

A DISTRIBUTIONAL AND HABITAT STUDY  
OF THE BIGHORN SHEEP IN WINTER, GRAND TETON  
NATIONAL PARK

Michael B. Whitfield  
Box 54  
Driggs, Idaho

Barry L. Keller  
Idaho State University

Objectives

This study was initiated in order to determine the population status of bighorn sheep (*Ovis canadensis*) in the Teton Range. Intensive field studies were initiated in the summer of 1978 and will be continued during the winter of 1978-79 in order to delineate the distribution of sheep and to relate this distribution to habitat factors which affect seasonal distributions. Additionally, information on the history of bighorn sheep has been sought through interviews of longtime residents of the several valleys surrounding the Teton Range.

Procedures

Traditional ranges have been examined on the ground, from the air and by historical records. In 1978 the habitat analysis study was begun. Fifty-eight plots of bighorn ranges in Fox Creek, Upper Darby, South Teton and Death Canyon were chosen randomly. An additional 23 random plots were selected on historical but abandoned range in Upper Game Creek and around Rendezvous Mountain. These 81 plots were first visited on the ground between June 19 and July 14 to examine spring conditions. Snow covered all but 19 of the plots. Beginning August 5, attempts were made to revisit each plot for summer measurements, but data were collected on only 33 plots within the occupied habitats by the time lasting snow fell on September 8. A late spring snowmelt and summer snowstorms from August 16 on into September greatly hampered progress.

On each plot sampled, canopy cover estimates were recorded for forbs, grasses and grass-like plants in 20 Daubenmire frame placements. The total area measured on each plot was 2 square meters. Shrubs were measured on 2x5 meter rectangles, and trees in 5x20 meter rectangles. Non-woody plant production was also measured in clip plots. Other biotic features measured were plant nutrient content, and the presence or evidence of man, sheep and other animals. Abiotic factors included elevation, slope, aspect, topographic roughness, distance to escape terrain, soil conditions and snow depth.

Forty field days and nine helicopter flights were spent on the study in the summer of 1978. One hundred forty-six sheep sightings were recorded, and behavior was observed when convenient to other facets of the study. Over 200 species of plants were collected and identified through work at the Grand Teton National Park and Idaho State University herbariums. Fecal material was collected for plant residue and endoparasite analysis. Soil and plant samples are currently being analyzed at the Utah State University Soils Laboratory.

In winter of 1978-79, winter ranges will be delineated, mostly through aerial reconnaissance funded by this grant. Garvice Roby of the Wyoming Game and Fish Department has determined some of the occupied winter range through aerial observations in 1976 and 1977. Close cooperation with Roby will be sought in this winter's effort. Ground observations will also be made.

In the spring of 1979 identified winter ranges will be visited on the ground and habitat measurements will be taken. As many additional summer plots, particularly those in the traditional but unoccupied ranges in upper Moose Creek, will also be examined in 1979. The data analysis will then be completed following the 1979 field season.

### Results

The data collected in 1978 are still being analyzed to determine what key factors bighorn sheep use to differentiate between acceptable and unacceptable habitat. A cursory examination of the southern Teton Range high elevation vegetation reveals a predominance of forbs over grass-like plants. It is difficult to say how much excessive grazing in the past influenced the present plant community, although plants typical of disturbed sites are evident in many areas. Bighorn food habit studies universally show a preference for grass-like plants. Teton Range bighorn sheep must be very selective if they adhere to this pattern. Microscopic analysis of plant residues in fecal pellets collected in 1978 will be undertaken this winter to better learn what Teton Range bighorns are eating.

Summer range is extensive in the Tetons relative to bighorn numbers. Ranges denuded by grazing have generally recovered. The bighorns of the Tetons appear to find ample summer forage in the forb dominated vegetation. However, winter range is severely limited.

While bighorn sheep numbers in the Tetons do not appear to have been much greater than at present any time during the past one hundred years, the range sheep occupy has shrunk appreciably. Most of the sightings collected thus far, particularly those in recent years, fall into two general areas. The heads of Darby, Teton and Death Canyons in the south central portion of the range make up an area of concentration on the Teton Basin District and adjoining National Park lands. The heads of Owl Creek, Berry Creek, Webb Canyon, and Bitch Creek make up a second area of concentration spilling from Grand Teton National Park onto the Ashton Ranger District. The degree of genetic interchange between Teton Range bands and the total population

size remain as unknowns. There is possible evidence of bighorn migration between north and south areas. Sightings in the area of the Paintbrush Divide in early spring may be of southern bighorns returning from rutting areas in the north. However, there may simply be wintering range in this area.

### Conclusions

Some areas in the Phillips Canyon area might have potential as winter range rehabilitation sites should bighorns reoccupy historical range in that area. Rehabilitation followed by small scale reintroduction of bighorns might serve to increase the occupied bighorn range and increase genetic diversity assuming that introduced sheep gained contact with the existing population. Manipulation of high elevation winter ranges, particularly through snow management, would be feasible if land use constraints allowed such activity. Continued study and considerable cooperative activity must take place before any such project could be recommended. Coordination is needed with backcountry recreation management programs. The entire Teton Range is subject to increased recreational visitor interest. In recent years, backcountry visitors have begun to explore the more remote areas of the range. This interest in the wilder portions of the Tetons poses a threat to bighorn sheep, for seclusion characterizes the primary bighorn ranges. The general ease of access characteristic of the Tetons makes this threat to the bighorns' opportunity to escape human contact even more real.

Trailless areas in Grand Teton National Park should be maintained in trailless status. Visitor numbers to key areas such as Prospectors Mountain, Doane and Ranger Peaks, Owl Peak, and Forellen Peak should be kept low. On the Targhee National Forest side, recreational use should be restricted in Fox Creek, Upper Darby Canyon, and around Red Mountain. Snowmobile use should not be permitted near any of the identified winter ranges.

Range managers on the Teton Basin and Ashton Ranger Districts hold the second key to coordinated bighorn habitat management. Domestic sheep sometimes graze on important bighorn sheep habitat in upper Darby Canyon and on Survey Peak. This domestic sheep use occasionally extends into areas closed to grazing, including Grand Teton National Park. It is essential that herds in these areas be strictly controlled. Possible conflicts on Red Mountain and potential conflicts in upper Game Creek, Moose Creek and Phillips Canyon should be investigated further. Existing or potential bighorn winter range should not be subject to domestic sheep use in any case.

Since the Teton Range bighorn population is apparently divided into southern and northern bands separated by an area where sheep are seldom observed, inbreeding becomes a strong possibility. A lack of genetic diversity potentially retained in small bands could curtail productivity and threaten the continued survival of this species. Extensive research is warranted on this possibility. Electrophoretic studies of tissue and blood proteins might be employed in considering genetic fixation.

Acknowledgments

To date Michael Whitfield of the Teton Basin District has conducted the background research and field work for this study. Shari Gregory of the Teton Basin District provided expertise in plant taxonomy in 1978, and Keith Birch has directed several of the helicopter flights. Several other Teton Basin District personnel have been taught the aerial observation routes and have been involved in flights. Targhee National Forest Supervisor's Office assistance has been provided through two field visits by Forest Biologist Sara Johnson and Regional Terrestrial Biologist Paul Shields. Garvice Roby, Wildlife Biologist for the Jackson District of Wyoming Game and Fish Department and William Barmore, Research Biologist for Grand Teton National Park, have also provided professional input.