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Jarbidge and Bruneau Rivers Owyhee County, Idaho

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INTRODUCTION

The objective of this study was to evaluate habitat suitability for California bighorn sheep (*Ovis canadensis californiana*) along the Bruneau and Jarbidge Rivers in Owyhee County, Idaho. We investigated the potential for augmenting the existing bighorn population or releasing bighorns into suitable unoccupied habitat. This bulletin discusses the suitability of available habitats, describes the current bighorn sheep distribution and provides recommended management practices.

This habitat evaluation is the result of a Challenge Cost Share project by BLM, Idaho State Office and Idaho Department of Fish and Game, Magic Valley Region.

STUDY AREA

The study area begins about 10 miles southeast of Bruneau and extends south upriver to the Nevada State Line. Elevations range from approximately 900 m at the mouth of Bruneau River Canyon to about 1800 m at the Nevada state line. The study area consists of steep-walled canyons and adjacent plateaus out to 300 m from the canyon rim. Canyons are typically about 200 m deep. Principal canyons are oriented in a north-south direction. Canyon slopes consist of alternating cliffs and terraces formed into a step-like profile. Cliff material is either rhyolite or basalt. There are numerous side canyons that branch from the major canyons. Cliff faces vary from straight to convoluted. The upper plateaus are bordered by a basalt rimrock averaging about 3 m in height.

Plant communities include willow (*Salix* sp.) in the canyon bottoms and extensive sagebrush (*Artemisia tridentata tridentata*, *A.t.wyomingensis*, and *A.t. vaseyana*) stands on the plateaus. The few trees present are cottonwoods (*Populus* spp.), western juniper (*Juniperus occidentalis*) and quaking aspen (*Populus tremuloides*). Grasses include bluebunch wheatgrass (*Pseudoroegneria spicata*), Sandberg bluegrass (*Poa secunda*), and wildrye (*Elymus cinereus*).

The principal land use is livestock grazing in spring and summer. Recreation uses include hunting, whitewater rafting, hiking and fishing. Hunted species are bighorn sheep, mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), sage grouse (*Centrocercus urophasianus*) and chukars (*Alectoris chukar*). Bobcat (*Lynx rufus*) trapping and predator hunting occur during winter.

METHODS

A Bell 206B Jet Ranger helicopter was used to count bighorn sheep and evaluate bighorn sheep habitats. Flights were made on June 8, 9, 10, and 11, 1993 and August 26 and 27, 1994. The helicopter doors were removed to increase visibility. Two or three observers were used

depending on flying conditions. Only two observers were used when high temperatures and canyon winds made flying difficult. Flights were conducted when the weather was clear and visibility good.

Habitat evaluation and population data were recorded during the same flight when possible but population data was the priority during first flights. Additional passes were flown as necessary to collect habitat evaluation data. Population survey flights were limited to areas where bighorn sheep were known to be present. Habitat evaluations covered the entire drainage. Observers who participated both years were Rusty Anderson, Randy Smith, Don Stucker, and ElRoy Taylor. Additional observers in 1993 were Tim Carrigan, Jim Clark, Jim Klott, Craig Kvale, Louis Nelson, and Lloyd Oldenburg.

The census and habitat evaluations were conducted along the Bruneau and Jarbidge Rivers in Owyhee County, Idaho. We searched areas near canyons from the mouth of the Bruneau River upstream along the Bruneau and Jarbidge Rivers to the Nevada state line. There is a rough division between occupied and unoccupied habitats at about the confluence of the Bruneau and Jarbidge Rivers. Unoccupied habitat was generally from the confluence of the two rivers downstream to the mouth of Bruneau Canyon. Occupied habitat extended upstream along both rivers from their confluence to the state line.

Population survey:

Survey followed sightability protocol developed by Bodie et al. (1992). This technique consists of selecting blocks of habitat and flying routes along canyon walls at about 200 foot elevation intervals within each block . Flights begin along the canyon bottom and end with a sweep out over the plateau to find any sheep that might be out of the canyon. Typically, we made three or four transects on each side of the canyon followed by a top sweep. Sightability conditions are recorded for each bighorn sheep observation. Data are recorded for: (1) terrain where animal was seen including cliff type, (2) activity, standing or moving, and (3) light conditions, sun or shade.

We classified each observed bighorn sheep by sex and age class (Giest, 1971). We classified ewes and lambs with no attempt to separate yearling ewes. We classified rams into class I (yearling), class II (≥1/2 curl), class III (≥3/4 curl), and class IV (≥full curl). Population estimates were obtained by computer model manipulation of field data to adjust for sightability conditions. Estimates of the number of sheep in each age class were made. Population estimates are followed by the 90% confidence interval in parentheses.

Habitat Evaluations:

A bighorn sheep habitat suitability model was developed based on the "Habitat Suitability Rating System for Desert Bighorn Sheep in the Basin and Range Province" (Armentrout and Brigham, 1988). Categories were modified to fit California bighorn sheep in southern Idaho based on the

nearby Little Jacks Creek study (E. Taylor, unpublished data). Basically, their system was modified by making the categories more generic and arbitrary so they could be quickly evaluated from a helicopter. Two examples will illustrate the differences between our methods and those of Armentrout and Brigham. We rated forage on a continuous scale from 0 points for exotic annuals without shrubs up to 10 points for native range with good shrub and bunchgrass components. Their rating system considered forage areas, seral stage or condition, distance to escape cover, and visual obstruction. We rated water from 0 for no water in an evaluation block to 10 for numerous perennial sources and gave bonus points if the source was high on a canyon wall. They rated water on amount and permanence, distance from escape cover, competition, visual obstruction, and distribution. We broke topography into slope and lambing habitat based on the Little Jacks Creek data. Each habitat variable was rated on a scale from 0 for unsuitable to 10 for excellent habitats. A habitat evaluation field form was developed for use in the helicopter (Appendix).

