season was 10 August–20 September during RY10–RY12. The bag limit was 1 ram with full-curl horns, both horns broomed, or at least 8-years old (Table 2).

Alaska Board of Game Actions and Emergency Orders. There were no board actions or emergency orders that addressed the White Mountains sheep population during RY10–RY12. In 2004 the board adopted a statewide provision that required hunters to allow ADF&G personnel or Alaska Wildlife Troopers to seal horns of sheep taken in areas with full-curl regulations, including the White Mountains.

Harvest by Hunters. The reported annual harvest during RY10–RY12 ranged 7–12 ($\bar{x} = 9$) (Table 3). The long-term (RY03–RY12) average annual harvest is 11 sheep. The average length of horns from sheep harvested during RY10–RY12 was 32.8 inches (Table 4). This is similar to the 10-year average of 33.3 inches during RY03–RY12. The average length of sheep horns in the White Mountains is generally smaller than other areas of the state because it includes a high percentage of broken horns. During 2003–2013, 28% of the rams harvested in the White Mountains had both horns broken. It is also common for rams in the White Mountains to severely break their horns past the fifth or sixth annuli. Total horn length for these rams is commonly 12–16 inches. Average age of rams harvested during RY10–RY12 was 8.5 years, similar to the 10-year average age of 8.8 years during RY03–RY12.

Hunter Residency and Success. Most sheep hunters in the White Mountains were Alaska residents (Table 3). The average success rate of all hunters during RY10–RY12 was 16% compared to 21% during RY03–RY09. In RY10–RY12, both successful and unsuccessful hunters spent an average of 5 days afield (Table 5). An average of 57 hunters reported hunting sheep in the White Mountains during RY10–RY12. This is slightly more than the average of 55 hunters during RY03–RY09.

Harvest Chronology. During RY10, 83% (10 of 12) of the sheep harvest occurred during the August portion of the season. During RY11 and RY12, 100% of the harvest occurred during August (Table 6).

Transport Methods. Aircraft access was at a few small airstrips in the mountains, gravel bars along creeks, and on small lakes. Ground access was primarily from trails and mining roads off the Steese Highway. In 1988, BLM established off-road vehicle (ORV) restrictions throughout WMNRA and SNCA that closed most sheep range to ORVs. However, ORVs weighing < 1500 lb were allowed in most of the area between the Steese Highway and Mount Prindle, which provided some motorized access to sheep habitat.

During RY10–RY12, 52% of successful hunters used airplanes and 26% used 3- or 4-wheelers for transportation. Unsuccessful hunters used 3- or 4-wheelers as the most common means of transportation (Table 7). Historically, aircraft have been the most common method of transportation for successful hunters in this area. It is difficult for hunters to access the majority of Dall sheep with ORVs because of ORV restrictions on most trails that access the White Mountains. However, 3- and 4-wheelers are becoming increasingly popular and some hunters

have found ways to gain access within walking distance of good sheep habitat. Some of the difference in success per mode of transport may also be attributed to the intention of the hunters. Contact with hunters suggests that many hunters who used 4-wheelers and highway vehicles intended mainly to hunt caribou or moose but would take sheep opportunistically. Conversely, hunters who used aircraft to hunt sheep were more focused on taking sheep.

Other Mortality

Weather and predation are probably the primary causes of Dall sheep mortality in the White Mountains, although no data are available to confirm this. Deep snow was implicated as an important cause of sheep mortality in previous years (Heimer and Watson 1986). The record snowfall of winter 1992–1993 caused a low lamb:ewe ratio and a drop in overall numbers in 1993. Subsequent winters had average or slightly below average snowfall.

Little is known about predation rates or predator populations in the White Mountains. McNay (1989) estimated 87 wolves resided in Unit 25C. One radiocollared ewe was killed by wolves in winter 1983–1984. Black and grizzly bears are commonly seen during surveys in the area. Other potential predators include golden eagles and coyotes (Scotton 1997).

Sheep in the White Mountains frequently travel through forested areas because sheep habitats are scattered, often at low elevations, and because of the scarcity of rugged escape terrain in the alpine areas (ADF&G 1976). Although these forested areas may provide some escape cover from eagles, they probably increase susceptibility to terrestrial predators.

HABITAT

Assessment

Important features of Dall sheep habitat include summer range, winter range, mineral licks, lambing areas, escape terrain, and travel routes between these habitats. Protecting these features is important to the long-term welfare of sheep in the White Mountains because the relatively low-elevation, discontinuous alpine areas offer limited sheep habitat.

