



Wildlife Heritage Account Project Proposal Form

APPLICANT INFORMATION

Person Submitting Proposal/Project Manager: _____ Marcus Blum and Dr. Kelley Stewart _____

Organization/Agency: _____ Board of Regents, NSHE, obo University of Nevada, Reno _____

Date: _____ 27 February 2020 _____

Address: _____ 1664. N. Virginia St, MS 186 _____ City: _____ Reno _____

State: _____ Nevada _____ Zip Code: _____ 89503 _____

Cell: _____ 775-313-5280 _____ Phone: _____ 775-784-4314 _____

Email: _____ kstewart@cabnr.unr.edu _____ Fax: _____

NDOW Monitor (if the project would be managed by someone other than a NDOW employee):

_____ Mike Cox, Bighorn Sheep / Mountain Goat Staff Biologist _____

PROJECT INFORMATION

Project Title: Dissemination of Results from Delineation of Lambing Habitat, Population Demographics, Resource Selection, and Movement Patterns of Desert Bighorn Sheep.

State Fiscal Year(s) Wildlife Heritage Account Funds are Needed:

Project Location: Garfield Hills and Lone Mountain, Nevada

Amount of Funds Requested from Heritage Account:

Is a Project Map Attached? Yes No

(a map **must** include the project title, map scale, date map was created, and a north arrow)

Purpose of the Project:

The objectives of this project are to understand demographic responses to selection of resources by adult and juvenile desert bighorn sheep (*Ovis canadensis nelsoni*) to: 1) to improve the delineation of high quality lambing habitat for multiple populations, 2) determine demographic parameters (survival and recruitment) of adult and young desert bighorn sheep in response to translocation, and 3) understand movement and dispersal patterns of males. This information will benefit NDOW by providing information on demographic parameters to help direct conservation and restoration towards habitats critical for



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enhancing population growth of desert bighorn sheep. Results from this project need to be disseminated to provide detailed information on designation and detailed descriptions of habitats that are selected by ewes to enhance lamb survival. This information will provide managers information on population parameters as well as helping them to direct conservation towards habitats critical for enhancing population growth of desert bighorn sheep.

Detailed Description of Project (include any development plans such as vegetation removal, planting, seeding, or installation of structures; also include the schedule for obtaining any necessary permits, completing NEPA compliance, etc.):

Data collection in the field for this project has been completed. A general description of the overall project follows, but please note that we are requesting funds to help us complete the final and in many ways the most important part of the project: getting the information from the results of this project available for others to use. We are, currently, in the process of compiling and analyzing data for publication in both the peer-reviewed and popular literature to disseminate information to NDOW (who provided primary support of the project), but also to provide that information to other professional biologists and managers, as well as the general public. Portions of this project required capture and handling of adult and young animals, and therefore dissemination of this information is a critical aspect of this project.

We conducted a population demographics project to determine population productivity: adult survival, and lamb recruitment into the breeding population in an extant and recently translocated population. We are in the process of correlating those demographic data with detailed analyses of diet composition and nutritional condition of adults, including assessing quality of birth sites and lamb rearing habitats relative to survival of lambs. Additionally, we have analyzed fecal pellets for diet quality and composition and we are in the process of correlating those data with demographic parameters to provide further insight to the effects of selection of resources by adult females on overall population dynamics.

Another important and exciting aspect of this project is identification of high-quality lambing habitat by evaluating selection of resources at the birth-site and lamb rearing areas. To investigate this question, we collected high quality imagery using an unmanned aerial vehicle (UAV) around birth sites and lamb rearing areas. Those data will allow us to obtain precise estimates of cover and a more detailed vegetation map of areas selected and avoided by females. We have collected all of those data and are nearly finished with creating 3-dimensional images of the habitats (Figures 1 & 2). With those data we are able to more accurately determine what habitats were selected by ewes during critical growing periods of lambs. Those data are increasing our ability to develop high-resolution and highly informative prediction models for delineation of high quality lambing and lamb rearing habitat across Nevada. This information will benefit NDOW and many other state wildlife agencies by providing important criteria for evaluating habitat quality for bighorn sheep both in extant populations where restoration is appropriate and for helping to evaluate areas that may be targeted for placement of translocated populations. Finally, this information will assist biologists in identifying and protecting lambing habitats for bighorn sheep within their regions.

