



2009 Aerial Dall Sheep Survey, Yukon-Charley Rivers National Preserve, Alaska

July 2009 Survey Report

Natural Resource Report NPS/CAKN/NRTR—2010/367



ON THE COVER

Group of Dall sheep rams grazing
Photograph by: NPS photo

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Executive Summary

- Dates of the survey: July 2 - 4, 2009
- 7 survey units (mountains) were flown in the Charley River Hills
- 333 sheep were counted; 151 ewes, 72 lambs, 43 yearlings, 67 rams
- 366 sheep estimated with sightability correction factor of 1.1 applied
- Composition: 48 lambs, 29 yearlings, 44 rams per 100 ewes
- 12 out of 67 rams (18%) were legal (full curl or better)
- 12.48 hours of survey flight time in one R44 helicopter

Key Words

Dall sheep, *Ovis dalli*, aerial survey, population estimate, Yukon-Charley Rivers National Preserve, Alaska.

Acknowledgments

This survey was funded by U.S. National Park Service, Yukon-Charley Rivers National Preserve, Alaska. Rick Swisher (Quicksilver Air) safely piloted the R44 helicopter and served as the second (and far superior) observer. Pat Sanders and Lou Flynn provided communications and flight following support based in Eagle. Tom Meier and Maggie MacCluskie made a number of valuable suggestions on earlier drafts of this report.

Introduction

Surveys of Dall sheep (*Ovis dalli*), some of which were ground based, were initiated in Yukon-Charley Rivers National Preserve (YUCH) (Figure 1) as early as 1973 by the Alaska Department of Fish and Game (ADFG) (Crain 1982). For most previous aerial sheep surveys, sheep habitat within YUCH was divided into 5 survey units: Mount Sorenson, Copper Mountain, Twin Mountain, Cirque Lakes, and Diamond Fork Mountain (Alaska Department of Fish and Game, unpublished data, 1973 – 75, 1980, 1981, Kellyhouse 1982, Ulvi 1983, Ulvi and Knuckles 1990, Ulvi 1991, Fox 1993). Beginning in 1997 the survey area was expanded slightly to include 2 more survey units, 5580 Mountain, and the Charley River Bluffs (Figure 2) (Burch 1997, Burch and Demma 1998, Burch and Lawler 1999, Burch and Lawler 2001).

Dall sheep inhabit the mountains in the southwestern area of the preserve, the bluffs along the Charley River, the hills and bluffs in the upper Seventymile River, and the hills and bluffs in upper Woodchopper Creek. Sheep also occur in the northeastern portion of the preserve in the Ogilvie Mountains which straddle the Alaska-Canada border. It is primarily in the Ogilvies that the darker 'Fannin' phase of Dall sheep are found within the preserve. Sheep in the Ogilvie Mountains are a small part of a much larger population contained primarily within Canada (Ulvi 1983, Ulvi 1991) and were not included in this survey.

From July 2 - 4, 2009, a sheep survey was conducted in the Charley River drainage of YUCH (Figure 1, Figure 2). A Robinson R44 helicopter (Quicksilver Air) was used to conduct the survey, and was piloted by Rick Swisher. The observer was John Burch.

Weather conditions for the survey were good, with clear skies and calm winds for most survey units. Afternoon build up created a few clouds and light turbulence. Temperatures at survey altitudes was 50° - 65° F. Light smoke from the wildland fires in and near the preserve was present for the survey but was not a factor. The clear skies and direct sunshine reduced visibility by creating some shadows. Only small patches of snow persisted on the lee side of some ridges and did not affect sightability.

