

Feb. 6, '89

Hello Jeff -

Enclosed you'll find two copies of our proposal. Please give one to Pica.

Our water system froze up the day after we returned - some homecoming! It's barely reaching 0° in the afternoon. Sure need some warmer weather for the sheep darting.

Look forward to seeing you again in March or April. Holly for sure will be in Moscow early in March.

Cheers, Jim A.

PS - If you talk to Jim Peck in the near future tell him that Jerry Jeppson has a gentle, 14.2 h., saddle mare (12 yr. old) he'll sell him for 350⁰⁰. Thanks. - J.

**ASSESSING ROCKY MOUNTAIN BIGHORN EWE-LAMB HERD COMPOSITION
IN LAMBING AREAS AND SEASONAL RANGES
ON BIG CREEK, IN IDAHO**

Description of Project: Bighorn ewes have been radio-collared so they can be located on their spring, summer and fall seasonal ranges. Once located, ewe herds will be observed to determine lambing production at lambing areas and herd composition in seasonal ranges. Lambs will be observed for illness and fecal samples will be collected from all sheep for parasite analysis. Signs of predation, necropsies, and analyses of tissue samples will be used to determine causes of lamb mortality.

Problem to be Solved: Bighorn lamb:ewe ratios have been significantly lower on the Big Creek winter range during the last 3 years compared with ratios in previous years and on adjacent winter ranges. Causes of this low proportion of lambs are unknown, but parasites and disease are suspected mortality factors for young lambs. In order to determine what is causing low lamb:ewe ratios by winter, ewes must be located and monitored from when they migrate to lambing areas in spring until they return to the winter range.

Describe How You Propose Solving Problem: By January 1989 twelve bighorn ewes will have been radio-collared on the Big Creek winter range as the first phase of this two year study. To determine the causes of low lamb numbers on the Big Creek winter range the 4 objectives listed below will be accomplished by the methods following.

1. **Locate spring migration routes, lambing areas, and summer and fall ranges of Big Creek ewes.** Weekly aerial tracking will be used to locate radioed ewes. Daily on the ground monitoring will be done in May and June.
2. **Evaluate herd composition (lambs:100 ewes) throughout summer and fall and compare these ratios among different groups of sheep.** Herd productivity (number of lambs born:100 ewes) and subsequent lamb:ewe ratios will be determined weekly by ground observations of groups containing radioed ewes at each lambing area and seasonal range. Ratios will be compared among areas to pinpoint problem ranges or time periods.
3. **Determine lamb mortality factors.** Lambs will be found by locating radioed ewes and will be observed daily. Searches for missing lambs will be made when mortality is suspected. Dead lambs will be necropsied and tissue samples analyzed to determine cause of mortality.
4. **Assess parasite loads in ewes and lambs throughout summer and fall.** Fecal samples will be collected weekly and analyzed for parasite and microorganism identification. The Washington State University Vet School will do the tissue related examinations.

**ASSESSING ROCKY MOUNTAIN BIGHORN EWE - LAMB
HERD COMPOSITION
IN LAMBING AREAS AND SEASONAL RANGES
ON BIG CREEK, IN CENTRAL IDAHO**

This application is for the second year of funding on our bighorn ewe and lamb study. The money from our first year's grant-in-aid has allowed us to purchase the necessary instrumentation, get the ewes fitted with radio collars, and get started on aerial radio tracking. The trapping and collaring will be completed by January 1989. The Idaho Department of Fish & Game is cooperating through providing the capture equipment and experienced personnel. Additional collaboration with IDF&G has produced funding for a complimentary study which will analyze sheep diseases. This investigation will occur while we have the animals captured for instrumentation and will be conducted by a veterinarian. Our second year budget has been streamlined from earlier estimates. The primary purposes of the second year's funding are to continue the radio tracking for locating sheep, to pay for analysis of fecal pellets and tissue samples by Washington State University Veterinary School, and to allow for intensive long term field observations of ewes and lambs by providing matching salary money for the principal investigators who are paid half-time salaries by the University of Idaho. The project will utilize wildlife student interns who will volunteer time as field assistants.