The study area was divided into blocks of similar habitats. Landmarks were selected at the end of each block and latitude and longitude coordinates taken to ensure mapping accuracy. The same blocks were used for the population survey and habitat evaluation purposes. All habitat variables were scored in each block. Scores for each habitat category were discussed by observers until agreement was reached. Total scores for each habitat block were calculated by adding the scores of all habitat variables. Habitats were then ranked by total scores. Habitats with the highest scores were judged to be the best habitat for bighorn sheep.

The characteristics of adjacent habitat blocks were also considered during the evaluations. Blocks with complimentary scores elevated the rank of individual blocks. For example, a block with abundant lambing shelves located next to a block with good forage would be ranked ahead of a similar lambing block but without available foraging area. Low category scores within an analysis block were used to identify potential limiting factors. The potential for management to improve a habitat was used to break ties in habitat rankings.

The number of sheep that could be supported in suitable habitats was estimated to be five bighorns per square mile. This estimate is based on work in Oregon (Van Dyke et al., 1986) and is similar to the five to six sheep per square mile present on the nearby Little Jacks Creek area. The number of acres used in calculations included canyons and plateau within 300 meters of canyons. At Little Jacks Creek about 95% of all ewe observations were within 300 meters of a canyon. The capacities of adjacent habitats were considered to identify the potential for the combined habitat to support a minimum viable population of bighorn sheep.

The following is a brief description of the categories evaluated and the rating criteria used for each category.

> Slopes were judged excellent if they were >50% and included cliffs and ledges suitable for security/thermal cover. Slopes became less suitable as they approached either flat or vertical. Slopes intermediate between excellent and unsuitable were scored according to

their perceived usefulness to bighorns.

Lambing habitat was judged on presence and abundance of lambing shelves. Lambing shelves were identified as isolated terraces with difficult access. Habitat ratings were low if few or marginal terraces existed and high if an abundance of suitable terraces was present.

Accessibility was based on availability of travel lanes suitable for bighorn sheep to cross slopes from top to bottom. A high rating was given if cliffs were broken into segments by travel lanes. Low ratings were given to long continuous cliffs which lacked crossing routes.

Livestock use was a measure of grazing pressure. Excellent scores were given if no sign of livestock was present. Low scores were awarded for the presence of numerous distinct trails and abundant signs of cattle grazing. If parts of a habitat block had obviously different grazing pressure, they were evaluated separately. Typically, grazing pressure was most evident in riparian areas and on plateaus adjacent to the canyon.

The vegetation category rated plant community composition. Native range with a good mix of shrubs and bunchgrass scored high. Annual grasses, weeds, and monocultures of crested wheatgrass scored low. As was the case with livestock use, in some cases the plateau, slopes and riparian areas were rated separately.

The water category scored high if water was abundant and convenient, especially if located high on a canyon wall. Lack of water or water largely inaccessible scored low. Ephemeral water also scored low. When information was available, notes were made regarding the presence of water during drought years. Good water available at the bottom of a canyon was scored as an eight. If this source was augmented with springs on the canyon wall, the score could be as high as 10. Water was considered available if it was within 2 miles of a habitat.

RESULTS

Population survey:

Survey and distribution patterns for the two years were similar (Table 1). In 1993, we saw 114 bighorns; 51 ewes, 55 rams, and 8 lambs. There were 16 legal rams (rams that can be legally taken by hunters must have horns $\geq$ 3/4 curl or exceed 4 years of age) and 39 sublegal rams. The population estimate based on the computer adjustment for sightability was 165 (±37) bighorns consisting of 79 (±27) ewes, 73 rams (±18), and 13 (±6) lambs. In 1994, we observed 132 bighorns; 76 ewes, 32 rams, and 24 lambs. We saw 17 legal and 15 sublegal rams.

Observations adjusted by the sightability model gave a population estimate of 174 (±31) bighorn sheep consisting of 101 (±22) ewes, 42 (±13) rams, and 31 (±8) lambs. We estimated that there were 19 (±6) sublegal rams and 23 (±8) legal rams in the population.

Bighorns were distributed along the Jarbidge and Bruneau Rivers above their confluence near Indian Hot Springs (Figs. 1 & 2). Sheep were seen on the Jarbidge River from two miles above Dorsey Creek downstream to the confluence. Sheep were seen on the Bruneau River from Black Rock Crossing to the confluence with the Jarbidge River.

Table 1. Census Data. Counts are raw data while estimates are the counts adjusted for the sightability of each observation.

Category	1993 Count	1993 Estimate	1994 Count	1994 Estimate
Total	114	165 (±37)	132	174 (±31)
Ewes	51	79 (±27)	76	101 (±22)
Rams	55	73 (±18)	32	42 (±13)
Lambs	8	13 (±6)	24	31 (±8)
Sublegal Rams	39	53 (±14)	15	19 (±6)
Legal Rams	16	20 (±6)	17	23 (±8)