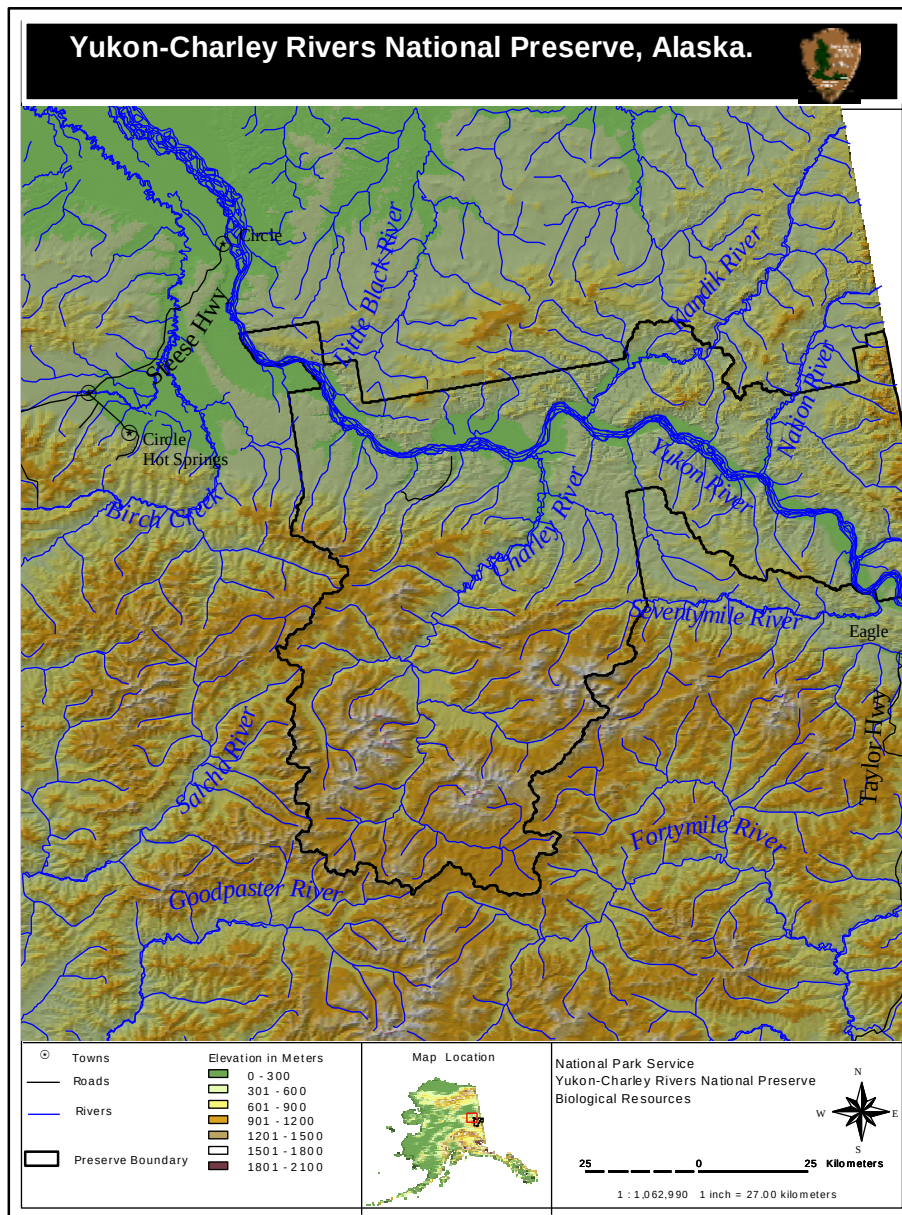


Figure 1. Location of Yukon-Charley Rivers National Preserve (YUCH), Alaska.

Methods

The survey technique used this year (as in the previous 2 surveys) surveyed each unit from one end to the other, flying each mountainside and then the ridge top above, then the next mountain side, etc. (as opposed to flying contours around the mountain until the starting point was reached again) Although slower, mixing this technique with contour flying provides faster coverage of individual drainages thereby reducing the chance of double counting or missing sheep that move over the top of the ridge. This flying was done in such a way as to be able to see all the terrain that sheep might occupy above shrub line except for the Charley River unit which is all well below tree line.. Usually this was easily accomplished with a single pass through a particular area, but two or three passes were made in areas of steep, vertical, broken terrain, or in areas with patches of snow or dark shadows. When groups of sheep were spotted, the helicopter flew in close to sex and age each individual by horn size and shape, body size, and occasionally seeing testicles to identify yearling rams. Flight path was recorded via GPS track files, and a waypoint stored for the location of each group of sheep (Figure 2).

Results

Seven survey units were flown for a total of 12.48 survey hours. Three units (Charley River, Twin Mt & Mt 5580) were flown the first day, three units (Cirque Lakes, Copper, and Sorenson) were flown the second day, and 1 unit (Diamond Fork) was flown the third day (Figure 2).

