Alaska Department of Fish and Game
Division of Wildlife Conservation
(907) 465-4190 – PO Box 115526
Juneau, AK 99811-5526

CHAPTER 15: DALL SHEEP MANAGEMENT REPORT

From: 1 July 2010
To: 30 June 2013[1]

LOCATION

GAME MANAGEMENT UNITS: Eastern 23, 24B, and portions of 24A and 26A (15,717 mi^2)

GEOGRAPHIC DESCRIPTION: Central Brooks Range west of Dalton Highway corridor management area to Howard Pass, including Gates of the Arctic National Park

BACKGROUND

The central Brooks Range comprises portions of Units 23, 24A, 24B, and 26A. It includes the drainages of the upper Noatak, Killik, Chandler, and Koyukuk rivers, encompassing the Schwatka and Endicott mountains (Fig. 1). Dall sheep are irregularly distributed within the central Brooks Range, but probably constitute a single population. Thus, beginning in fall 1995, sheep data in these drainages were combined into a single report. Previously, harvest and population data for sheep in those portions of Units 23 and 26A east of Howard Pass were included in the Units 23 and 26A sheep management report for the Baird and DeLong mountains, and data for sheep in western Unit 24 (west of the Dalton Highway corridor management area [DHCMA]) were included in the Unit 24 sheep management report. Data for sheep in Unit 24 within and east of the DHCMA were and currently are included in the eastern Brooks Range sheep management report. Within western Unit 24, sheep in Gates of the Arctic National Park and Preserve (GAAR) are managed under federal law. Federal subsistence hunting regulations have applied in GAAR since 1991. GAAR lands (11,966 mi^2) compose 56% of the total area (21,300 mi^2) in the central Brooks Range report area.

Most sheep surveys conducted within the central Brooks Range occurred within GAAR and varied in size and type. During the early to mid-1970s, the population was thought to be low (Whitten 1997). Surveys conducted during the 1980s and 1990s suggested that the population increased between 1982 and 1984, was stable during 1984 through 1987, and declined dramatically by 1996 (Singer 1984, Whitten 1997, Brubaker and Whitten 1998). During the late 1980s and early 1990s, lamb recruitment was low following several winters of heavy snowfalls.

Prior to expansion of GAAR in 1981, all of Unit 24 and those portions of Units 23 and 26A included in this report were open to general sheep hunting (Lenart 2002). The average annual total harvest (reported and estimated unreported) was 50 rams. The take by Nunamiut hunters

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

(inland Inupiat Eskimos) was unknown but estimated to be ≤50 per year (Osborne 1996). During the 1980s, hunting regulations for this area changed substantially and general sheep hunting was closed in GAAR (park portions). Harvest in the state general hunt has been low (4–18 rams) since 1992 (Hollis 2011). This was probably partially due to the low density of sheep on state land and because a majority of the best sheep habitat is in GAAR, where hunting is restricted to local residents under federal regulations.

MANAGEMENT DIRECTION

MANAGEMENT GOAL

- Provide for harvest and viewing opportunity of Dall sheep.

MANAGEMENT OBJECTIVE

- Provide the opportunity for hunters to harvest mature rams during a general hunting season.

MANAGEMENT ACTIVITY

- Monitor harvest in the central Brooks Range through the harvest ticket system and analyze harvest data.

METHODS

POPULATION STATUS

No surveys were conducted on state land in the central Brooks Range between 1 July 2010 and 30 June 2013. Methodology for surveys conducted during 1983–2008 varied. They included aerial minimum count composition surveys (1983 and 2008), double sampling (1996), and stratified random sampling (2005) and are summarized and referenced in Hollis (2011). In 2009 and 2010 the National Park Service (NPS) conducted large scale surveys on all sheep habitat in GAAR lands using distance sampling approaches with line transects (Schmidt et al. 2012). These surveys included the Itkillik study area which is a 954 mi^2 area located in the northeastern portion of GAAR and includes portions of the preserve that are open to hunting by the general public. In 2011 (Schmidt and Rattenbury 2013) and 2012 (NPS, unpublished data, Fairbanks, Alaska) NPS surveyed just the Itkillik study area using the distance sampling methods described in Schmidt et al. (2012).

