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1982 Mount Baxter Herd Census

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Census work in the range of the Mount Baxter bighorn herd in the Sierra Nevada was more intense in the winter of 1982 than in any previous year. This intensity was due to both a need for accurate census data relative to removal of sheep for reintroduction and a fascination with some data patterns that appeared to be related to mountain lion predation.

From January 3rd to March 26th a total of 21 days of census work was put in. In addition to myself, many of these involved Rob Ramey, Louis Andaloro, and Tom Blankinship; and one day involved a total of 12 people in a group census. Sand Mountain was censused 13 times, Sawmill Canyon 6 times, the Black Canyon and Thibaut ranges 7 times, and Goodale Creek once.

Census Totals

Two censuses, one in early February and one in late March, ¹are noteworthy for their completeness (Table 1). Intervening censuses exhibited a steady decline in total count and notable trends in ratios (Figure 1) discussed below. The maximum bighorn counted, excluding Goodale Creek, was 168; but totalling the maxima of different sex and age classes yields a minimum of 186. Adding Goodale Creek provides a minimum total for the whole population of 210 (Table 1), which is probably very close to the actual total.

The 1978 total was about 220. This indicates that reproduction has nearly replaced the 40 sheep removed from the population in 1979 and 1980. However, the skewed sex ratio of sheep removed during those years has shifted the sex ratio of the population from about 70 rams

Table 1 - 1982 census results for the Mount Baxter herd.

<u>Location</u>	<u>Dates</u>	<u>Ewes</u>	<u>Lambs</u>	<u>Yearling Rams</u>	<u>Adult Rams</u>	<u>Total</u>	<u>Lambs per 100 Ewes</u>
Sawmill Can. to Thibaut Cr.	2/8-11	72	42	15*	39	168	58
	2/19	70**	31	6**	42	149	44
	2/26,27	60	26	12	49	147	43
	3/5,10	55	19	10	55	139	34
	3/12,15	52	17	9	51	129	33
	3/24-26	71	35	11	51	168	49
	maxima	72	42	15(12*)	60***	189(186*)	58
Goodale Cr.	2/14	<u>9</u>	<u>5</u>	<u>-</u>	<u>10****</u>	<u>24</u>	<u>56</u>
Minimum Total		81	47	15(12*)	70	213(210*)	58

* it is probable that three 2-yr. old rams were misclassified as yearling rams in the first census.

** it is probable that three yearling rams were misclassified as ewes in the 2/19 census.

*** sum of maxima for either side of Sawmill Creek.

**** the ram count listed for Goodale Creek is based on observations by Tom Blankinship in January from a helicopter; only 7 rams were observed on the census listed.

Figure 1 - 1982 winter sex and age ratio trends for the Mount Baxter herd.