A total of 333 sheep were counted: 151 ewes, 72 lambs, 43 yearlings, and 67 rams. Overall, the lamb/ewe ratio was 48 lambs/100 ewes, the yearling/ewe ratio was 28 yearlings/100 ewes, and the ram/ewe ratio was 44 rams/100 ewes (Table 1). Applying a conservative sightability correction of 1.1, derived from past radio telemetry studies and surveys in YUCH (Lawler et al. 2005, page 37), produces an estimate of 366 sheep.

The same 7 survey units have been flown in 1997, 1998, 1999, 2001, 2002, and now 2009. Comparing this year to past years, the total number of sheep counted was above average (333 vs. a 6 year average of 313). Composition (#/100 ewes) was higher than average for lambs and yearlings, 48 and 29 respectively, vs. a 6 year average of 46 and 26. However the ram:ewe ratio was smaller at 44 rams/100ewes vs. a 6 year average of 51 rams per 100 ewes.

One old radio-collared ewe was seen on Mt 5580 that had been captured and collared in 1997 or earlier. This ewe is likely only 1 of 2 possible individuals; the younger of the 2 was estimated at 4 years old in 1997 so would be about 16 years old, and the older ewe was estimated at 7 in 1997 so would be about 19 years old.

A dead ewe was found on the west end of Mt Sorenson while conducting the 2009 survey. The fresh and intact 3 year old ewe was collected by the survey helicopter and necropsied by ADF&G veterinarian Kimberlee Beckman in Fairbanks. Dr. Beckman determined the ewe died from Contagious Hoof Disease. No other dead or sick sheep were reported for the remainder of the summer or fall hunting season.

