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MOUNT BAXTER BIGHORN POPULATION: 1987 STATUS

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INTRODUCTION

Sierra Nevada bighorn have been the subject of an intensive management program since reintroductions were begun in 1979. As the source stock for these reintroductions, the Mount Baxter population has played a pivotal role in this program; consequently, it is carefully monitored annually. The last written report on its status was in 1983 (Wehausen 1983). The purpose of this report is an updating of information on that population. Included is a synopsis of demographic information gathered since 1976.

HERD DEFINITION

Over the years, it has been customary to refer to the sheep wintering between Thibaut and Division Creeks as the Mount Baxter herd. In studying these sheep during 1976-79, it became apparent that there was little, if any, interchange of sheep across the Sawmill Creek in winter. Consequently, guidelines for removal of sheep were set up to preserve minimum wintering population sizes on either side of Sawmill Creek. However, sheep on both sides of the creek were treated as a single population in arriving at a strategy of sheep removals for reintroduction. Recruitment ratios were sufficiently different on either side of Sawmill Creek in the winter of 1984 to cause me to question the validity of treating this as a single demographic unit. To look somewhat further at the question, radio collars were placed on two ewes on the north side of Sawmill Creek in March of 1986. The few aerial relocations of these sheep in summer have indicated a summer range from canyons north of Sawmill Canyon south to the south side of the Woods Lake Basin. Given that the summer range of ewes wintering south of Sawmill Creek lies almost entirely south of the Woods Lake Basin, there probably is only minimal overlap in summer ranges of the ewes that winter on either side of

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Sawmill Creek. In other words, there appears strong justification for regarding them as separate demographic units. In this report I have presented all data on these two demographic units separately. Those sheep wintering south of Sawmill Creek are referred to the Sand Mountain herd, while those to the north are called the Sawmill Canyon herd. For convenience, the two together will continue to be called the Mount Baxter population. Genetically, they are certainly a single population.

WINTER CENSUS RESULTS

Sand Mountain Herd

Table 1 lists major results of winter counts since 1976. Values listed by sex and age classes are the minimum number of sheep present in any year. Only in 1978 and 1983 were winter conditions sufficient that these minimum values were probably actual population values, or very close to them. Using recruitment ratio data and the assumption that every ewe was counted in 1978 and 1983, it was previously calculated that a recruitment rate of 32 lambs per 100 total ewes would maintain a constant population in the Mount Baxter herd, as previously defined. When this value is recalculated using only data from the Sand Mountain herd, it drops slightly to 31.5:100. Using this value, yearly recruitment data, known sheep removals, and again the assumption that all ewes were counted in 1978 and 1983, it is possible to calculate probable numbers of ewes present in the Sand Mountain herd for every year since 1976. These probable population levels are plotted in Figure 1. It is noteworthy that the current population level is the lowest in this time period.

The winter of 1987 was by far the worst so far for censusing these sheep, including the drought years of 1976 and 1977 (Table 1, Figure 2). Over the years, it has become apparent that one of the major determinants of the degree of congregation of sheep at low elevation is the nutritional status of the vegetation. In 1987, the first winter storm large enough to deeply soak the winter range soil deeply, and thereby initiate plant growth, did not occur until early March -- one month later than in 1976, which was nutritionally the worst of the drought years. This initiating storm usually occurs in November or December. A second factor that has been apparent in bringing sheep

low in winter where they can be censused is accumulation of snow; thus the excellent data in 1978 and 1983 and poor data in 1976, 1977, and 1987 (Figure 2). A multiple regression model verified the importance of both these factors in census success. The date of the first major (soaking) winter storm (expressed as the log of the number of days before 15 March), and the inches of water in the snowpack at the 10,300' survey point in Sawmill Canyon at the end of the census season (April 1) were used as independent variables. Together, they explained 91% of the variation plotted in Figure 2, and both factors were highly significant ($P=.003$ and $.004$, respectively).

Spring/summer and winter lamb:ewe ratios in the Sand Mountain herd have exhibited considerable variance since 1975 (Table 2). Previous analyses of some of these data (Wehausen 1980) are questionable because they were based on an inaccurate definition of the population. It is noteworthy that, in addition to a relatively low number of ewes in the ^{Sand Mountain} ~~Mount Baxter~~ herd at present, lamb:ewe ratios at the end of lambing have been low in both 1986 and 1987 (Table 2). These rates will effect no appreciable population growth; thus, few ewes will be available for reintroduction for at least a couple of years. A high lambing rate was expected for 1987 due to the low population density and visually excellent condition of ewes in the fall of 1986. The low rate recorded in spring 1987 may have been due to high neonatal lamb mortality resulting from a particularly stormy lambing season.

