

STUDY OUTLINE
 FOR FUNDING REQUESTS SUBMITTED TO THE
 GRANTS-IN-AID COMMITTEE
 National Rifle Association
 1600 Rhode Island Avenue, N.W.
 Washington D.C. 20036

TITLE OF PROPOSED STUDY: Lambing area and summer range use, and spring migration patterns of Rocky Mountain bighorn sheep on Big Creek in central Idaho.

PROPOSED DURATION OF STUDY: 1 Jan. 1989 to 30 August 1990

AMOUNT REQUESTED FOR STUDY: From NRA \$8,060
 From Univ. of Idaho \$400

INSTITUTION TO WHICH GRANT SHOULD BE MADE: University of Idaho
 Moscow, ID 83843

PERSONS APPLYING: Holly A. Akenson
 James J. Akenson
 Wilderness Research Center
 University of Idaho
 Moscow, ID 83843
 (208/885-7911)

SIGNATURES _____

DATE _____

FISCAL OFFICER OF INSTITUTION:

? _____
 University of Idaho
 Moscow, ID 83843
 (/)

SIGNATURE _____

DATE _____

**LAMBING AREA AND SUMMER RANGE USE,
AND SPRING MIGRATION PATTERNS OF
ROCKY MOUNTAIN BIGHORN SHEEP ON BIG CREEK
IN CENTRAL IDAHO**

ABSTRACT:

Lambing areas and summer ranges are unknown for this native population of bighorn sheep. Since winter 1986-1987 lamb to ewe ratios have been very low and sick lambs have been observed on the winter range. These symptoms are probably indicative of a problem occurring on one or several summer ranges. In order to assess the causes of these problem lambing and summer ranges must be located and potential mortality factors must be evaluated. Ten bighorn ewes will be radio instrumented to locate lambing areas and summer ranges and spring migration routes used by the Big Creek population. Herd productivity (lamb:ewe), causes of mortality, and lungworm parasite loads will be monitored through daily observations, necropsies, and analysis of fecal samples. Habitat characteristics will be measured in each lambing area and summer range to acquire a composite description of both types of seasonal ranges.

INTRODUCTION:

The purpose of this study is to locate bighorn sheep lambing areas and summer ranges, to evaluate herd productivity, to determine lamb mortality causes and assess lungworm parasite loads in each seasonal range, and to measure vegetation and abiotic habitat characteristics. Idaho Department of Fish and Game aerial surveys and personal observations on the ground documented a very low winter lamb:ewe ratio in 1986-1987. In 1985 there were 45 lambs per 100 ewes counted, then in 1986 the number was just 11 lambs per 100 ewes. If management action is to be taken in this, or similar situations there first needs to be a source of baseline information for this native sheep population. The first priority of this study is to document where the lambing occurs and what the initial lamb production (lamb:ewe) is, and then assess habitat use during the lambing season. Secondary priorities are to determine the seasonal migration routes and quantify the lambing and summer ranges. By knowing this information it is then possible to evaluate the factors causing mortality at the lambing areas and along the migration routes. Such data are necessary in order to assure a healthy and hunttable bighorn sheep population.

JUSTIFICATION:

In the rugged and remote River of No Return Wilderness Rocky Mountain bighorn sheep have passed on traditional seasonal ranges and migration routes to their offspring for thousands of years. Migratory habits of different bighorn sheep populations vary from minor seasonal drifts to long distance movements between multiple seasonal ranges (Blood 1963). Festa-Bianchet (1986) found that a particular range may be used by several different herds of sheep at different times or the same time. The complexity of range use and migration patterns is probably greater in native populations such as the one described in this proposal. Preliminary data (Bennett 1977, pers. obs.) indicates that ewes from the Big Creek population move to at least two and possibly five different lambing areas, one greater than 25 miles away. Only one lambing area, and no summer ranges nor migration routes to these areas have been documented, while all of these factors are key components in understanding the ecology of this sheep population. With information provided through this study more refined management of this population of bighorn sheep is possible, including prediction and control of disease spread, identification and rapid treatment of localized problems on a specific summer range, and an understanding of the spatial relationship between seasonal ranges and hunting units. In the winter of 1986-1987 the lamb to ewe ratio was an extremely low 11:100 (pers. obs.) compared with 46:100 the previous winter; similar trends were observed in Idaho Department of Fish and Game helicopter counts. The cause of this low recruitment of lambs into the population is unknown. Sick lambs have been observed on the winter range for several years. A noticeable difference in sizes of lambs in winter and the wide variation in lamb:ewe ratios among different herds within the population suggest that problems may be occurring on some lambing and summer ranges, but not on others.

The Idaho Department of Fish and Game is trying to increase hunter opportunity on "trophy species". According to the IDF&G Trophy Species Management Plan 1981-1985 (Idaho Department of Fish and Game 1983), a primary goal is to increase Idaho's bighorn sheep population and increase the number of permits authorized. The allocation of permits is in direct proportion to the available resource. Information on seasonal range use and migration patterns of a native population of bighorn sheep can be applied to reintroductions of bighorns into new areas and can improve the success of reintroductions. The end result is more sheep to enjoy through observation and hunting.

OBJECTIVES:

1. To document spring migration routes and movement patterns of ewes moving to lambing areas.
2. To locate lambing areas and describe these sites.
3. To determine summer distribution of ewes and describe these ranges.
4. To evaluate herd productivity (lamb:ewe) in summer.
5. To determine lamb mortality factors on the lambing and summer ranges.
6. To assess lungworm larvae parasite loads in ewes and lambs during summer.