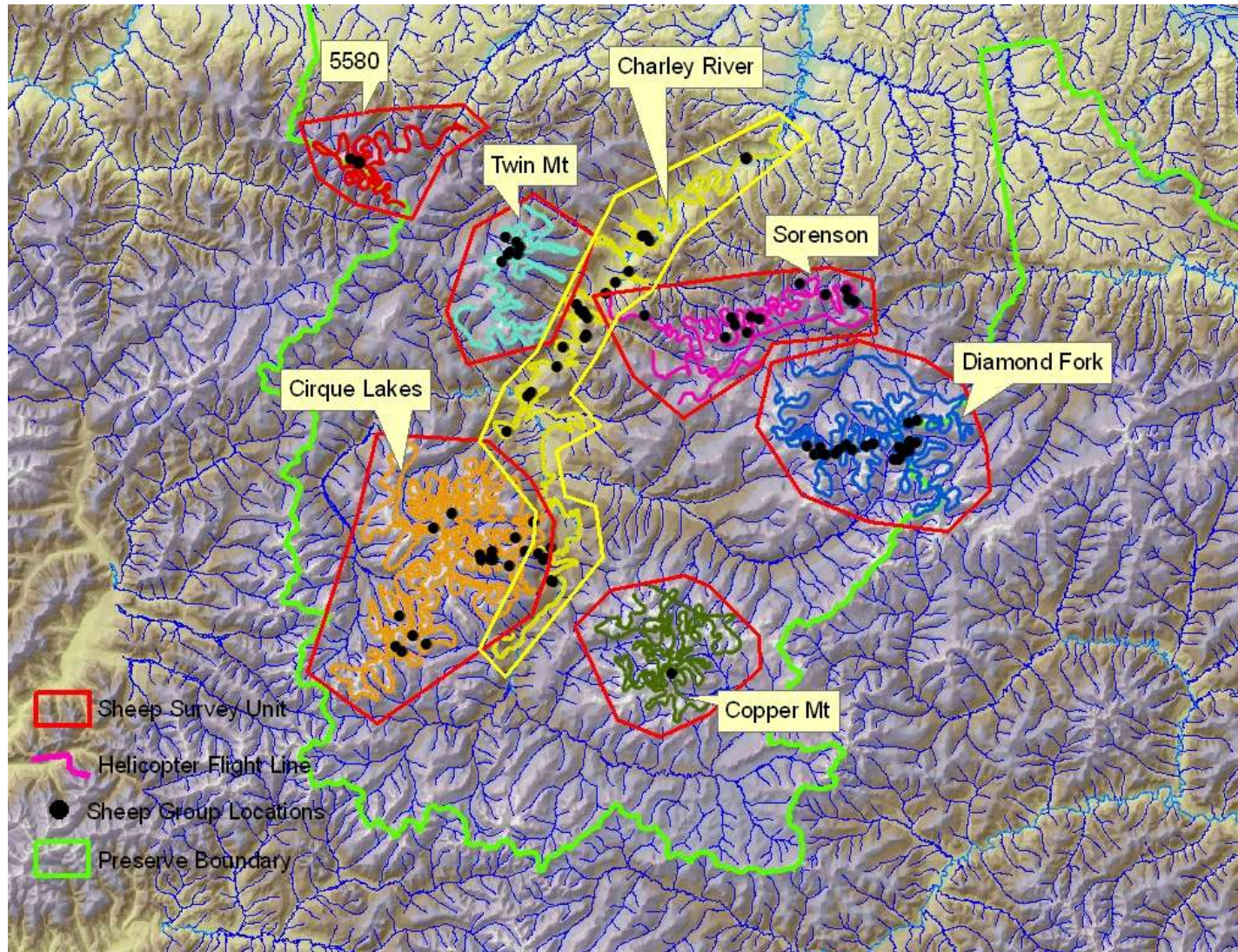


Figure 2. Flight Lines and locations of sheep groups for the 2009 survey in Yukon-Charley Rivers National Preserve.

Table 1. Results of 2009 sheep survey Yukon-Charley Rivers National Preserve.

Survey Area	Survey Time	Total Sheep	Ewes	Lambs	Yrls	Rams	Lambs/ 100 ewes	Yrls/ 100 ewes	Rams/ 100 ewes	Legal Rams	Sub-legal Rams	% Legal Rams
Cirque Lakes	3.65	41	20	7	5	9	35.0	25.0	45.0	2	7	22.2
Sorenson	1.27	65	37	17	9	2	45.9	24.3	5.4	0	2	0.0
Twin	0.77	40	12	5	4	19	41.7	33.3	158.3	4	15	21.1
Mt.5580	0.67	23	9	3	7	4	33.3	77.8	44.4	0	4	0.0
Charley	2.47	105	54	33	15	3	61.1	27.8	5.6	0	3	0.0
Diamond Fork	2.2	50	19	7	3	21	36.8	15.8	110.5	4	17	19.0
Copper	1.45	9	0	0	0	9	0.0	0.0	900.0	2	7	22.2
TOTAL	12.48	333	151	72	43	67	47.7	28.5	44.4	12	55	17.9
MEANS	1.78	47.6	21.6	10.3	6.1	9.6	36.3	29.1	181.3	1.7	7.9	12.1

Discussion

Evaluating any trends in the population of sheep for YUCH is difficult at best. When comparing to previous surveys (Table 2) care needs to be taken to compare data from years when all of the same survey units were flown. Furthermore, all 7 of the survey units should be flown to produce meaningful numbers. This is because of the extensive and frequent movement of sheep between survey units that was documented in previous radiotelemetry studies (Burch and Demma 1998, Burch and Lawler 2002, Lawler et al. 2005). These movements occur before, during and after the late June- early July time frame when sheep surveys are typically conducted. If some survey units are not flown, a significant portion of the population could be missed. This precludes comparison with years when only two or three survey units were flown as trend areas.

This survey continues to emphasize the need to survey the entire area and not try to rely on smaller trend areas. The sheep in this population move between survey units, back and forth frequently and at unpredictable times. This is illustrated in this current survey by counting the most sheep ever seen along the Charley River Bluffs (105 sheep) and counting the second fewest sheep on Cirque Lake Mountain (41 sheep) since 1983, yet producing an overall survey result only slightly above average (Figure 3, Table 2).

When using these criteria, there are 6 years (1997, 98, 99, 2001, 2002, 2009) that are comparable for all 7 survey units (Figure 3). It appears that the population is stable and lamb survival and yearling recruitment are good. The ewe:ram ratio seems the most variable, possibly due to movements of some ram groups in and out of the overall survey area. We suspect the slight drop in overall number in 1998 is due to flying the units too fast, resulting in poorer sightability and fewer sheep seen rather than an actual drop in the sheep population.

Two additional areas were surveyed in 1999, 2000, 2001, and 2002 west of the Preserve in the Upper Salcha River area near West Point and Puzzle Gulch. These areas were surveyed to meet the objectives of the Military Overflights sheep project looking at the effects of military overflights on sheep. The results of those surveys are not included in any data presented here and are summarized in a separate report (Lawler et al 2005).