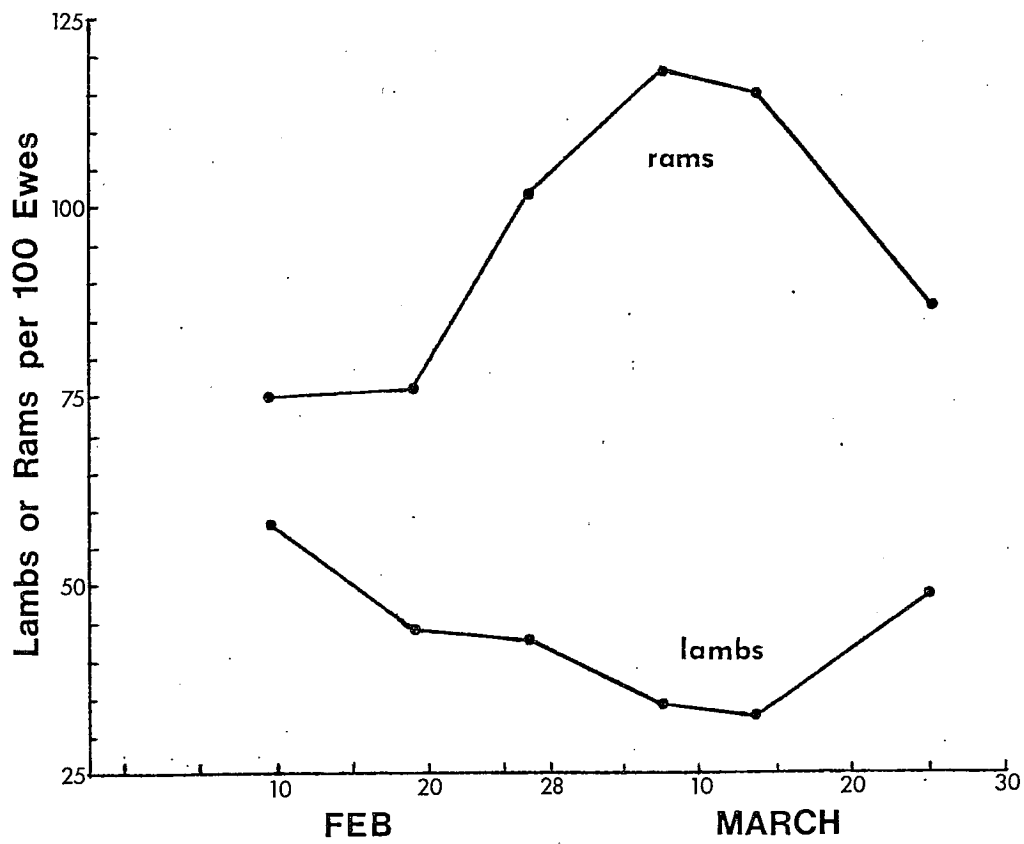
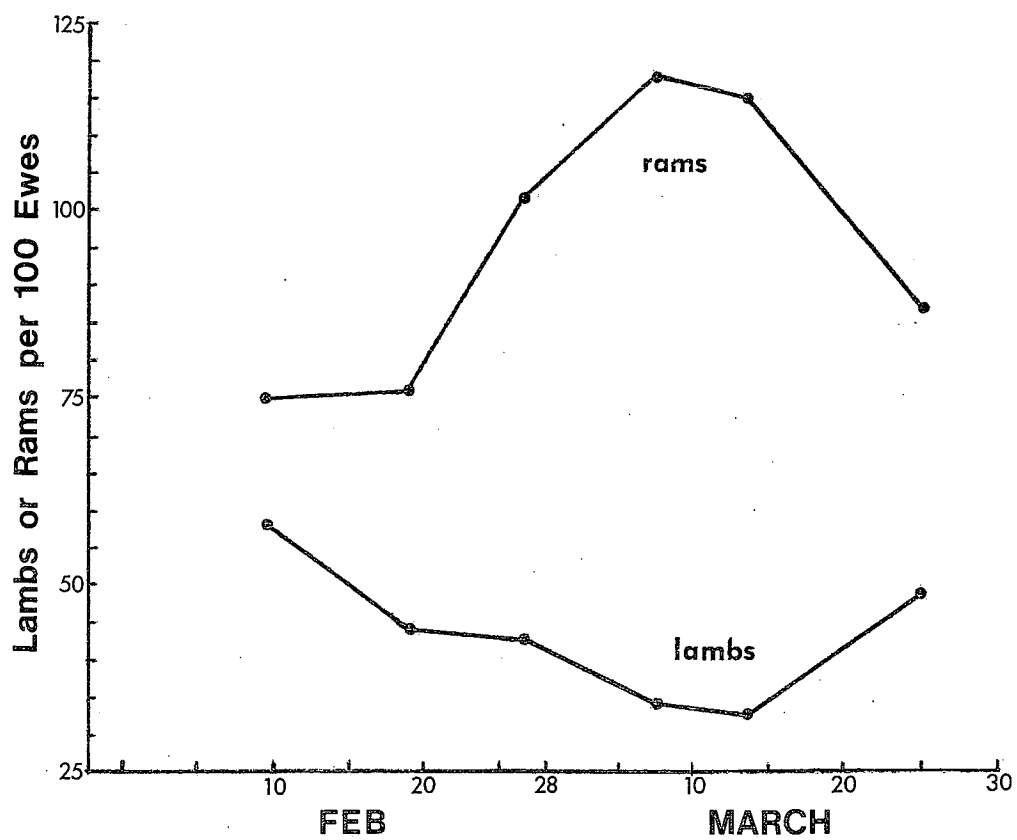


Figure 1 - 1982 winter sex and age ratio trends for the Mount Baxter herd.



per 100 ewes to 102:100. Consequently, the number of ewes in the population is still about 25 below the 1978 level.

Census Trends

Three important trends apparent in this winter's censuses were: (1) a declining total count until late March (Table 1), (2) a decline in ratio of lambs to ewes with a late winter rise, and (3) a large rise in the ratio of rams to ewes, with a sudden drop in late March (Figure 1).