Potential threats to sheep habitat include mineral exploration; BLM's development of recreational facilities in the WMNRA and SNCA; and, in the absence of a natural fire regime, forest succession encroaching on sheep range. BLM's facilities include trails and remote cabins intended to substantially increase human use of the area. For recreational purposes, BLM maintains several trailheads and the 18-mile Nome Creek Road, which links the Steese Highway with 2 campgrounds.

CONCLUSIONS AND RECOMMENDATIONS

Our goal to maintain a harvestable population of Dall sheep was met. Use of ORVs, mineral exploration, trail development, access, and cabins should be monitored and managed to help maintain this goal. Nonconsumptive use of sheep, such as viewing, will probably increase during the future as BLM promotes recreational use of the area.

We met our management objective to provide for sustained opportunity to harvest full-curl rams from a population of at least 250 sheep. We maintained a resident and nonresident general season from 10 August to 20 September for a full-curl ram. Our population estimates of 667 and 565

sheep during RY11 and RY12 met our minimum population objective. No changes to season or bag limits are recommended at this time.

We will continue to work cooperatively with BLM and U.S. Fish and Wildlife Service on survey data in the area. Funding available from each agency should allow continuation of the population surveys in all regions of the White Mountains.

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Table 1. White Mountains aerial Dall sheep composition counts, 1970–2012

Date	Rams			Rams: 100 ewes	Ewes ^c	Lambs	Lambs:100 ewes	Total sheep ^b	Count time (hr)
	Legal ^a	Sublegal	Total ^b						
28 Aug 1970	19	25	44	26	171	70	41	285	5.9
5–8 Aug 1977	13	25	38	58	66	20	30	124	6.5
29 Jun–3 Jul 1982	15	30	45	58	77	10	13	132	9.6
17–29 Jun 1986	17	42	59	45	132	49	37	240	14.6
4–10 Aug 1989	6	50	56	42	132	31	23	219	3.6
30 Sep–3 Oct 1991	9	72	81	37	220	53	24	354	8.8
1–4 Aug 1992	8	68	76	35	215	33	15	324	11.8
4 Aug 1994 ^d	8	64	72	36	201	71	35	344	10.3
1–11 Aug 1995	6	78	88	35	248	73	29	409	11.1
5–7 Aug 1996	16	90	106	39	270	88	33	464	– ^e
5 Aug 1997 ^f	10	88	98	37	266	53	20	417	12.1
1–3 Aug 1999 ^g	26	125	151	37	406	160	39	717	13.1
5–7 Aug 2000 ^g	24	121	145	38	381	41	11	567	13.1
19 Jul 2002 ^g	25	125	150	57	262	73	28	485	– ^e
Jul–Aug 2003 ^g	21	70	91	29	318	99	31	508	10.9
3–5 Aug 2004 ^g	19	107	126	48	262	55	21	443	14.3
1–4 Aug 2005 ^g	25	107	132	42	317	64	20	513	14.9
2–5 Aug 2006 ^g	21	102	123	38	321	39	12	483	13.2
26–28 July 2007 ^g	16	55	71	31	229	79	34	379	– ^e
23–25 July 2008 ^h	21	22	43	19	224	99	44	366	– ^e
July 2011 ^g	21	131	152	44	342	86	25	580	10.8
July 2012 ^g	15	129	144	49	292	55	19	491	10.8

^a Legal rams = $\frac{3}{4}$ -curl in 1970 and 1977, $\frac{7}{8}$ -curl in 1982 and 1986, full curl or both horns broken since 1987.

^b Total numbers may include sheep that were not classified.

^c Ewes includes unclassified young rams and yearlings of both sexes.

^d Numbers include sheep observed during the 12–13 July 1994 ground survey of Mount Prindle, which was not surveyed in August due to severe turbulence.

^e Total count time could not be calculated from data sheets.

^f Victoria Mountain was not surveyed in 1997 (47 sheep were counted in this area in 1996).

^g Big Bend to Windy Gap, Windy Gap to Willow Creek, Cache Mountain, Lime Peak, Mount Prindle, Mount Schwatka, and Victoria Mountain.

^h Windy Gap to Willow Creek and Lime Peak not included in survey.

Table 2. White Mountains Dall sheep seasons and bag limits, regulatory years^a 1983–2012.