How Would This Project Help with “the protection, propagation, restoration, transplantation, introduction and management of any game fish, game mammal, game bird or fur-bearing mammal in this State; or the management and control of predatory wildlife in this State”? (See NRS 501.3575)

Bighorn sheep (*Ovis canadensis*) are one of the most sought after game animals across the western United States, and management of this species receives considerable attention from both state and



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federal agencies. Populations of bighorn sheep occupy a large portion of mountain ranges across Nevada and recent trends suggest that some of their populations are in decline. Due to their economic and aesthetic values, bighorn sheep are a high priority for biologists and sportsmen across the state, and the Nevada Department of Wildlife (NDOW) and many non-government organizations have invested substantial financial resources in managing these species, through translocations, habitat improvement and restoration, and population management. Results from this research will increase NDOW's ability to effectively manage habitats to improve recruitment of young and seasonal habitats for both adults and young bighorn sheep across the state. Additionally, our results will provide NDOW biologists with important criteria for evaluating habitats at proposed sites for translocations, and mountain ranges with high-quality habitats to enhance growth of translocated populations. This information may also provide biologists with additional data that can be used to better understand demographics in other mountain ranges that are currently occupied by desert bighorn sheep.

Legal Description of the Property on Which the Proposed Project is to be Located (must include the property address, access roads, township, range and section):

We had 2 study areas associated with this project. Lone Mountain is located in Hunt Unit 212 southwest of Tonopah. The Garfield Hills are located in Hunt Unit 206 between Hawthorne and Mina, NV, south and west of Hwy 95 (Figure 3).

Does this Project Have Additional Funding Sources Other than Your Wildlife Heritage Account Request? Yes No

Does this Project Involve Habitat Restoration and Improvement of a Long-term or Permanent Nature? Yes No

Please Describe in Detail the Reason Why You Need Wildlife Heritage Account Funding to Fund this Project:

Data collection for this project has been completed and analysis of those data are ongoing. The funding for support of the graduate student ends June 30, 2020, but in all likelihood the student will not graduate until late summer or early autumn. We need funding from the Wildlife Heritage Trust for the student to complete his dissertation and to continue funding him for the year to publish his findings in both professional and popular publications. With large, long-term projects with large amounts of data as in this project, sometimes the timeline is extended in large part because of the time consuming aspect of data analysis. An important portion of this project was to delineate high-quality lambing habitat, where survival of our marked lambs was highest. We collected 3-dimensional data on lambing habitat through the use of unmanned aerial vehicle (UAV) photography at a resolution of 2-cm to determine the quality of sites used by ewes for lambing or by lambs for hiding (Figure 2).



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If data collected from projects like this are not published in outlets that have been through the peer-review process, which increases the rigor associated with it and gives the information more credence. Obviously it is not available to other managers if results are sitting in a file cabinet or a thesis that is not available outside of a small group of people. Publication in peer-reviewed journals is costly (~\$2,000 / paper). We hope to have at least 1 paper published before our current support expires, but the peer-review process can take 6-8 months before publication (and the associated costs are due). We anticipate 5-6 manuscripts from this project.

We are requesting support from Heritage to aid in funding publication of the data from this project and to support the student and then researcher (following graduation) to continue to work for 1 year to focus on dissemination of the important information obtained from this project.

Budget Justification: We budget for \$8,000 for publication charges for 3 -4 professional (e.g. peer-reviewed) publications. We also budget for 6 months of graduate assistant salary (\$1900/month with 12.1% Fringe), which is \$11,400 + 1379 (fringe), and following graduation to fund the former student as a Letter of Appointment (LOA) for 6 months to complete the publication process \$21,400 + (10.2% fringe, ~\$2,183). Tuition (8 credits x \$202.88/credit = \$1,638). Therefore, we budget \$46,000 for salary for student/LOA for 1 year, tuition, and publication costs.

Project Duration: one year two years three years more

Estimated Start Date: 1 July 2020

Estimated End Date: 30 June 2020



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PROJECT FUNDING

The funding breakdown below should cover the total funding needs of the project. While projects may be extended beyond the fiscal year for which money was awarded, such an extension must be due to unusual circumstances and be approved by the Wildlife Commission (see NAC 501.340). Double click on the table to activate the embedded spreadsheet.

The University of Nevada, Reno will not allow me to fill out this table, but by the description you can ascertain that NDOW is a partner, and this request of Heritage is not for funding the entire project.

1. Amount of Heritage Account Funds Being Requested		\$ 46,000.00
2. Other Cash Funding Sources for this Project		
a.		
b.		
c.		
d.		
e. Total Other Cash Funding Sources (lines a - d)		\$ -
3. In-kind Services for this Project		
a. Volunteer Time		
b. Equipment		
c. Materials		
d.		
e.		
f.		
g.		
h. Total Donations/In-kind Services (lines a - g)		\$ -
4. Total Project Funding	\$ 46,000.00	



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Are There Going to be Any Ongoing Costs for This Project? Yes No

If There are Ongoing Costs Associated with This Project, is There an Anticipated Funding Source for These Costs? Yes No

Do You Anticipate Needing Additional Wildlife Heritage Account Funds Beyond the Upcoming Fiscal Year? If So, Please Describe What You Think Your Funding Requirements will be and for What Purposes (As noted above, extensions beyond the first fiscal year must be due to unusual circumstances and approved by the Wildlife Commission.):

No, funds from Heritage will help us to complete the final steps of this project.