These trends largely represent differential movements of lambs, ewes, and rams in and out of the area that can be reasonably censused (5,000'- 7,500' from Sawmill Canyon to Thibaut Canyon). The distribution of rams in early winter commonly includes elevations above the census area, with a gradual shift to lower elevations as forage quality increases there; this results in the observed increase in number of rams in censuses. The large increase in the ram:ewe ratio reflects also a movement of ewes out of the census area; and the declining lamb:ewe ratio indicates that lambs were leaving at an even greater rate.

Movement of ewes and lambs out of this census area is most probably due to mountain lion predation. There was much evidence of an adult and a juvenal mountain lion hunting together throughout the bighorn winter range all winter. Lambs are the class of bighorn most vulnerable to this predation due to their size and lack of experience. Presumably, many of them followed ewes to higher, safer elevations after experiencing mountain lion attacks. The reverse in these trends in late March reflects a return of these animals to low elevation. The reason for this is presumably the general flush of new vegetation growth at that time, through its influence on the risk:benefit ratio for these animals.

The 9 lambs per 100 ewes lost between early February and late March indicates that lamb mortality was in part responsible for the winter decline in this ratio. A total of 7 lambs disappeared during this period, all of which are probably attributable to mountain lion predation. Census data from Sawmill Canyon indicated a loss of 3 lambs, all of which were found as lion kills. An additional lamb kill was found south of Sawmill Canyon prior to the first February census. This suggests that lion predation accounted for 8 of 43, or 19% of the lambs over about two months.

It appears that mountain lions are rarely successful in catching adult bighorn. Only one ewe was missing in the last census. A lion-killed ewe found in Harry Birch Spring may have been that missing ewe. I observed a lion catch an additional ewe in Sawmill Canyon in March, but it ultimately escaped because the lion fled upon seeing me.

It is probable that the same trends observed this winter have been present, but undetected, in past winters. It has been recently suggested that density effects were responsible for deviations from a statistical recruitment model in 1980 and 1981 (Reintroduction proposal - Sierra Nevada bighorn sheep; California Department of Fish and Game 1982). It now appears that these deviations are an artifact of when the recruitment ratios were obtained. The 1980 ratio was 22 lambs per 100 ewes below expected, and was obtained in early March, when the ratio in 1982 had dropped 24 lambs per 100 ewes below the value from the first census. Likewise, the 1981 ratio was 12 lambs per 100 ewes below expected, but was obtained about 2 weeks earlier, when the 1982 ratio had dropped 14.

In 1977 a large number of sheep appeared low on the winter range at the end of March as they did this year. The patterns observed this

year may be the norm.

Group vs Individual Census

One of the purposes of this year's censuses was to compare results of one or a couple of experienced individuals with a single day group census including relatively inexperienced individuals. The second census in Table 1 (19 Feb.) was carried out by 12 people, including five with considerable experience. Its comparison with more complete censuses listed is not valid given the apparent movement of sheep in and out of the census area, as discussed above. It is probable that all sheep within this area were observed during that census, but some misclassification of small yearling males as ewes is probable. It is certainly not evident that a group census records more sheep than an experienced individual. It is also necessary to make more than one census to record maxima of different sex and age classes if a reasonable minimum total population is to be obtained.

Population Subunits

A major question relative to removal of sheep from the Mount Baxter herd for reintroduction has been the distinctness of different wintering areas. Thick vegetation along Sawmill Creek has been previously noted as a barrier dividing the population, except for one possible crossing spot a bit outside the mouth of the canyon. On two occasions this winter I observed tracks, and in one case also fur on a rosebush, of single sheep crossing from south to north at this spot.

Sawmill Canyon gained two ewes from the first to the last census, while the range to the south lost three. It is possible that movement across Sawmill Creek is responsible for the gain in Sawmill Canyon.

However, this movement is clearly very small and warrants treating the north side of Sawmill Creek as a separate winter management unit. A ram (#5415) that was trapped on the north side of Sawmill Creek in 1980 returned from the Lubkin Creek transplant and wintered on the north side of Sawmill Creek in 1981 and 1982. This suggests strong winter range fidelity.

Much movement was recorded between areas south of Sawmill Creek. There was much movement between Sand Mountain and Black Canyon, to the extent that Sand Mountain was completely abandoned on two occasions, perhaps due to mountain lion activity. Movement between Black Canyon and the Thibaut Creek area was also evident. It seems warranted to treat the entire winter range south of Sawmill Creek as a single winter management unit.

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