HARVEST

ADF&G monitors harvest on state land through the state general harvest data, collected through the statewide harvest ticket system. Harvest ticket reports were required from all hunters not qualified to hunt under the federal system. Total harvest, residency and success, chronology, and transportation were summarized by regulatory year (RY), which begins 1 July and ends 30 June (e.g., RY11 = 1 July 2011–30 June 2012).

ADF&G does not collect harvest data for federally qualified hunters in GAAR National Park because federal regulations do not require those hunters to use state harvest tickets. GAAR regulations allow only residents of Unit 24 who live north of the Arctic Circle and residents of Allakaket, Alatna, Hughes, and Huslia to hunt within GAAR park lands. Hunting by the general public is allowed on GAAR preserve lands. In 1997, GAAR implemented a community harvest

quota for Anaktuvuk Pass (60 sheep, not to exceed 10 ewes), and GAAR personnel assumed responsibility for collecting harvest data from that village. Currently GAAR relies on the North Slope Borough to provide subsistence harvest data from this area (J. Lawler, GAAR, personal communication, 2008). These data have not been reliably available since 2004.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size and composition

Within GAAR, Schmidt et al. (2012) estimated 8,412 sheep (95% CI: 6,517–11,090, density = 0.72 sheep/mi^2) during 2009 in 12,144 mi^2 and 10,072 sheep (95% CI: 8,081–12,520, density = 0.97 sheep/mi^2) during 2010 in 10,394 mi^2. Because surveys previous to 2009 used various methodologies and covered different areas (Hollis 2011) comparisons are difficult and areawide trends are unknown.

Within the Itkillik study area (954 mi^2, Table 1), total abundance estimates from surveys conducted by GAAR staff showed no noticeable change between 2009 and 2012. Composition data for the Itkillik study area were only available for 2011 and 2012 and were generally consistent between years. However, there appeared to be fewer lambs in 2012 (246) compared to 2011 (431), although confidence intervals overlap (Table 1). Most estimates of age-sex composition had acceptable precision (<20% coefficient variation) except for full curl or greater rams which had coefficient variations of 52% in 2011 (Schmidt and Rattenbury 2013) and 2012 (NPS, unpublished data).

MORTALITY

Harvest

Season and Bag Limit (RY98–RY12). Only state regulations are listed below, although federal subsistence regulations apply on federal lands within the area.

Units and Bag Limits	Resident Open Season (General Hunts)	Nonresident Open Season
Units 26A and 26B, that portion within the Gates of the Arctic National Park on private lands.		
RESIDENT HUNTERS: 3 sheep.	1 Aug–30 Apr	No open season
Unit 24B, that portion within the John River drainage upstream from Till Creek, and that portion within the Glacier River drainage.		
RESIDENT HUNTERS: 3 sheep.	1 Aug–30 Apr	No open season
Remainder of Unit 24B		
RESIDENT AND NONRESIDENT HUNTERS: 1 ram with full-curl horn or larger.	10 Aug–20 Sep	10 Aug–20 Sep

Units and Bag Limits	Resident Open Season (General Hunts)	Nonresident Open Season
Units 23 (Schwatka Mountains) and Unit 26A, east of the Cutler, Redstone, Aniuk, and Etivluk rivers.		
RESIDENT HUNTERS:		
3 sheep by registration permit only (RS389)	1 Aug–30 Apr	
RESIDENT AND NONRESIDENT HUNTERS:		
1 ram with full-curl horn or larger	10 Aug–20 Sep	10 Aug–20 Sep

Alaska Board of Game Actions and Emergency Orders. The Alaska Board of Game did not change any seasons or bag limits for Dall sheep in the central Brooks Range during RY10–RY12, and we issued no emergency orders.

Harvest by Hunters. Very little harvest data were available during RY10–RY12 for lands included in GAAR, where 8 sheep were reported harvested (Table 2). All 8 of these reported sheep were attributed to the Unit 26A portion of GAAR preserve lands. Most harvest in GAAR (park) likely was by residents of Anaktuvuk Pass and probably was not reported on state harvest tickets.