Regulatory year(s)	Season	Bag limit	Legal horn size ^b	
			Portion in Unit 20	Portion in Unit 25
1983	10 Aug–20 Sep	1 ram	$\frac{7}{8}$ -curl horn or larger	$\frac{7}{8}$ -curl horn or larger
1984–1986	10 Aug–20 Sep	1 ram	Full-curl horn or larger	$\frac{7}{8}$ -curl horn or larger
1987–2012	10 Aug–20 Sep	1 ram	Full-curl horn or larger	Full-curl horn or larger

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 1983 = 1 July 1983–30 June 1984).

^b Full-curl and $\frac{7}{8}$ -curl restrictions also allow harvest of rams with both horns broken or with 8 horn annuli present.

Table 3. White Mountains sheep hunter residency and success, regulatory years^a 2003–2012.

Regulatory year	Successful hunters				Unsuccessful hunters				Total	
	Resident	Nonresident	Unspecified	Total	Resident	Nonresident	Unspecified	Total	Hunters	% Success
2003	18	1	0	19	35	2	1	38	57	33
2004	10	0	0	10	26	1	0	27	37	27
2005	6	0	0	6	40	3	0	43	49	12
2006	14	1	1	16	38	1	1	40	56	29
2007	8	1	0	9	51	1	0	52	61	15
2008	16	0	0	16	59	0	0	59	75	21
2009	4	0	0	4	46	1	0	47	51	8
2010	12	0	0	12	66	1	1	68	80	15
2011	7	0	0	7	33	0	0	33	40	18
2012	8	0	0	8	43	2	0	45	53	15

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

Table 4. White Mountains sheep harvest characteristics, regulatory years^a 2003–2012.

Regulatory year	Average horn			
	Age (yr)	Broomed (%)	Length (in)	Base (in)
2003	9.2	44	31.1	13.6
2004	8.1	35	29.1	13.6
2005	8.0	33	34.5	13.2
2006	8.8	44	32.9	13.4
2007	8.7	44	31.3	13.2
2008	10.4	44	31.8	13.4
2009	9.0	0	34.5	13.6
2010	9.0	75	29.8	13.6
2011	8.3	63	34.2	13.6
2012	8.1	25	34.3	13.6

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

Table 5. White Mountains Dall sheep hunter effort^a, regulatory years^b 2003–2012.

Regulatory year	Successful		Unsuccessful		Total hunters
	Hunters	\bar{x} days	Hunters	\bar{x} days	
2003	19	4	38	4	57
2004	10	2	27	5	37
2005	6	2	43	4	49
2006	16	4	40	4	56
2007	9	4	52	5	61
2008	16	4	59	5	75
2009	4	4	47	6	51
2010	12	3	67	6	79
2011	7	6	31	4	38
2012	8	6	45	5	53

^a This table includes only hunters who reported the number of days they hunted and does not include all hunters.

^b Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

Table 6. White Mountains Dall sheep harvest chronology by day/month, regulatory years^a 2003–2012.

Regulatory year	Harvest chronology by day/month					Unknown	n
	10–20 Aug	21–31 Aug	1–10 Sep	11–20 Sep			
2003	9	6	3	0	1	19	
2004	7	2	0	1	0	10	
2005	3	0	1	2	0	6	
2006	9	4	3	0	0	16	
2007	4	3	1	1	0	9	
2008	7	5	1	3	0	16	
2009	4	0	0	0	0	4	
2010	9	1	2	0	0	12	
2011	2	5	0	0	0	7	
2012	6	2	0	0	0	8	

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).

Table 7. White Mountains Dall sheep hunter success by transport method, regulatory years^a 2003–2012.

Regulatory year	Hunter success by transport method				
	Airplane	3- or 4-wheeler	ORV	Highway vehicle	Other\Unknown
<i>Successful hunters:</i>					
2003	14	2	0	1	2
2004	8	1	0	0	1
2005	5	0	0	1	0
2006	11	5	0	0	0
2007	5	1	1	1	1
2008	11	4	0	0	1
2009	4	0	0	0	0
2010	8	3	0	0	1
2011	3	1	0	0	3
2012	3	3	0	0	2
<i>Unsuccessful hunters:</i>					
2003	11	15	0	6	4
2004	9	9	0	2	7
2005	5	14	2	13	9
2006	7	16	1	10	6
2007	5	26	2	10	9
2008	13	32	2	7	5
2009	12	24	3	5	3
2010	16	32	1	5	14
2011	6	18	0	5	3
2012	7	17	1	9	7

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2003 = 1 July 2003–30 June 2004).