Sheep harvest has averaged 4 rams per year from 1983 – 2007 within YUCH's boundary and ranged from 0 to 11 (Figure 4). However, hunting regulations changed in 1993, going from 4 drawing permits to an open hunt (all of full curl rams only). This regulatory change took 2 years to have an effect as the marked increase in harvested sheep from 1995 on shows. Despite the increase in harvest since 1995 (average of 6.6/year) the population appears to have remained stable. However the total number of full curl rams appears to have declined (Figure 3), although this may be self-regulating with a full curl ram harvest.

There was an anecdotal observation of 5 sheep (ewes and lambs) on Kathul Mountain by Eagle resident Steve Gowins in mid-July of 2010. Steve saw them while going by in his boat from the Yukon River. Don Woodruff, a 30+ year resident of the area, reports no one seeing sheep on Kathul for at least 30 years. These sheep were 30 miles from known sheep groups.

Table 2. Data summary for each sheep survey unit for each year, Yukon-Charley Rivers National Preserve, 1983 - 2009.

Survey Unit	Year	Total Sheep	Survey Time	Total Counts				Per 100 Ewes			Rams		
				Ewes	Lambs	Yearlings	Rams	Lambs	Yearlings	Rams	Legal Rams	Sublegal	% Legal
Diamond Fork	1983	7	N/A	0	0	0	7	0	0	0	2	5	29
	1990	19	1.7	2	2	0	15	100	0	750	6	9	40
	1997	11	1.8	1	0	2	8	0	200	800	4	4	50
	1998	37	2.0	11	5	5	16	45	45	145	6	10	38
	1999	18	2.7	0	0	0	18				7	11	39
	2000	NA											
	2001	41	2.4	7	4	3	27	57	43	386	9	18	33
	2002	55	2.5	22	5	6	22	23	27	100	7	15	32
	2009	50	2.2	19	7	3	21	37	16	111	4	17	19
	Mean	29.75	2.19	7.75	2.88	2.38	16.75	43.69	55.23	381.95	5.63	11.13	34.92
Cirque Lakes	1983	66	N/A	26	10	9	21	38	35	81	10	11	48
	1984	27	4.8	16	4	8	1	25	50	6	0	1	0
	1990	107	2.5	47	15	19	26	32	40	55	13	13	50
	1993	58	2.5	38	9	1	10	24	3	26	0	10	0
	1994	63	2.6	21	9	9	24	43	43	114	3	21	13
	1995	76	3.2	27	9	11	29	33	41	107	7	22	24
	1997	77	3.2	42	13	3	19	31	7	45	5	14	26
	1998	62	2.1	18	9	3	32	50	17	178	7	25	22
	1999	69	3.7	33	13	15	8	39	45	24	3	5	38
	2000	NA											
	2001	52	3.4	16	4	5	23	25	31	144	5	18	22
	2002	57	2.6	28	16	7	6	57	25	21	1	5	17
	2009	41	3.7	20	7	5	9	35	25	45	2	7	22
	Mean	62.92	3.11	27.67	9.83	7.92	17.33	36.06	30.15	70.65	4.67	12.67	23.38

Table 2. Continued

				Total Counts				Per 100 Ewes			Rams		
Survey Unit	Year	Total Sheep	Survey Time	Ewes	Lambs	Yearlings	Rams	Lambs	Yearlings	Rams	Legal Rams	Sublegal	% Legal
Copper Mountain	1983	13	N/A	1	2	1	9	200	100	900	0	9	0
	1990	27	1.2	9	2	9	7	22	100	78	3	4	43
	1997	25	0.8	9	5	3	8	56	33	89	4	4	50
	1998	11	0.7	5	2	1	3	40	20	60	1	2	33
	1999	10	1.4	4	0	0	6	0	0	150	2	4	33
	2000	NA											
	2001	14	1.4	6	2	2	4	33	33	67	2	2	50
	2002	20	0.8	9	5	1	5	56	11	56	1	4	20
	2009	9	1.5	0	0	0	9				2	7	22
	Mean	16.13	1.12	5.38	2.25	2.13	6.38	58.10	42.54	199.84	1.88	4.50	31.47
Twin Mountain	1983	35	N/A	12	10	3	11	83	25	92	1	10	9
	1990	48	1.5	15	13	4	16	87	27	107	0	16	0
	1997	54	1.2	23	11	4	16	48	17	70	4	12	25
	1998	49	0.8	23	10	6	10	43	26	43	3	7	30
	1999	62	0.5	22	10	6	24	45	27	109	6	18	25
	2000	62	1.0	22	8	4	28	36	18	127	6	22	21
	2001	27	0.7	3	3	0	21	100	0	700	7	14	33
	2002	17	0.6	3	2	0	12	67	0	400	5	7	42
	2009	40	0.8	12	5	4	19	42	33	158	4	15	21
	Mean	43.78	0.89	15.00	8.00	3.44	17.44	61.27	19.33	200.67	4.00	13.44	22.95