The general season harvest in the central Brooks Range (excluding GAAR) averaged 9 sheep during the past 5 years (range: 6–13; RY08–RY12; Table 3). This is within the range of harvest during RY00–RY07 (4–17). The low harvest is best attributed to the small number of hunters in the field, a result of the large portion of the central Brooks Range that is within GAAR where hunter access is limited by residency. The mean age and horn length could not be used to make generalizations about the harvest or population due to the small sample size (Table 4).

Hunter Residency and Success. In the state general season harvest, the 5-year average success rate for the area was 39% (range: 29–50%; RY08–RY12; Table 3). Success rates were higher for nonresident hunters (range: 50–88%) than resident hunters (range: 13–50%). Nonresident hunters primarily used guides, which explains the increased success. Nonresidents made up 29–35% of all hunters during RY10–RY12 (Table 3). In general, most hunting occurred in Units 24B and 26A and little or no hunting occurred in Unit 23.

Harvest Chronology. The highest harvest of sheep in the central Brooks Range in the general hunt usually occurred during the first 10 days of the season (Table 5). This is consistent with most general season sheep hunts throughout Alaska. Due to the low harvest in the central Brooks Range general hunt, the harvest chronology can vary with increased harvest of just a few rams during the second 10 days.

Transportation Methods. During RY10–RY12, aircraft were the major means of transportation (Table 6) because access by other means was limited.

CONCLUSIONS AND RECOMMENDATIONS

Comparable survey data for the sheep population in the central Brooks Range are limited and current trends are unknown for the overall area. Surveys within the Itkillik study area conducted by NPS staff suggest that the population was likely stable during RY10–RY12. With continued survey efforts by NPS in connection with their monitoring network, we expect that information on areawide population trends will be available in the future.

Because the general season harvest was low and made up of predominantly older rams, this harvest likely had little effect on the sheep population. Even though there are no data available for harvest by federally qualified subsistence users on federal lands, it was probably minimal and did not likely affect the overall sheep population.

The goal of providing harvest and viewing opportunities for Dall sheep in the central Brooks Range was met. GAAR was used by Dall sheep viewers and photographers, albeit sparingly. This activity has increased since 2000 as a result of increased tour bus transit on the Dalton Highway. The goal of providing an opportunity for a general harvest outside of GAAR was met, as there was a season and bag limit for this sheep population.

The objective of maintaining a general harvest of mature rams outside of GAAR was also met. Seasons and bag limits did not change, allowing ample opportunity to harvest Dall sheep. The number of hunters has remained low since RY00 (range: 13–31) and harvest has been maintained at low levels.

We will continue to work with staff from GAAR to summarize harvest data, especially of sheep harvested in GAAR. We suggest a cooperative effort between GAAR and ADF&G to continue sheep surveys currently conducted by GAAR staff.

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PREPARED BY:

Nathan J. Pamperin
Wildlife Biologist I

SUBMITTED BY:

Doreen I. Parker McNeill
Management Coordinator

REVIEWED BY:

Torsten W. Bentzen
Wildlife Biologist III

Laura A. McCarthy
Publications Technician II

Marion E. Glaser
Wildlife Technician III

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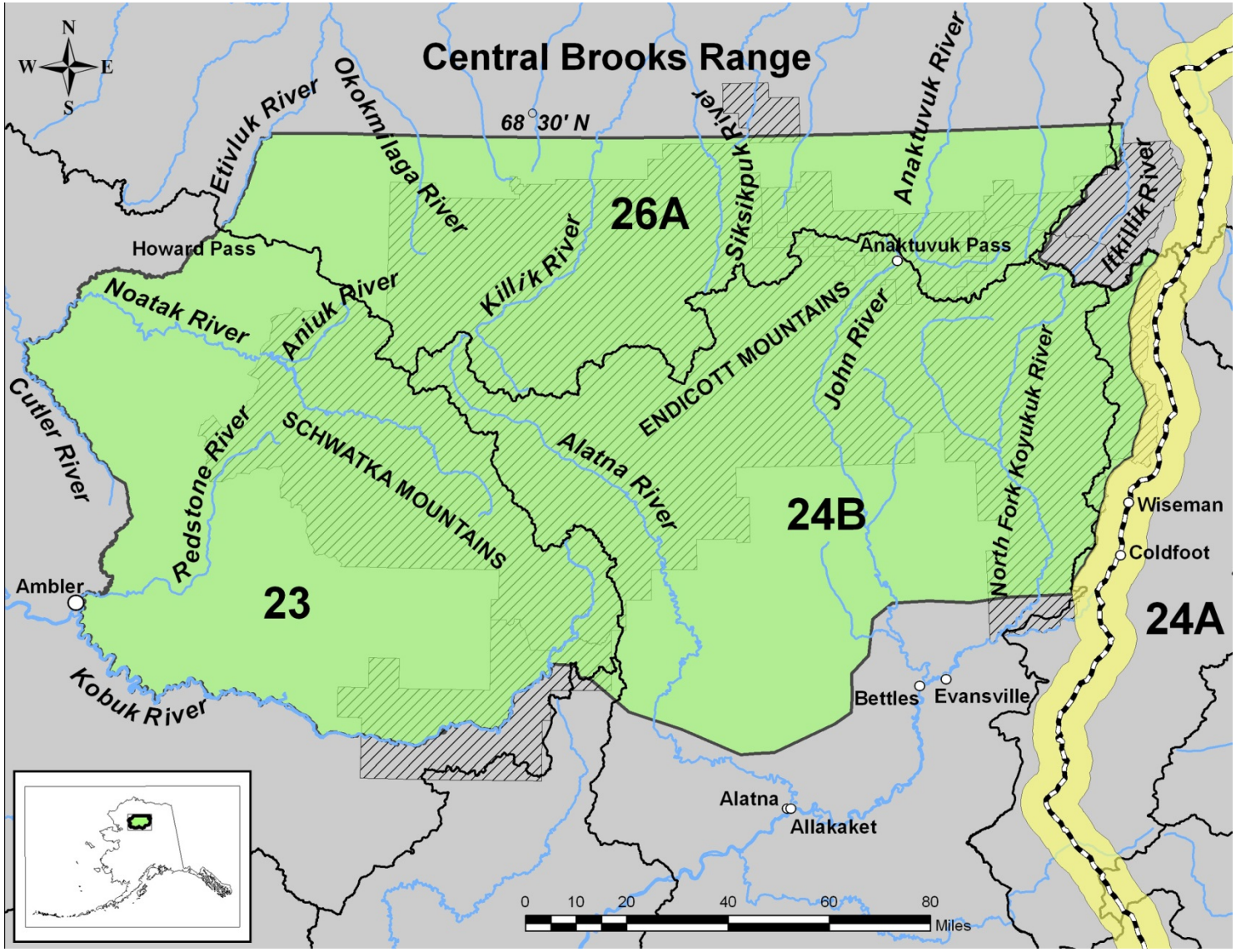

Figure 1. Central Brooks Range (green shaded area), Alaska.

Table 1. Results from aerial Dall sheep surveys in the 954 mi^2 Itkillik Preserve study area.

Year	Lambs	(%)[a]	Ewe-likes[b]	(%)[a]	Lamb:100 Ewe-like	Rams	(%)[a]	Rams:100 Ewe-like	% Rams ≥full curl[a]	Unk adults[c]	Total sheep
1983[d]	341	(17)	1,167	(59)	29	457	(23)	39	4.1	26	1,965
1996[e]											1,365[f]
2005[g]	371	(23)	926	(57)	40	311	(19)	34	4.3	0	1,608
2008[g,h]	276	(22)	683	(55)	40	278	(22)	41	4.3	1	1,237
2009[i]											1,898 (1,421–2,578)[j]
2010[i]											1,854 (1,342–2,488)[j]
2011[k]	431 (296–618)[j]	(26)	903 (695–1196)[j]	(54)	48 (32–70)[j]	335	(20)	38 (24–55)[j]	2.3 (39:11–88)[j]		1,669 (1,339–2,120)[j]
2012[l]	246 (147–389)[j]	(14)	1,102 (805–1519)[j]	(65)	23 (13–36)[j]	357	(21)	33 (21–50)[j]	2.7 (46:12–104)[j]		1,706 (1,297–2,285)[j]

