

Bienn. Symp. North. Wild Sheep
and Goat Counc. 7: 12-18.

STATUS AND DISTRIBUTION OF CALIFORNIA BIGHORN SHEEP IN IDAHO

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Abstract: Helicopter surveys and ground observations were used to estimate the distribution, population size and age and sex ratios of 4 reintroduced California bighorn sheep (*Ovis canadensis californiana*) populations in southwest Idaho. Between 1963 and 1966, 38 bighorns were translocated from the Chilcotin River area of British Columbia, Canada to the East Fork of the Owyhee River drainage. An additional 12 were moved to the Little Jacks Creek drainage in 1967. In 1989, the minimum population of California bighorns in Idaho was at least 1027 and the average population increase has been 12.5% per year. We estimate that bighorns are occupying 58% (681 km²) of the available bighorn habitat. Bighorns from these herds have been used to establish 4 additional herds in Idaho, 3 in Nevada and 1 in Oregon. Variability of herd composition data is discussed.

Historically, California bighorn sheep were numerous throughout the mountains and canyon lands of southwest Idaho. Bailey (1936) stated that bighorn sheep occupied "every canyon, cliff, and lava butte in eastern Oregon". Because these habitats are contiguous with habitats in southwest Idaho, we assume sheep were equally numerous in Idaho south of the Snake River.

Historical and archeological evidence supports this conclusion (Hanna and Rath 1976). Bighorn populations were heavily exploited as food for miners, prospectors and homesteaders (Bailey 1936). Large numbers of cattle and domestic sheep grazed on and adjacent to bighorn habitats during a period of unrestricted livestock grazing between the 1860's and the 1930's, resulting in the elimination of California bighorn populations in Idaho. The last reported sighting of a California bighorn sheep occurred during the 1920's in the Owyhee River drainage (Hanna and Rath 1976).

Reduced livestock numbers and the resulting improved range conditions by the 1960's encouraged wildlife biologists and land managers to consider reintroducing California bighorns onto historic habitats in Owyhee County. Between 1963 and 1967, California bighorns were translocated from Chilcotin, British Columbia: 38 to the East Fork of the Owyhee River drainage and 12 to the Little Jacks Creek drainage.

In 1980, the Idaho Department of Fish and Game initiated an aggressive trapping and transplanting program designed to reintroduce bighorns into all suitable habitats. Between 1980 and 1990, 37 sheep were moved to 3 sites in Nevada and 111 to 4 sites in Idaho (Table 1). Sheep from Idaho herds were reintroduced into the Bruneau/Jarbridge, South Fork of the Owyhee, and Big Jacks Creek drainages in Owyhee County and the Cottonwood Creek drainage of Twin Falls County. Twenty-six bighorns were relocated from the Chilcotin area of British Columbia to 2 sites in Idaho during this period, 12 to the Bruneau/Jarbridge and 14 to Big Jacks Creek.

Table 1. Transplants of California bighorn sheep from Idaho by trapping site, release site and composition, 1980-1989.

Date	Trap Site	Release site	(N)		
			Rams	Ewes	Total
03/80	Little Jacks	Granite Mtns. NV	1	4	5
02/81	Little Jacks	Jarbridge River, NV	3	9	12
12/82	East Fork Owyhee	Bruneau-Jarbridge	2	10	12
12/84	East Fork Owyhee	Bruneau-Jarbridge	2	9	11
01/85	Little Jacks	Bruneau-Jarbridge	1	0	1
01/85	Little Jacks	South Fork Owyhee	2	7	9
12/86	East Fork Owyhee	Snowcloud Mtns. NV	1	6	7
12/86	East Fork Owyhee	Cottonwood Cr.	4	11	15
12/87	Little Jacks	Cottonwood Cr.	3	8	11
03/88	East Fork Owyhee	Big Jacks Cr.	2	0	2
11/88	Little Jacks	Cottonwood Cr.	5	9	14
11/88	Little Jacks	Snowcloud Mtns. NV	2	11	13
11/88	East Fork Owyhee	Big Jacks Cr.	9	15	24
11/89	Little Jacks	Bruneau-Jarbridge	2	10	12

Hunting was initiated in 1969 and 133 rams have been harvested from the Little Jacks and East Fork of the Owyhee populations.

