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DENALI NATIONAL PARK MOOSE TREND SURVEY 1987

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INTRODUCTION

A variety of moose surveys have been conducted in Denali National Park (DENA) since 1970 (Buskirk 1975, Dubois 1985, Haber 1977, Troyer 1974, 1976, 1977, 1978, 1979, 1980, and 1981, Meier 1987, Singer 1984, and Van Ballenberge 1982, 1983, 1985 and 1986) but differences in methods or environmental conditions have made it difficult to determine trends in the population. Knowledge of population change is needed for studies in progress in the park on moose ecology, predator-prey relationships, and the effects of vehicle traffic on wildlife use of the road corridor. In addition, as an unhunted population, DENA moose are used as a comparison for studies of hunted population (Gasaway et al. 1983, Haber 1987).

The objective of the 1987 survey was to compare a portion of the eastern end of the park with a 1976 survey (Troyer 1976) using similar methods and under similar environmental conditions in order to determine the trend in the population of the eastern end of DENA.

METHODS

We followed aerial trend survey methods that have been standard in interior Alaska for several years (Haber 1977, Troyer 1979), with the addition of trying to maintain a minimum search effort,

plus doing intensive sightability checks at 12 min/mi² in randomly selected 2 mi² plots (Gasaway et al. 1986).

The survey area consisted of units 14, 15 and 16 (Fig. 1). These coincided with Troyer's (1976) units 13 (he did not survey the north side of the Outer Range nor did we), and 14, 15, and 16. We subdivided our unit into count units averaging 13.6 mi². There were several reasons for limiting our survey to this area from the Sanctuary River to the Nenana River. This has generally had the highest density of moose in the park north of the Alaska Range (Troyer 1974, Singer 1984, and Meier 1986). Troyer (1974) recommended this area for trend surveys as he found 40% of all moose in the park at that time in this east end. This area has the longest and most intensive moose studies in DENA. It can be surveyed in a few days, before weather deteriorates, with minimal ferry time. Many attempts at surveys have been incomplete due to weather changes.

The survey was conducted on October 30 and 31, 1987. Snow cover was ranked as good (Gasaway et al. 1986), except in the southcentral portion of unit 14-7 which was ranked moderate. We generally had about 6 inches of fresh snow with snow on trees and bushes, except in southcentral 14-7 where south facing sides of trees were bare and snow was 2-6 inches. Light conditions were generally good and of moderate intensity. Very little turbulence was encountered.

Two PA-18 Super Cub aircraft were used simultaneously. We tried to survey adjacent units to minimize recounting moose that might move between units. Sightability checks were done immediately after a unit was surveyed. One pilot and both observers were experienced and current in moose surveys in the units. The pilot that was inexperienced in moose surveys flew the less forested, less rugged units, and was accompanied by the most experienced observer. Pilots were Don Glaser and Jim Unruh and observers were John Burch and myself.

RESULTS

We surveyed 16 count units totalling 217.2 mi^2 in 16 hours of actual survey time (Table 1). Conducting the survey required an additional 9 hours ferry time. Our search effort averaged 4.4 min/mi^2 . Search effort was less than 4 min/mi^2 in some units due to very sparse vegetation, while higher in units with large amounts of forest. Intensive sightability checks were done in 6 units with 11 moose were seen where 9 had been observed previously, resulting in a sightability correction factor of 1.2.

A total of 266 moose were observed for an observed density of 1.2 moose/mi^2 . Applying the sightability correction factor gives an estimated population of 319 with a density of 1.5 moose/mi^2 .

Age and sex composition was 23 calves, 3 yearling bulls and 34 adult bulls per 100 cows.

COMPARISON WITH THE 1976 SURVEY

Troyer (1976) counted 396 moose. His survey time was 8 hours and 15 minutes with an average search effort of 2.3 min/mi². We counted 266 moose in the same survey units with an average search effort of 4.4 min/mi². Survey dates were very similar for both surveys: October 29, 30 and November 2 and 4 for Troyer, while ours was October 30 and 31.

Like us, Troyer (1976) surveyed under good conditions. He had 8-10 inches of fresh snow, little turbulence, and good light. He used a PA-18 Super Cub with 2 pilots alternating the flying. Both were experienced in moose surveys in the park. He used 3 different observers.

The major difference between the surveys was the 1987 search effort averaging twice that of 1976. Other differences include our use of one pilot inexperienced in moose surveys, although Troyer had an inexperienced observer on his highest density unit and others. Our increased search time should have compensated for pilot inexperience, plus our most experienced observer flew with

and directed this pilot. Troyer's survey was spread over 7 days, which could cause duplicate counting due to movements of moose between units, while duplication was low or unlikely in our survey which was done over 2 days. Duplication was probably not significant in the 1976 survey because moose movements are usually minimal during the post-rut period unless heavy snowfall occurs. Park headquarter's weather records show only 1 inch of snow falling after the start of the 1976 survey.