[a] When calculating percent ratios, unknown classified animals were subtracted from total.
[b] Ewe-likes included ewes, yearlings of both sexes, and rams smaller than ¼-curl.
[c] Unknown adults not included in total.
[d] Singer 1984.
[e] Whitten 1997.
[f] The 1996 survey for total sheep was an estimate, not a count.
[g] Rattenbury and Lawler 2010.
[h] The 2008 survey was only conducted on 77% of the Itkillik Preserve study area.
[i] Schmidt et al. 2012, composition data not available.
[j] 95% Bayesian credible interval.
[k] Schmidt and Rattenbury 2013.
[l] National Park Service, unpublished data.

Table 2. Central Brooks Range Dall sheep harvest, regulatory years[a] 2000–2012.

Regulatory year	Unit[b] 23 GAAR[c]	23 Other[d]	24 West GAAR	24 West Other	26A GAAR	26A Other	Total harvest GAAR	Total harvest Other	Total harvest Combined
2000	0	0	6	6	6	1	12	7	19
2001	0	0	3	7	2	3	5	10	15
2002	0	0	4	9	3	3	7	12	19
2003	0	0	5	2	4	3	9	5	14
2004	0[e]	0	0[e]	7	0[e]	4	0[e]	11	11
2005	3[e,f]	0	0[e]	3	0[e]	1	3[e,f]	4	7
2006	0[e]	0	0[e]	11	0[e]	6	0[e]	17	17
2007	0[e]	0	1	8	0[e]	4	1	12	13
2008	0[e]	0	0[e]	6	1	2	1	8	9
2009	0[e]	0	0[e]	9	0[e]	4	0[e]	13	13
2010	0[e]	0	0[e]	5	4	1	4	6	10
2011	0[e]	0	0[e]	8	2	2	2	10	12
2012	0[e]	0	0[e]	5	2	2	2	7	9

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

[b] Because location of sheep harvest by Anaktuvuk Pass federally qualified subsistence hunters was variable and uncertain, half of the annual known harvest from that community was attributed to Unit 24 and half was attributed to Unit 26A. In years where an odd number of sheep were harvested, Unit 24 was arbitrarily attributed the larger number.

[c] Gates of the Arctic National Park and Preserve (GAAR) includes harvest by federally qualified hunters in Gates of the Arctic National Park (since 1981).

[d] Other sheep harvest includes all other harvest besides the GAAR harvest.

[e] No reported harvest was available from GAAR.

[f] These 3 sheep were reported by federally qualified subsistence hunters on a state harvest ticket.

Table 3. Central Brooks Range (excluding Gates of the Arctic National Park) hunter residency and success, regulatory years[a] 2000–2012.

Regulatory year	Successful					Unsuccessful					Total hunters (% nonresident)
	Local[b] resident	Nonlocal resident	Nonresident	Unk	Total (%)	Local[b] resident	Nonlocal resident	Nonresident	Unk	Total (%)	
2000	0	2	5	0	7 (35)	1	4	8	0	13 (65)	20 (65)
2001	0	2	7	1	10 (48)	1	8	2	0	11 (52)	21 (45)
2002	1	6	5	0	12[c] (52)	0	7	4	0	11 (48)	23 (39)
2003	0	2	3	0	5 (26)	0	9	5	0	14 (74)	19 (42)
2004	1	3	7	0	11[c] (46)	1	11	1	0	13 (54)	24 (33)
2005	0	2	2	0	4 (31)	0	6	3	0	9 (69)	13 (38)
2006	1	5	11	0	17 (61)	1	8	2	0	11 (39)	28 (46)
2007	0	3	9	0	12 (57)	2	7	0	0	9 (43)	21 (43)
2008	0	1	7	0	8 (40)	0	11	1	0	12 (60)	20 (40)
2009	0	3	9	1	13 (42)	0	15	3	0	18 (58)	31 (40)
2010	0	2	4	0	6 (35)	0	9	2	0	11 (65)	17 (35)
2011	1	4	5	0	10[c] (50)	0	8	2	0	10 (50)	20 (35)
2012	1	1	5	0	7 (29)	0	15	2	0	17 (71)	24 (29)

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

[b] Local resident includes residents of Ambler, Shungnak, and Kobuk in Unit 23; Wiseman, Bettles, and Coldfoot in Unit 24; and Anaktuvuk Pass in Unit 26A. Most local residents harvest sheep under the federal system, which is not reported in this table.

