



## INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior  
National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236) Exp. Date (11/30/2010) Form No. (10-226)
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<b>Reporting Year:</b> 2008	<b>Park:</b> Grand Teton NP	<b>Select the type of permit this report addresses:</b> Scientific Study	
<b>Name of principal investigator or responsible official:</b> Alyson Courtemanch		<b>Office Phone:</b> 307-766-6415	
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<b>Additional investigators or key field assistants (first name, last name, office phone, office email)</b> <b>Name:</b> Dr. Matthew Kauffman <b>Phone:</b> 307-766-6404 <b>Email:</b> mkauffm1@uwyo.edu			
<b>Project Title (maximum 300 characters):</b> Resource Selection, Seasonal Distribution, Movement and Recruitment of Bighorn Sheep in the Teton Range of Northwest Wyoming			
<b>Park-assigned Study or Activity #:</b> GRTE-00161	<b>Park-assigned Permit #:</b> GRTE-2008-SCI-0005	<b>Permit Start Date:</b> Feb 18, 2008	<b>Permit Expiration Date:</b> Dec 31, 2008
<b>Scientific Study Starting Date:</b> Dec 06, 2007		<b>Estimated Scientific Study Ending Date:</b> Dec 31, 2010	
<b>For either a Scientific Study or a Science Education Activity, the status is:</b>  Continuing		<b>For a Scientific Study that is completed, please check each of the following that applies:</b>  <input type="checkbox"/> A final report has been provided to the park or will be provided to the park within the next two years <input type="checkbox"/> Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park <input type="checkbox"/> All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed	
<b>Activity Type:</b> Research			
<b>Subject/Discipline:</b> Animal Communities / Wildlife			

<p><b>Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):</b></p> <p>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. Although the herd historically wintered at lower elevations in the Jackson Hole valley and Teton Basin, they now winter exclusively at high elevation on windswept ridges and cliff areas. It is Wyoming's smallest and most isolated native herd- a remnant population of perhaps 125-150 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 genetic isolation from surrounding herds, 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. Of the native ungulates present in the Jackson Hole area, bighorn sheep face the most precarious future.</p>
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This study was developed in order to improve our understanding of how and why bighorn sheep use the Teton landscape. Although some broad scale data are available about sheep seasonal distributions and movements, more detailed information on habitat selection, movements, and travel routes is urgently needed. Since the herd has been eliminated from much of their historic habitat, their current distribution is unlikely to be a reliable indicator of habitat patches critical to their long-term persistence. Furthermore, a better understanding of the relationship between human activities and bighorn sheep habitat use is needed in order to evaluate whether sheep avoid high human use areas and to inform appropriate management strategies.

The overall objectives of this study are to:

1. Administer this research project, graduate student training, scientific publications, workshops, presentations, data sharing with agency partners, and annual reports to funding agencies;
2. Compile and map historic sheep distribution using historical data sources;
3. Document locations, characteristics, and use patterns of seasonal habitats and movement corridors;
4. Quantitatively assess the habitat selection patterns of the herd (in winter and summer);
5. Quantitatively assess avoidance of seasonal habitats by bighorn sheep due to human activities;
6. Evaluate the effects of retiring domestic sheep allotments on the Teton Range bighorn sheep herd;
7. Determine lamb production and lamb survival to mid-summer for the sample of radio-collared adult female sheep;
8. Provide community education on bighorn sheep and the project in the form of public presentations, written materials, local media, etc.

During 2008, our aim was to initiate the study by capturing and fitting 20 bighorn ewes in the Teton Range with GPS store-on-board radio-collars. The GPS radio-collars are programmed to collect GPS locations every 5 hours for about 2.5 years (the radio-collars will automatically detach from the bighorn sheep in July 2010 and collected by field crews). We also aimed to test every captured ewe for pregnancy and for disease. During the summer season, our goals were to locate and observe every radio-collared ewe from the ground at least three times in order to determine the lamb survival rate. We also planned to conduct monthly spring and fall and bi-weekly summer monitoring flights to locate radio-collared bighorn sheep to assist field crews in ground observations and to identify mortality incidents.

**Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):**

In February 2008, 20 female bighorn sheep were successfully captured by net-gunning from a helicopter in the Teton Range. We fitted each individual with a store-on-board GPS radio-collar, collected blood and fecal samples for pregnancy and disease analysis, and released the animal. Blood sample analysis at the Wyoming State Vet Lab in Laramie, Wyoming showed that of the radio-collared ewes that were of reproductive age (18/20), 94% were pregnant. We also analyzed blood samples for the presence of 12

common bighorn sheep diseases: Brucella ovis, wildlife brucellosis serology, epizootic hemorrhagic disease virus (EHD), Johne's disease, bluetongue virus, parainfluenza virus (PI3), respiratory syncytial virus, bovine viral diarrhea, infectious bovine rhinotracheitis, ovine progressive pleuropneumonia, caprine arthritis encephalitis, and Psoroptes mites. All of the radio-collared ewes tested negative or very low exposure for all diseases, indicating that this herd has had little or no interaction with other bighorn sheep herds and is currently relatively disease-free.

In March and April 2008, three radio-collared bighorn sheep died in avalanches (Jensen Canyon and Mount Hunt area) or falls from cliffs (Mount Hunt) in the southern Teton Range. Their GPS radio-collars were collected and will be re-deployed during winter 2009. A fourth radio-collared bighorn sheep died in November 2008 in Webb Canyon in the northern Teton Range. The cause of that mortality is unknown and the radio-collar has not yet been recovered.

During summer 2008, two field crews (2 people each) radio-tracked and observed the bighorn sheep ewes in the Tetons. We determined that 50% of lambs from radio-collared ewes survived to mid-summer, which is a typical lamb survival rate for that time of year. The average bighorn sheep group size observed was 5.5 animals, and the maximum was 16 animals. Field crews also collected 62 fecal samples for diet composition analysis to be completed during winter 2009.

This winter, we plan to capture and fit 7 additional bighorn sheep ewes with store-on-board GPS radio-collars in the Tetons, including Grand Teton National Park. Winter field work will consist of quantifying backcountry recreation in the Teton Range in relation to bighorn sheep by recruiting backcountry users at trailheads to carry GPS tracking units for the day and by utilizing trail counters to measure total daily, weekly, and seasonal use.

This is an ongoing project, and we plan to continue work through 2010.

<p><b>For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?</b></p> <p>Yes</p> <p><b>If "Yes", identify where the specimens currently are stored:</b></p> <p>20 bighorn sheep blood samples &amp; 20 fecal samples, collected during captures in February 2008 and stored at the Wyoming State Veterinary Lab in Laramie, WY.</p> <p>62 bighorn sheep fecal samples from summer 2008, stored at the Wyoming Game and Fish Department in Jackson temporarily (will be shipped for analysis this winter).</p>	
<p><b>Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):</b></p> <p>\$5000</p>	<p><b>Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):</b></p> <p>\$85000</p>
<p><b>List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:</b></p> <p>Teton Conservation District [\$12350]          Wyoming Game and Fish [\$12350]          WY Big Game License Coalition [\$25000]          US Forest Service [\$5000]</p>	

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Resources (3127 MIB), National Park Service, 1849 C Street, N.W., Washington, DC 20240.