RM-CESU -Project Progress Report, FY 07

Project Title: Resource selection, seasonal distribution, movement and recruitment of bighorn sheep (*Ovis canadensis*) in the Teton Range in northwest Wyoming

Park: Grand Teton NP

Funding Sources:

Rocky Mountains CESU Research Funding - $10,000
Wyoming Chapter of the Foundation for North American Wild Sheep (FNAWS)
Wyoming Governor's Big Game License Coalition
Grand Teton National Park Foundation
Bridger-Teton National Forest
Caribou-Targhee National Forest
Teton County Conservation District
Grand Teton National Park (in-kind)
Wyoming Game and Fish Department (in-kind)
Bridger-Teton National Forest (in-kind)

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Duration of Study: December 2007 – December 2010

Project Description:

The Teton Range bighorn sheep herd resides year-round at high elevation in Grand Teton National Park and on the Bridger-Teton and Caribou-Targhee National Forests. It is Wyoming's smallest and most isolated native herd- a remnant population of perhaps 100-125 sheep derived from a much larger bighorn sheep complex that historically lived in northwest Wyoming. The population's hold on the future is tenuous owing to its small size, likely isolation and the combined effects of loss of historic winter ranges, habitat alteration due to fire suppression and threats posed by increasing recreation in and near important seasonal ranges. The overall goal of this study is to improve our understanding of how and why bighorn sheep use the Teton landscape through identifying locations, characteristics, and use patterns of seasonal habitats and movement corridors by collecting data from radio-collared ewes. Additionally, we aim to map historic bighorn sheep distributions in the Tetons, assess the avoidance of seasonal habitats by bighorn sheep due to human activities, evaluate the effects of retiring domestic sheep allotments on the herd, determine lamb production and survival to mid-summer for the sample of radio-

collared ewes, and determine causes of mortality incidents. This study will provide critical information on the bighorn sheep herd to inform wildlife management strategies in the future.

Methods:

Capture and Radio-Collaring
Seasonal habitats, movements and travel routes will be identified by tracking a sample of 20 female bighorn sheep fitted with GPS store-on-board collars over 2.5 years (December 2007 – May 2010). GPS store-on-board collars are programmed to collect and store GPS locations of radio-collared individuals several times each day, allowing for intense spatial data collection without frequent over flights in Wilderness areas.

Bighorn sheep will be captured in mid-December 2007 by net-gunning from a helicopter. Unlike other capture methods such as darting, net-gunning does not involve the use of tranquilizers, which makes the capture period shorter and less stressful for the animal, and does not include the risk of drug-induced mortality. Capture from the air is necessary due to this bighorn sheep population's remoteness and fear of humans from being hunted, which makes capture on the ground unfeasible. During capture, individuals will be fitted with a radio-collar, have routine biological samples collected, and be aged by an annual horn ring count (Geist 1966).

Analyzing Habitat Use and Selection

All of the sheep radio-collars will be equipped with a release mechanism and programmed to drop from the animals on 15th May 2010. During the following months, field crews will collect the radio-collars on the ground using radio-telemetry. GPS location data stored in the collars will be analyzed to evaluate habitat use and selection patterns using a Resource Selection Function (RSF). A RSF (a predictive model) will be created to estimate the relative frequency of sheep use of the entire study area as a function of habitat attributes. The model will be mapped back onto the study area to create a spatially continuous map of sheep habitat quality as indexed by frequency of use. The habitat map will allow managers in Grand Teton National Park, Bridger-Teton National Forest, Caribou-Targhee National Forest, and Wyoming Game and Fish Department to evaluate the conservation value of various types of sheep habitat, irrespective of their current occupancy by the Teton Range bighorn sheep.

Aerial Monitoring

In order to monitor for possible mortalities and collect general locations of radio-collared sheep, we will conduct monthly fixed-wing aircraft flights throughout the Teton Range. All radio-collared sheep mortalities will be investigated on the ground through necropsy procedures.

Measuring Winter Recreation

Winter recreation levels will be measured in the study area by installing and monitoring trail counters at the base of popular skiing and mountaineering routes in Grand Teton National Park, Caribou-Targhee National Forest, and the Jackson Hole Mountain Resort.

Measuring Reproduction and Nutrition

Reproductive information, including lambing rates and lamb survival to mid-summer, will be gathered by observing and monitoring radio-collared females in the field. These data will be used to estimate current recruitment rates for comparison to other bighorn sheep demographic studies. Additionally, fecal samples may be collected in the field to measure nutrition levels. In order to collect these data, two field crews (two people each) will spend 7-10 days in the backcountry during the summers, tracking sheep groups and monitoring females.

Project Achievements to Date:

This project has continued to gain support from government agency collaborators, funding partners, and the Teton Range Bighorn Sheep Working Group. In 2007, we secured a total of $128,000 in project funding from 6 partners with additional in-kind contributions. Funding was sufficient to begin the first year of the study and allow the graduate student (Alyson Courtemanch) to attend classes at the University of Wyoming beginning in January 2008. During 2007, we also secured all the necessary permits from the local land and wildlife management agencies including: a permit to conduct research within Grand Teton National Park; special use permits to conduct research in the Jedediah Smith Wilderness, and Caribou-Targhee and Bridger-Teton National Forests; and a Chapter 33 permit from the Wyoming Game and Fish Department. We also received research approval from the University of Wyoming Animal Care and Use Committee.

In the fall of 2007, we ordered and received 20 Telonics store-on-board GPS radio-collars specifically designed for our sample of ewes and programmed to our data collection specifications. The collars were scheduled for deployment in mid-December 2007. In preparation for captures, we assembled capture kits and produced maps of potential bighorn sheep winter range in the Teton Range from past aerial surveys and a VHF radio-collar study (early 1990's).

Capture operations within the Teton Range were scheduled for December 12-15th 2007, as described in the methods above. Due to a combination of factors our capture operations were unsuccessful. The extreme terrain of bighorn sheep winter habitat in the Tetons restricts net-gun capture operations to a very narrow window relative to weather/snow conditions, which did not exist during our capture efforts. High winds, poor visibility, and an unstable snowpack made captures too dangerous to attempt. Previous net-gun capture efforts (mid - 1990's) were successful in the Teton Range during the month of January. However, the crew leader was contacted and did emphasize the high level of difficulty and risk associated with the captures in the mid-1990's.

Net-gunning appears to be the only feasible means of collar deployment. Thus, we are planning for an additional attempt(s) to deploy collars under better weather/snow conditions in either February or March 2008. Despite this setback, we are confident that captures can occur later this winter under better conditions and that the project will go forward.

<u>Expected Final Report:</u>
Final results from this project will be made available to cooperators in December 2010 through a master's thesis, one or more articles published in a professional publication, and a final report. Annual progress reports, copies of habitat maps, GPS location data and other GIS products will also be provided to cooperators upon request.