Table 2. Continued

				Total Counts				Per 100 Ewes			Rams		
Survey Unit	Year	Total Sheep	Survey Time	Ewes	Lambs	Yearlings	Rams	Lambs	Yearlings	Rams	Legal Rams	Sublegal	% Legal
Mt. Sorenson	1983	31	N/A	9	2	0	20	22	0	222	5	15	25
	1984	32	2.7	15	8	2	6	53	13	40	1	5	17
	1987	35	N/A	14	9	2	10	64	14	71	1	9	10
	1990	58	1.9	18	12	7	21	67	39	117	2	19	10
	1993	16	1.4	0	0	0	16	0	0	0	5	11	31
	1994	48	1.5	17	6	0	25	35	0	147	6	19	24
	1995	57	1.3	20	17	6	15	85	30	75	5	10	33
	1997	79	1.1	46	17	15	1	37	33	2	1	0	100
	1998	35	1.0	15	7	2	11	47	13	73	7	4	64
	1999	98	1.3	55	21	9	13	38	16	24	6	7	46
	2000	NA											
	2001	97	1.4	59	15	19	4	25	32	7	2	2	50
	2002	71	1.1	35	18	9	9	51	26	26	1	8	11
	2009	65	1.3	37	17	9	2	46	24	5	0	2	0
	Mean	55.54	1.46	26.15	11.46	6.15	11.77	47.62	20.09	67.45	3.23	8.54	32.36
Charley River	1997	39	1.4	25	11	3	0	44	12	0	0	0	0
	1998	53	1.0	27	19	6	1	70	22	4	0	1	0
	1999	52	2.1	25	16	10	1	64	40	4	0	1	0
	2000	31	1.6	20	6	5	0	30	25	0	0	0	0
	2001	31	2.6	17	9	5	0	53	29	0	0	0	0
	2002	81	1.7	40	30	3	8	75	8	20	0	8	0
	2009	105	2.5	54	33	15	3	61	28	6	0	3	0
	Mean	56.00	1.84	29.71	17.71	6.71	1.86	56.77	23.42	4.75	0.00	1.86	0.00
5580 Mnt.	1997	24	0.5	10	6	5	3	60	50	30	0	3	0
	1998	35	0.4	17	11	3	4	65	18	24	0	4	0
	1999	20	0.5	10	5	5	0	50	50	0	0	0	
	2000	27	0.5	12	4	7	4	33	58	33	1	3	25
	2001	32	0.5	13	6	5	8	46	38	62	2	6	25
	2002	29	0.5	17	4	4	4	24	24	24	3	1	75
	2009	23	0.7	9	3	7	4	33	78	44	0	4	0
	Mean	27.14	0.52	12.57	5.57	5.14	3.86	44.44	45.11	30.91	0.86	3.00	17.86

Trends in Overall Sheep population for all 7 Survey Units, Yukon-Charley Rivers National Preserve