How Will You Give Credit to the Wildlife Heritage Account and Other Funding Sources?

The Wildlife Heritage Trust will be acknowledged in any scientific and population publications associated with this project. In addition, the Heritage Trust also will be acknowledged in any presentations at scientific, academic, or public venues.

Authorizing Signature:

Review Date 03/02/2020

Figure 1: Example of high-resolution 3-dimensional data collected by unmanned aerial vehicles (UAV) for mapping of habitat for bighorn sheep at Lone Mountain, Nevada. Data from UAVs will be used in further analysis of selection of lambing sites by adult females and hiding sites by lambs.

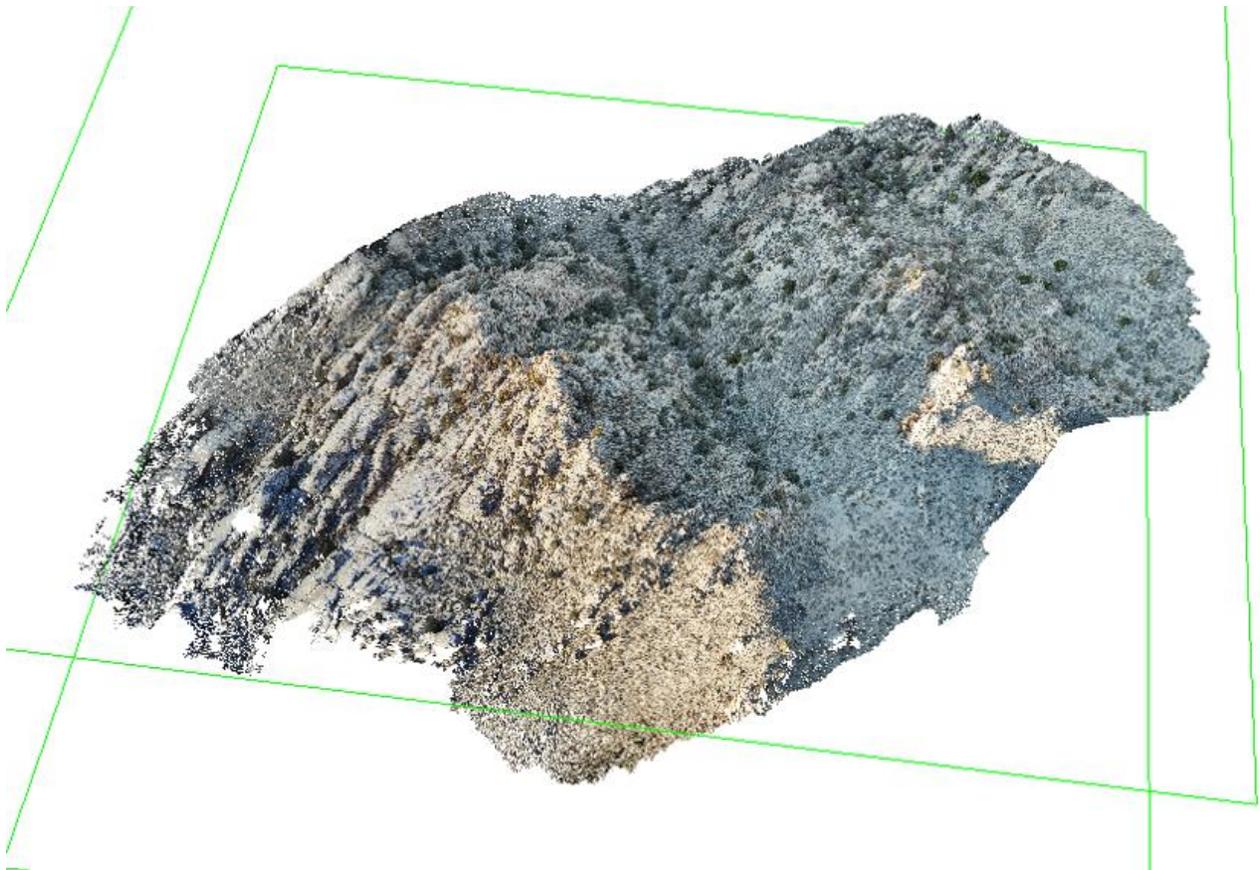


Figure 2: Further detail of high-resolution data collected from UAVs for analysis of lambing sites and hiding sites at Lone Mountain, Nevada.



Figure 3: Location of the Garfield Hills (Hunt Unit 206) and Lone Mountain (Hunt Unit 212) study areas.