STUDY AREA

The study area is located in Owyhee County in southwest Idaho. Most of this area is a rolling plateau averaging 1,700 - 1,900 m in elevation. This plateau is sharply divided by several major drainages including

Little Jacks Creek, the Bruneau/Jarbridge River, East Fork of the Owyhee River and Big Jacks Creek (Fig. 1). Canyon walls along these drainages are composed of recent rhyolitic and basaltic materials and average 300 m high. These walls are typically step-like, with tiers of cliffs separated by small "benches" with shallow soils.

Vegetation typically consists of a variety of sagebrush (*Artemisia* spp.) communities. The few trees are primarily western juniper (*Juniperus occidentalis*) and mountain mahogany (*Cercocarpus ledifolius*) and usually occur singly and widely scattered. Willows (*Salix* spp.) occur in riparian areas. On the high plateau, Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) dominates areas having moderately deep soils while low sagebrush (*Artemisia arbuscula*) dominates areas of shallow stony soils. Rabbitbrush (*Chrysothamnus* spp.) and plains pricklypear (*Opuntia* sp.) occur on disturbed sites. Common grasses include: cheatgrass brome (*Bromus tectorum*), bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa sandbergii*), and bottlebrush squirreltail (*Sitanion hystrix*).

METHODS

Helicopter surveys were conducted over all areas of known bighorn use during 1983, 1985, 1987 and 1990; additional surveys were conducted on the Little Jacks Creek population in 1988 and 1989. A Bell 206 III Jet Ranger or Hiller 12-E helicopter with 2 observers was flown on 65 m contours over all known, suspected or contiguous bighorn habitats. Survey methods were standardized for these flights, except that a stratified random sample survey (Scheaffer et al. 1979) was conducted in 1987 on the East Fork of the Owyhee herd, and the number of sheep in the units not flown was estimated. The areas surveyed increased as populations expanded or new populations were established. The recently introduced population in Cottonwood Creek was not surveyed.

Data recorded included location, total numbers and herd composition. All aerial observations of sheep were plotted on topographic maps. Use areas were determined by including all canyon areas where sheep were observed and the flats within 1 Km of these canyons. The amount of potential habitat was estimated by mapping canyon lands and adjacent flats within 1 Km that had topographic and vegetative characteristics similar to areas currently used by sheep.

RESULTS AND DISCUSSION

East Fork of the Owyhee Population

In 27 years since the initial transplant, the Owyhee River herd has increased steadily. During the 1990 survey, 607 sheep were observed (Table 2). The growth rate averaged approximately 11% per year.

Recent lamb:ewe ratios have been relatively high (0.50 to 0.57, Table 3). These ratios are comparable to the 0.50 lambs:ewe reported for the same population in 1975 (Hanna and Rath 1976). Ram:ewe ratios have been highly variable (0.37-0.90). The percentage of the population that was rams 3/4 curl or larger ranged from 6.3 to 13.5 and averaged 9.7. The

average percentage of rams 3/4 curl or larger is comparable to that observed for a lightly hunted dall sheep population in Alaska (Heimer and Smith 1976).

The distribution of this population has increased from the initial transplant site in Battle Creek. Bighorns now occupy all the available habitat in the East Fork and South Fork drainages except for the upper portions of the South Fork and it's tributary, the Little Owyhee River north of the Nevada border (Fig.1). Bighorns are currently using 211 km² (89%) of the 238 km² of available habitat with an estimated density of 2.9 sheep per km². The currently used range extends along 56 km of the East Fork of the Owyhee River from the Duck Valley Indian Reservation to the Oregon border. The Oregon Department of Fish and Wildlife estimates that this population has expanded another 55 km down the East Fork and number about 75 animals in Oregon (Bill Olson pers. comm.).

Hanna and Rath (1976) reported that by 1975, the Owyhee River herd had stabilized at a population of 275 animals and that the population was slow in expanding it's range. Our information shows that the herd has continued to increase and has rapidly expanded it's range.

Little Jacks Creek

The Little Jacks Creek herd has increased from the initial transplant of 12 animals to an observed minimum population of 208 sheep (Table 3). The average yearly growth rate (14.3%) was higher than that observed for the Owyhee River population.

Observed lamb:ewe ratios have been more variable than those observed for the Owyhee River herd and ranged from 0.34 to 0.58 (Table 3). Ram:ewe ratios were highly variable ranging from 0.26 to 1.3 (Table 3). Three-quarter curl and larger rams made up an average of 12.2% of the population and approached the 15% reported by Heimer and Smith (1976) for unhunted dall sheep herds in Alaska.