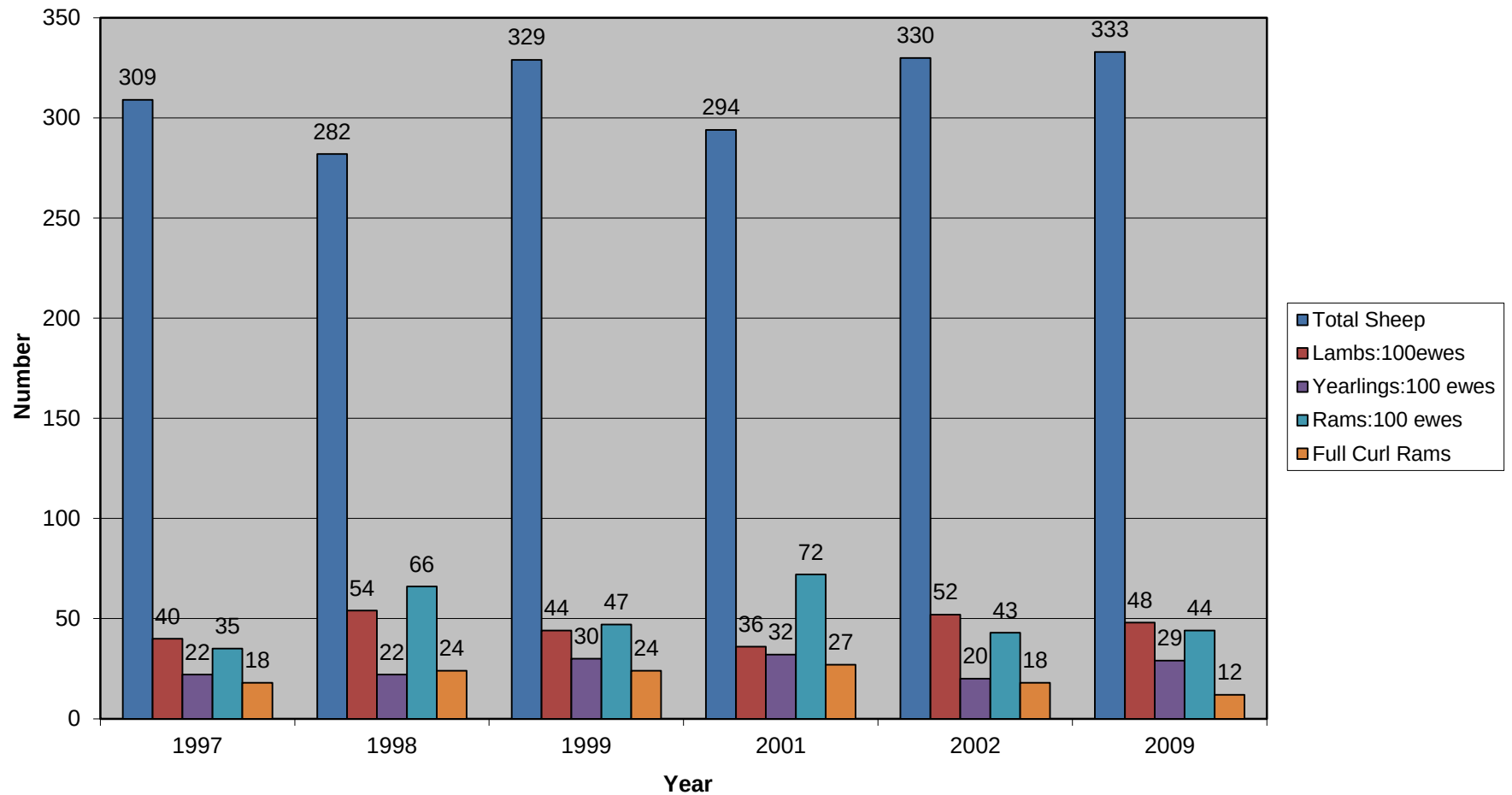


Figure 3. Trends in overall sheep population for all 7 survey units, Yukon-Charley Rivers National Preserve 2009.