Sawmill ^{Canyon} Creek Herd

Data from Goodale Creek are presented separately from Sawmill Creek in Table 1, although there is no good reason to believe that these are separate demographic units. It is particularly noteworthy that the number of sheep wintering in Goodale Creek has been steadily dropping since a high recorded in 1981-82. It is possible that Goodale Creek serves somewhat as an overflow when the population density in Sawmill Creek is high. High numbers of sheep have been counted in neither Goodale Creek nor Sawmill Creek since these two range netted a peak total of 92 in 1982, despite the excellent census year in 1983 (Table 1). The removal of ten sheep from Sawmill Canyon in 1982 can account for only about one-third of the apparent population drop in these two areas. It is

possible that some of these missing sheep are wintering in a different canyon.

LITERATURE CITED

Wehausen, J. D. 1980. Sierra Nevada bighorn sheep: history and population ecology. Ph. D. Diss., Univ. of Michigan, Ann Arbor. 240pp.

Wehausen, J. D. 1983. Sierra Nevada bighorn herds: 1983 status. Admin. Report, Inyo Nat. Forest, Bishop, CA. 18pp.

TABLE 1. Census and removal data for bighorn sheep on the Sand Mountain, Sawmill Canyon, and Goodale Creek low elevation wintering areas in the Sierra Nevada. Sand Mountain represents the range from Thibaut Creek to Sawmill Creek. Sawmill Canyon represents the range on the north side of Sawmill Creek and includes Division Creek Canyon. Numbers by sex and age represent the minimum number present in any year. Data for years of removals represent preremoval numbers.

YEAR	SAND MOUNTAIN							SAWMILL CANYON						GOODALE CREEK							
	EWE	YRL EWE	LAM	YRL RAM	RAM	TOT	L:100E	EWE	YRL EWE	LAM	YRL RAM	RAM	TOT	L:100E	EWE	YRL EWE	LAM	YRL RAM	RAM	TOT	
1976	29	4	16	4	31	84	55	19	1	10	4	12	36	53							
1977	35	10	29	10	24	108	77	27	5	10	3	17	62	37							
1978	60	16	29	13	32	150	48	23	9	9	5	18	62	39							
1979	48	9	17	9	46	129	35	17	4	5	3	23	55	29							
REMOVED:						2	2	4		2	1		7								
									(2,0)												
1980	65	7	24	8	39	143	37	13	1	8	2	27	52	62	5	1	2	1	7	16	
REMOVED:	15	1	7	1	1	25		1				5	6								
			(4,3)																		
1981	40	7	16	6	27	106	40	23	4	10	2	11	46	44	6	2	3	3	11	25	
1982	39	9	29	9	36	122	74	24	2	13	5	24	68	54	7	2	5	0	10	24	
REMOVED:						10	10	5		1		4	10								
										(0,1)											
1983	56	13	15	10	37	131	27	19	5	7	1	17	49	37	3	0	1	2	7	13	
1984	41	5	20	5	29	106	49	11	2	2	1	4	20	18							
1985	54	8	25	4	40	131	46	18	3	7	2	19	49	39							11
1986	61	7	28	10	41	147	46	16	2	2	2	15	37	12	2	0	2	0	4	8	
REMOVED:	16	1	7	5	3	32															
			(5,2)																		
1987	12	2	4	4	21	43	35	4	4	3	1	3	15								

TABLE 2. Spring/summer and winter lamb:ewe ratios for the Sand Mountain bighorn herd in the Sierra Nevada. Spring surveys are generally initiated in the last week of May and completed by the end of June. Summer ratios are for July and August. Sample sizes are in all cases the number of adult (≥ 2 yr. old) ewes constituting the denominator.