DISCUSSION

We found 33% (n=130) fewer moose than Troyer (1976) even though we had twice as much search time. Troyer's count would likely have been even higher had his search effort been similar to ours. With the 1976 search effort more than 75% of moose present should have been seen, while in 1987 we should have seen more than 80% (Gasaway et al. 1986:Fig. 9, which is based on open canopy forest; Denali's east end contains much nonforested terrain where sightability should be much better). Given the similarities in survey methods and conditions, the large difference in moose observed indicates a decrease in the moose population in the eastern portion of the park.

Singer (1984) surveyed the same area as we did, using the same methods, although part of his area had only moderate snow

conditions. He concluded that the moose population in the eastern area was either stable or had declined by 32% from Troyer's 1976 survey. Van Ballenberghe (1986) concluded there had been a decline based on his field work and helicopter surveys of a 58 mi² area.

While cow:calf ratios alone are not necessarily reliable indicators of a population trend, many years of such composition data from park surveys seem to support the evidence for a declining population. Between 1974 and 1986, ratios for the east end of the park from 14 surveys have a mean of 15 calves:100 cows.

The 1987 calf ratio was the second highest since 1974 and was considerably higher than the mean for 14 surveys since 1974. The bull ratio of 34:100 cows was close to the mean of 33:100 cows since 1974. The yearling bull ratio of 3:100 cows was the second lowest recorded in the east end since 1974, and was below the mean of 5.8. However, classifying yearlings is difficult under the best of conditions, so large errors are possible in the various surveys over the years, and the data should be interpreted with caution.

Singer (1984) found 257 moose, while Meier (1986) conducting a stratified random sampling survey estimated 256 moose in the same area. Both figures are close to our 266 for the same area and

may indicate the moose population has stabilized after declining from the 396 counted by Troyer (1976). However, differences in survey methods and conditions could mask larger changes. Additional surveys using methods comparable to those of recent years should be done to monitor the trend. It is recommended that the stratified random sampling method used by Meier (1986) become the standard method for future DENA moose surveys.

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Table 1. Results of 1987 moose survey, Denali National Park.

SURVEY UNIT	SURVEY DATE	BULLS ¹			COWS W/#CALVES			UNK. AGE/SEX	TOTAL MOOSE	SIGHTABILITY TEST		AREA MI ²	SEARCH TIME MIN	SEARCH EFFORT MIN/MI ²	DENSITY MI ²
		Y	M	L	0	1	2			BEFORE	AFTER				
14-1	10-30-87	1			3	1			6			14.1	59	4.2	0.4
14-2	10-30-87				2	2			6			11.9	63	5.3	0.5
14-3	10-30-87	1	1		8	4	1		21	3	3	23.3	123	5.3	0.9
14-4	10-30-87	1	7		12	4			28	4	4	9.0	44	4.9	3.1
14-5	10-30-87	1	9		14	1			26	1	1	15.5	86	5.5	1.7
14-6	10-31-87				2	4			10			13.8	79	5.7	0.7
14-7	10-30-87					1			2			6.4	31	4.8	0.3
	SUBTOTALS	4	17	0	41	17	1	0	99	8	8	94.0	485	5.2	1.1
15-1	10-30-87		1	1	10	3	1		21		2	12.6	59	4.7	1.7
15-2	10-30-87		4	7	16	4			35			14.8	81	5.5	2.4
15-3	10-31-87				5		1	1	9			10.5	38	3.6	0.9
15-4	10-31-87		7	5	42	4			62			19.0	98	5.2	3.2
15-5	10-31-87								0			5.1	15	2.9	0.0
15-6	10-31-87	1	1	4	16			1	23			6.6	28	4.2	3.5
	SUBTOTALS	1	13	17	89	11	2	2	150	0	2	68.6	319	4.4	2.2
16-1	10-31-87											9.4	31	3.3	0.2
16-2	10-31-87					1			2			13.8	49	3.5	0.1
16-3	10-31-87	1	4		2	4			15	1	1	31.4	76	2.4	0.5
	SUBTOTALS	1	4	0	2	5	0	0	17	1	1	54.6	156	3.0	0.3
	TOTALS	6	34	17	132	33	3	2	266	9	11	217.2	960	4.4	1.2

¹y = yearling, M = medium, L = large