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. The country they now occupy is the largest expanse of roadless terrain in the lower 48 states. The University of Idaho's Taylor Ranch Field Station is optimally located in the center of this expanse and is the base of operations for this study. Preliminary data 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. In the winters of 1986-87 and 1987-88 extremely low lamb to ewe ratios have been documented. The cause of low lamb survival or productivity 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 of lamb to ewe ratios among different herds within the Salmon River Mountains suggests that problems may be occurring on some lambing areas and summer ranges but not on others.

With information provided by this study more refined management of this population of bighorn is possible including prediction and control of disease spread, and the identification and treatment of localized problems on a specific spring or summer range. The foundation has been laid for this study to answer those questions vital in enabling management to put more sheep on these Salmon River Mountains.

To determine the causes of low lamb numbers on the Big Creek winter range these 7 objectives will be accomplished by the following methods.

1. To document spring migration routes and movement patterns of ewes moving to lambing areas.
2. To locate lambing areas.
3. To determine summer distribution of ewes and determine habitat use patterns.
4. To evaluate herd composition (lambs:100 ewes) for each group of sheep, throughout the summer and fall.
5. To determine lamb mortality factors on the lambing and summer ranges.
6. To assess lungworm larvae and other parasite loads in ewes and lambs throughout summer.
7. To assess parasite loads, blood chemistry, and presence of disease in sheep on the Big Creek winter range.

Sixteen bighorn sheep will have been radio collared by January 1989 on the Big Creek winter range for this two year study. The following information will be obtained from groups containing radio instrumented ewes:

1. During spring migration (Apr 15-May 30) radioed ewes will be tracked and followed on the ground daily, with airplane tracking support as needed. Travel routes will be mapped. Habitat descriptions including vegetation type, canopy cover, slope, aspect, distance to escape terrain, elevation, and percent and depth of snow will be determined through ground observations and aerial photo interpretation. Potential migration hazards will be assessed.
2. Lambing areas will be located (May 15-June 15) by ground radio tracking migrating ewes in late May or aerial radio tracking.
3. Sheep will be located on the ground daily on lambing ranges by tracking and spotting during the 2 weeks following parturition, then monitored weekly during summer and fall via aerial and ground tracking. Habitat descriptions will be determined for each different range utilized by radio instrumented sheep. Habitat use patterns will be determined from relocations of radio-collared ewes located regularly.
4. Herd productivity (lambs born) will be determined from daily observations of ewes in lambing areas. Lamb:ewe ratios for each herd that contains a collared ewe will be determined daily by ground observations during the two weeks following lambing, then weekly for the remainder of summer and fall. These herd composition ratios will be graphed with respect to time since lambing to determine the critical period when the greatest mortality occurs.

5. Lambs will be located and observed daily in lambing areas. Searches will be made for lambs suspected to be dead. Behavior and symptoms of sick lambs will be recorded. When dead lambs are found a preliminary cause of death will be determined (from searches of the area for signs of predation and observations of the carcass). Carcasses will be necropsied in the field and/or tissue samples or the carcass will be sent to Washington State Univ. Vet School Lab for examination. In the second year of the study, ground observations and monitoring of sheep will intensify during critical periods when mortality was found to be most common, in order to increase the sample of dead lambs and determine sources of mortality.

6. Fecal samples will be collected daily on lambing areas and weekly for the rest of the summer and fall. Samples will be analyzed at Taylor Ranch for lungworm larvae; other samples will be sent to WSU Vet School for parasite and microorganism identification.

7. Idaho Dept. of Fish and Game and a veterinarian are working in coordination with this project to collect body fluid and fecal samples from ewes trapped for radio-collaring. These samples will be analyzed to determine parasites, blood chemistry, and the presence of disease in this sheep population. Information obtained from these samples will help focus our observations and data collection toward likely periods or locations for mortality.