YEAR	LAMBS PER 100 ADULT EWES		SUMMER	N	WINTER
	<u>SPRING</u>	<u>N</u>			
1975-76			72	40	55
1976-77	81	36			77
1977-78	70	27			48
1978-79			30	40	35
1979-80			39	28	37
1980-81					40
1981-82			59	32	74
1982-83			26	19	27
1983-84	62	32			49
1984-85	64	22			46
1985-86	46	26			46
1986-87	33	24			35
1987-88	35	31			

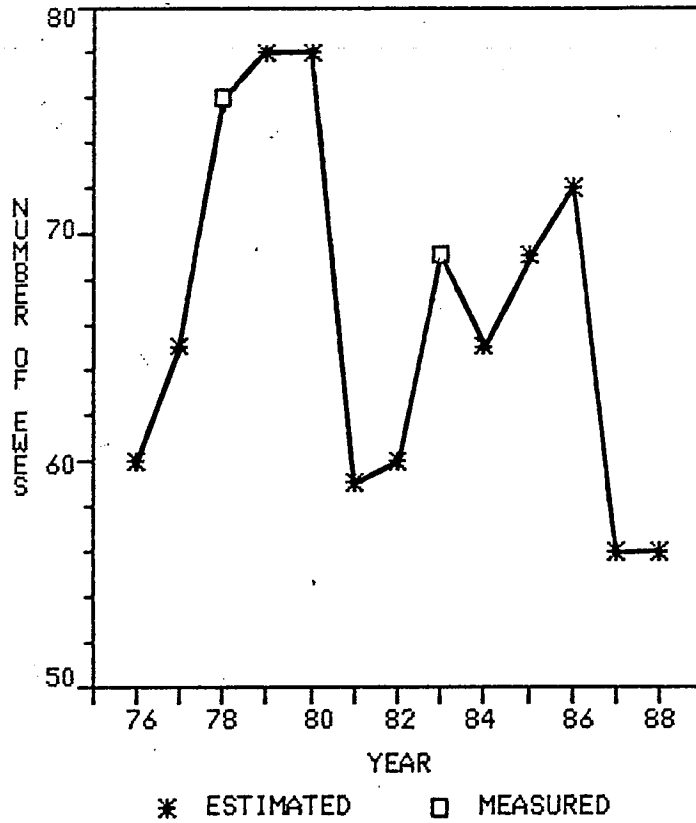


FIGURE 1. Probable dynamics of the Sand Mountain ewe population since 1976. Estimated values were calculated from the measured values on the basis of yearly recruitment rates and the recruitment rate calculated as necessary for a constant population. The two major declines result from ewes removed for reintroduction.

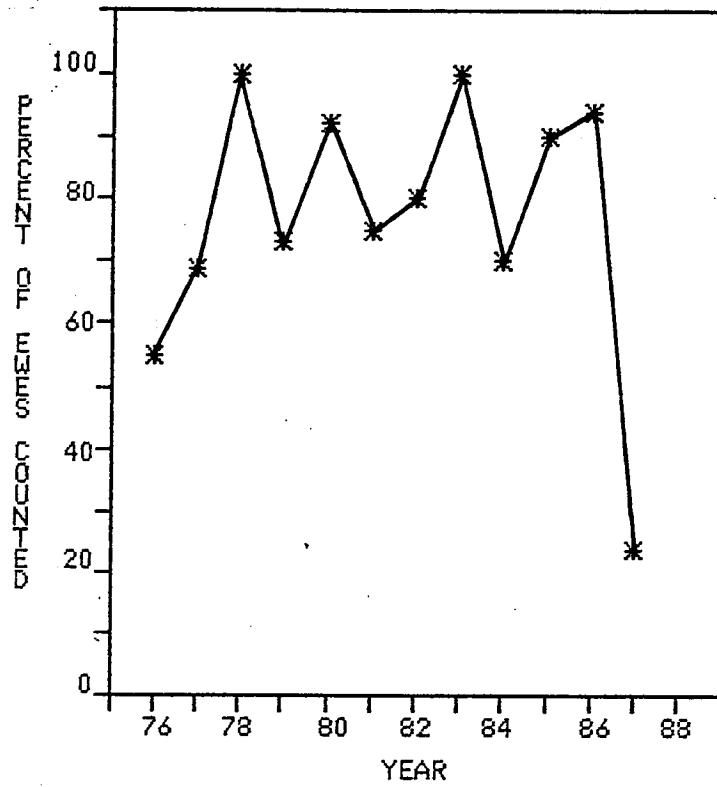


FIGURE 2. The efficiency of censuses of the Sand Mountain ewe population relative to calculated population sizes plotted in Figure 1.