[c] One sheep reported on state harvest ticket was a ewe.

Table 4. Central Brooks Range Dall sheep harvest (excluding Gates of the Arctic National Park and Preserve), regulatory years[a] 2000–2012.

Regulatory year	$\bar{x}$ Horn length	% Over 40″	$\bar{x}$ Age	Total rams
2000	37.2	14	10.0	7
2001	36.9	20	11.0	10
2002	35.4	9	9.0	11
2003	36.7	0	9.8	5
2004	35.7	10	9.6	10
2005	33.9	25	9.3	4
2006	35.8	6	9.4	17
2007	36.0	17	9.6	12
2008	35.8	0	10.3	8
2009	35.9	0	10.2	13
2010	35.5	17	9.3	6
2011	32.7	11	11.1	9
2012	34.9	0	9.4	7

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).

Table 5. Central Brooks Range Dall sheep harvest (excluding Gates of the Arctic National Park and Preserve) chronology percent by month/day, regulatory years[a] 2000–2012.

Regulatory year	Harvest chronology percent by month/day				
	8/10–8/20 (*n*)	8/21–8/31 (*n*)	9/1–9/10 (*n*)	9/11–9/20 (*n*)	*N*
2000	43 (3)	43 (3)	14 (1)	0 (0)	7
2001	70 (7)	30 (3)	0 (0)	0 (0)	10
2002	17 (2)	58 (7)	17 (2)	8 (1)	12
2003	60 (3)	40 (2)	0 (0)	0 (0)	5
2004	60 (6)	20 (2)	0 (0)	20 (2)	10[b]
2005	25 (1)	25 (1)	25 (1)	25 (1)	4
2006	44 (7)	31 (5)	19 (3)	6 (1)	16[b]
2007	58 (7)	33 (4)	8 (1)	0 (0)	12
2008	63 (5)	13 (1)	25 (2)	0 (0)	8
2009	54 (7)	31 (4)	15 (2)	0 (0)	13
2010	33 (2)	50 (3)	17 (1)	0 (0)	6
2011	70 (7)	0 (0)	20 (2)	10 (1)	10
2012	43 (3)	29 (2)	29 (2)	0 (0)	7

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).
[b] Does not include harvest from dates outside 10 August–20 September.

Table 6. Central Brooks Range Dall sheep harvest (excluding Gates of the Arctic National Park and Preserve) percent by transport method, regulatory years[a] 2000–2012.

Regulatory year	Harvest percent by transport method						
	Airplane (*n*)	Boat (*n*)	Snowmachine (*n*)	Horses (*n*)	ORV (*n*)	Unknown (*n*)	*N*
2000	71 (5)	29 (2)	0 (0)	0 (0)	0 (0)	0 (0)	7
2001	70 (7)	20 (2)	0 (0)	10 (1)	0 (0)	0 (0)	10
2002	83 (10)	8 (1)	8 (1)	0 (0)	0 (0)	0 (0)	12
2003	100 (5)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5
2004	64 (7)	9 (1)	0 (0)	9 (1)	0 (0)	18 (2)	11
2005	100 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4
2006	71 (12)	12 (2)	0 (0)	12 (2)	0 (0)	6 (1)	17
2007	75 (9)	0 (0)	0 (0)	0 (0)	0 (0)	25 (3)	12
2008	100 (8)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8
2009	85 (11)	15 (2)	0 (0)	0 (0)	0 (0)	0 (0)	13
2010	83 (5)	17 (1)	0 (0)	0 (0)	0 (0)	0 (0)	6
2011	90 (9)	0 (0)	0 (0)	0 (0)	10 (1)	0 (0)	10
2012	43 (3)	29 (2)	0 (0)	0 (0)	0 (0)	29 (2)	7

[a] Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2000 = 1 July 2000–30 June 2001).