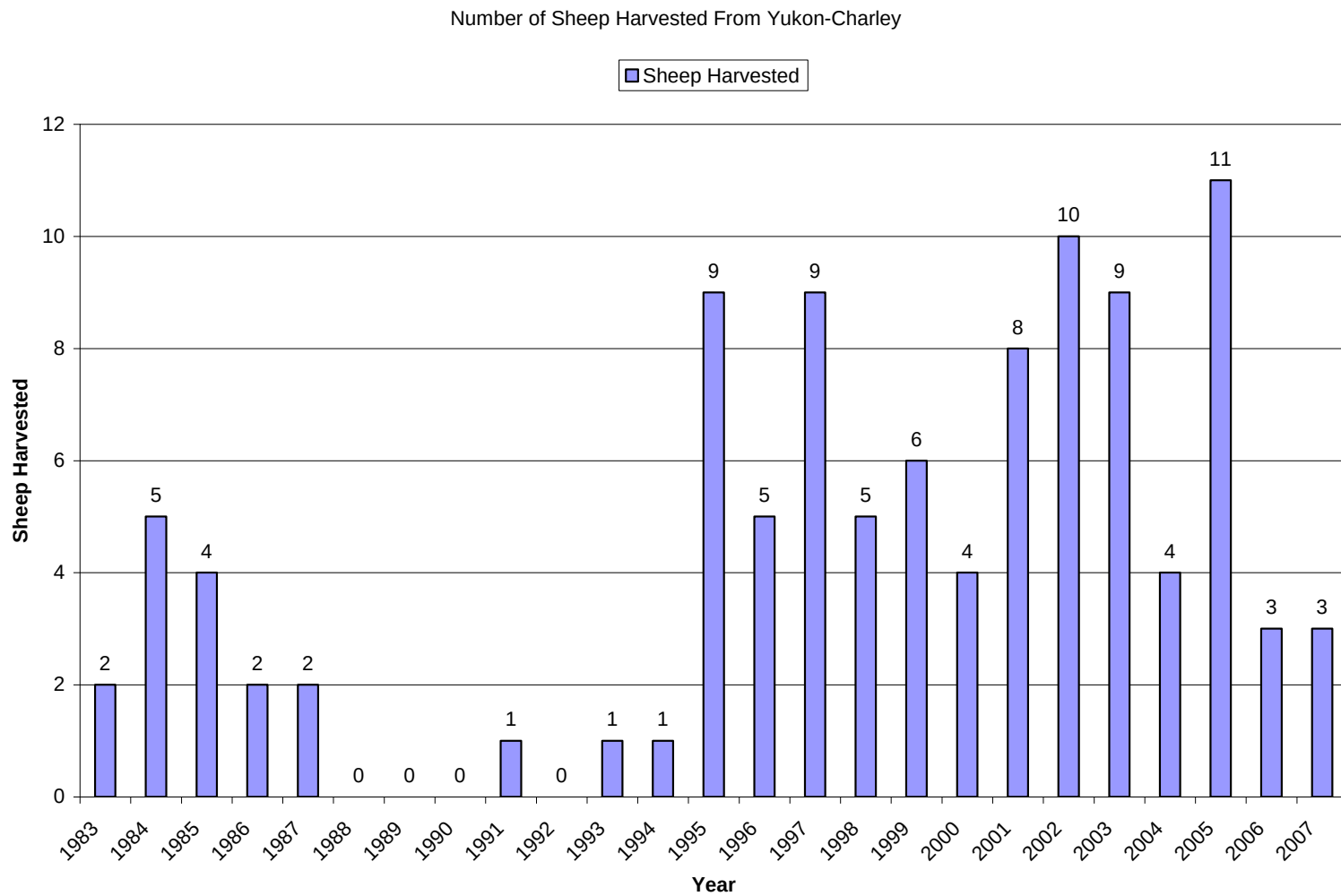


Figure 4. Reported sheep harvest within Yukon-Charley Rivers National Preserve, Alaska, 1983 – 2007.

Recommendations / Conclusions

- Continue to survey all 7 survey units (5580, Twin, Cirque Lakes, Charley River, Sorenson, Diamond Fork, and Copper) as in past years. Extensive sheep movements argue against surveying anything less. Diamond Fork and 5580 would be the only two to consider leaving out and it would be better not to.
- Use an R44 helicopter to complete the surveys. This aircraft can safely survey in higher winds and poorer weather compared to a fixed wing, the sex and age composition is far superior, and the survey area is small enough that it is still affordable.
- Don't try to survey too fast to try to save money. Use the flight time averages for the individual units (roughly 12 hours of actual survey time).
- Another technique that could be employed for some survey units is to make one high pass along the ridge top to find sheep that could be missed from moving over the ridge away from the helicopter, then fly the survey as usual. However the flight paths used since 1999 minimize the need for this (Figure 2).
- Flying a duplicate survey with a supercub to determine effects of the helicopter on sheep sightability as in Whitten (1997) could prove educational. However, the ability to sex and age the sheep accurately from a helicopter and the ability to continue the survey with a helicopter despite some wind and turbulence, overshadows any cost savings from moving to a strictly fixed-wing survey

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