STUDY SITE:

The indigenous population of bighorn sheep to be studied resides along lower Big Creek, in the heart of the Salmon River Mountains, home to the largest population of bighorn sheep in Idaho. This two year study will be based at the University of Idaho's Taylor Ranch Field Station, located in the midst of this sheep population's winter range and in the center of over 2 million acres of wilderness. Ten ewes will be instrumented during winter. The Idaho Department of Fish and Game has agreed to provide support personnel and some equipment for instrumenting sheep with radio transmitters.

The Taylor Ranch Field Station is optimally located for conducting this project. The facility has a backcountry airstrip with weekly supply flights. Aerial tracking will be done in conjunction with these flights, eliminating one hour of charter flight time for each aerial tracking session. Since the entire study area is in wilderness, all ground travel is by foot or horseback, on trails and crosscountry. Horsepacking services can be provided by the Taylor Ranch. The principal investigators live at Taylor Ranch and have studied and photographed these sheep for 5 years. They are the resident managers of the Wilderness Research Center's Taylor Ranch Field Station and participate in research projects through the Center. Holly is completing a master's thesis conducted from Taylor Ranch on the behavioral interactions of bighorn sheep with deer and elk in winter. Jim is a research associate in the College of Forestry, Wildlife, and Range Sciences.

METHODS:

This bighorn sheep project contains three phases of study. The first phase involves determining spring migration routes and movement patterns of ewes wintering along Big Creek. In the second phase, lambing areas will be located and described. If these groups of sheep utilize a summer range separate from the lambing areas, these summer ranges will be located and described in the third phase of the study. Ten ewes will be captured and radio telemetry instrumented during January to March 1989. Radioed animals will be located daily from April 15 until migration occurs.

SPRING MIGRATION. April 15 to May 30. Herds of sheep which include a radio instrumented animal will be tracked on the ground and followed as they move from the winter range. Travel routes will be mapped daily on aerial photos and USGS quadrangle maps. Locations as well as habitat descriptions including slope, distance to escape terrain, elevation, aspect, percent and depth of snow, vegetation type, and canopy cover will be measured every 2 hours during daylight. All radio instrumented sheep will be located once via aerial tracking during migration.

LAMBING AREAS. May 15 to June 30. Sheep will be located on lambing areas through aerial radio tracking and from ground tracking of migrating sheep during May 15 to May 31. Spike camps will be established near two of the lambing areas where intensive data collection will be done. All ewes in the herd will be located daily through ground tracking and spotting. Habitat use patterns will be determined from relocations of radio collared ewes located daily at random times; location will be mapped, activity (feeding, bedded, travelling, standing, other) recorded, and habitat described at that site (slope, distance to escape terrain, elevation, aspect, topography, vegetation type). Radio locations will be used to determine home range using the minimum area polygon method (Mohr 1947). Lamb:ewe ratios will be determined daily, and will be plotted with respect to time since lambing to determine critical periods when mortality occurs. In the second year of study sheep observations will be intensified during this period in order to locate dead lambs and sources of mortality. When dead lambs are found a preliminary cause of death will be determined; a detailed search of the area will be conducted to identify the predator if predation is suspected, carcasses will be necropsied in the field or sent to Washington State University Veterinary School Laboratory for examination, tissue samples from field necropsies will be preserved and sent to the WSU Lab for diagnostic tests. Fecal samples will be collected daily and combined as a weekly sample to be tested for concentrations of lungworm larvae using a Baermann apparatus (Knapp 1968). The vegetation of each lambing area will be measured using 40

randomly located 20 x 50 cm Daubenmire plots (Daubenmire 1959). This vegetation evaluation will be combined with the habitat information collected during observations of radio instrumented ewes to form a composite description of lambing area characteristics.

SUMMER RANGE. July 1 to August 15. Radio instrumented ewes will be aerial tracked in mid-summer to determine if the herds they are associated with move to a summer range separate from the lambing area. Summer ranges will then be located on the ground. Radioed sheep will be located twice weekly and habitat data will be collected as described in the lambing area section. Lamb:ewe ratios and fecal samples from both ewes and lambs for lungworm analysis will be collected weekly. Vegetation plots will be measured as in the lambing area phase.

From the desk of:
BILL McLAUGHLIN

LITERATURE REVIEW:

The literature has been reviewed and incorporated into the justification and methods sections in order to eliminate repetition. The following is a literature cited section for the entire proposal.

20,
Please handle.
Send proposal
NRA. Then
process through
Bill

The literature has been reviewed and incorporated into the justification and methods sections in order to eliminate repetition. The following is a literature cited section for the entire proposal.

Field notes from a bighorn sheep study, University of Idaho. Unpublished.

Blood, D. M. 1963. Some aspects of behavior of a bighorn sheep. *Can. Field Nat.* 77:77-94.

Blanchet, M. 1986. Seasonal dispersion of overlapping groups. *J. Wildl. Manage.* 50:325-330.

Canopy coverage method of analysis. *Northwest Sci.* 33:43-61.

Fish and Game 1983. Species management trophy species - moose, bighorn sheep, pronghorn antelope. Boise, Idaho. 113pp.

1968. A laboratory guide to parasitic diseases of game animals. Department of Veterinary Medicine, Oregon State University, Corvallis, Oregon. 97pp.

Mohr, C. O. 1947. Table of equivalent populations of North American small mammals. *Am. Midl. Nat.* 37:223-249.

PROPOSED PUBLICATION OUTLETS:

- Journal of Wildlife Management (The Wildlife Society)
- Idaho Wildlife Magazine (Idaho Department of Fish and Game)
- Wild Sheep Magazine (Foundation for North American Wild Sheep)
- Forest, Wildlife and Range Experiment Station Bulletin (College of Forestry, Wildlife, and Range Sciences, University of Idaho)