Table 2. Helicopter census results for the Owyhee River Herd, Idaho, 1983-1990 and herd composition.

Date	(N)	Rams:100 Ewes:Lambs ^a	% ≥ 3/4 Curl
8/83	334	90:100:56	37
11/85	273	63:100:57	22
8/87	329 (397) ^b	85:100:50	32
6/90	607	37:100:55	39

a. Males and females ≥ than 1 year of age included as adults.

b. Estimate based on random stratified sampling procedure.

Table 3. Helicopter census results for the Little Jacks Creek Herd, Idaho, 1983-1990.

Date	(N)	Rams:100 Ewes:Lambs ^a	%>3/4 Curl
9/83	115	74:100:53	3
8/85	85	130:100:53	33
11/85	96	95:100:45	42
6/87	184	61:100:58	49
8/87	164	26:100:34	30
6/88	184	112:100:34	32
6/89	205	50:100:43	40
6/90	208	111:100:50	38

a. Males and females ≥ 1 year of age included as adults.

This population has not expanded its range at the same rate as the Owyhee River herd. The observed distribution was similar between the 1983 and 1990 surveys but the density increased from 0.68 to 1.2 sheep per km² (Table 4). Although a large amount of suitable habitat was located in the adjacent Big Jacks Creek drainage no expansion of use was documented. In 2 locations these habitat areas are within 1.6 km of each other. In 1988 bighorns were reintroduced into Big Jacks Creek and within 4 months movements of radio collared sheep were documented between the 2 populations. Bighorns currently occupy 169 km² of habitat at a density of 1.2 sheep per km². The adjacent areas of Big Jacks Creek to the east and Castle Creek to the west provide approximately 400 km² of additional habitat for expansion.

Recent Introductions

The recently introduced Bruneau/Jarbidge (1980) and Big Jacks Creek herds (1988) were added to the survey schedule in 1990. Eighty-four bighorns were observed in the Bruneau/Jarbidge drainage and 38 in Big Jacks Creek. The Bruneau/Jarbidge herd currently uses 135 km² of the 278 km² of available habitat. The Big Jacks Creek herd has a potential habitat area of 166 km² but observations have been insufficient to estimate the current use area.

Table 4. Minimum population and density estimates for California bighorn sheep in Idaho, 1990.

Population	Minimum # Observed (N)	Occupied Habitat (km ²)	Minimum Density/km ²
East Fork of Owyhee	607	211	2.90
Little Jacks Creek	208	169	1.20
Bruneau/ Jarbidge	84	135	0.62
Big Jacks Creek	38	166	0.23
Total	1027 ^a	681	1.36

a. Includes an estimate of 50 sheep in the Cottonwood Creek herd and 50 sheep transient in Owyhee County.

The Cottonwood Creek population in Twin Falls County is estimated at 50 animals (Craig Kvale pers. comm.) but has not been added to the survey schedule. The status of this herd has not been determined.

Idaho Department of Fish and Game Region III personnel estimate that an additional 50 sheep are transient animals in the mountainous portion of Owyhee County (Charles Harris pers. comm.).

Herd Composition

The wide ranges of observed ram:ewe and lamb:ewe ratios probably resulted from sampling biases rather than actual changes in herd composition. Rams were more visible when on the flats than when in the canyon lands. Ram use of the flat areas above the canyons was highest during the spring green up period (Bodie et al. 1989). Rams were the least visible when using the highly dissected cliffs. The high variability in ram:ewe ratios and the percentage of rams 3/4 curl or larger limits the usefulness of these data in assessing the effects of hunting on these populations.

Ewes and lambs were more difficult to observe during the spring period than at other times of the year due to pre- and post-natal behavior. Ewes selected the highly dissected cliffs for lambing and for a period of 4 - 5 weeks after parturition until the lambs were of sufficient size to keep up with the ewes. If surveys are conducted during this period +-some lambs will be missed. During some years the previous year's ram lambs were at a stage of horn growth that made them difficult

to distinguish from ewes. These factors tended to overestimate ram:ewe ratios and underestimate lamb:ewe ratios.

The average number of rams observed on surveys was highest during the spring but was still highly variable and short term trends in ram numbers were difficult to document. A more accurate and precise methodology for estimating population trends and herd composition is needed.

The Idaho California bighorn sheep reintroduction program has been extremely successful with populations increasing at an minimum average yearly rate of 11%. It appears that there is sufficient habitat available to allow the Owyhee County herds to expand their range and increase their populations.

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