RESILIENT BIGHORN SHEEP PROJECT NEWSLETTER

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The goal of the ***Resilient Bighorn Sheep Project*** is to develop mechanisms, procedures and management policies that ensure and maintain the health of natural ecosystems and native wildlife populations, specifically the Bighorn Sheep, in the Northern Rocky Mountains. The project was initiated by Jeff Kneteman (Alberta Environment and Sustainable Resources Development (ESRD) – Wildlife Branch) as part of his graduate thesis program in the Department of Biological Sciences, University of Alberta (supervised by David Hik).

This research is necessary because the environments used by Bighorns, and other wildlife, are changing. There is more intensive land use and climate change is altering environmental conditions.

We need to determine how many animals make up the basic population and the extent of their natural range, in order to understand how composition (male/female), productivity (number of surviving lambs) and seasonal or long-term movements (immigration and emigration) affect the overall health and sustainability of the population.

Important questions include:

- What enables populations to tolerate or benefit from environmental change and what are the limits to this tolerance?
- How can we manage landscape disturbances to be consistent with Bighorn Sheep population "health"?

The second ***Ecological Resilience and Bighorn Sheep*** workshop was held at the University of Alberta on June 3, 2013. Chaired by Jeff and David, it brought together people from ESRD-Wildlife Branch, the University of Alberta (U of A) and several private groups (Alberta Fish and Game Association, Wild Sheep Foundation, Alberta Professional Outfitters Society and Safari Club International, Northern Alberta Branch) interested in the sustainability of the Bighorn Sheep population in the Northern Rockies.

Jeff provided an overview and background to the project and a summary of his research-to-date. The 40-year Bighorn Sheep census dataset indicates that the population has been relatively stable over the entire Northern Rockies. However, at the Census Zone and Wildlife Management Unit scale, it appears that rams and ewes are leaving some areas and congregating in others, in particular a man-made habitat associated with mining in the Cadomin census zone. Lamb survivability is also variable at this regional scale.

Research

Four areas of research were identified.

Demographics – This activity takes advantage of existing census data collection and is ongoing.

Genetics – Fecal samples were collected throughout the Bighorn Sheep's range during the winter of 2012-13 in order to develop new techniques for determined genetic structure of the population. It is hoped that this analysis will tell us whether or not there are distinct genetic groups within the larger population; for example, is it possible to tell a Willmore Bighorn Sheep from a Clearwater Bighorn Sheep? If it is, we may be able to trace the movements of individuals from these distinct populations into other areas. There is no existing data that currently allows us to do this.

David Coltman's lab (U of A) is responsible for analyzing these fecal samples. Beth Adamowicz,

who currently works in his lab, is refining the DNA extraction protocols to optimize the process and expects to have some preliminary results by the end of the summer. Coltman hopes to recruit a Postdoctoral Fellow to conduct the main analysis during the 2013-14 academic year.

The Government of Alberta has supported the collection of additional fecal samples through its biennial Bighorn Sheep census efforts.

Horn Growth Analysis – The annuli circumference and length of Bighorn Sheep horns can be used to infer something about the environmental conditions the sheep lived in. When compiled, this information may give us some insight into the Bighorns' habitat dating back several decades. Initial measurements will be made on the Wildlife Branch's inventory and horns offered by private parties in the province. The annuli analysis of these horns could be used to construct an environmental timeline in much the same way tree rings and deep glacier ice cores are used to reconstruct prehistoric climates.

Workshops will be held to train individuals in the *Yukon Protocols* for determining annuli characteristics. The workshop participants will use the inventory of Bighorn Sheep horns held by the province as part of their training. This will help them standardize their evaluations and document the province's horn collection. As necessary, they will travel throughout the province analyzing privately held trophy horns.

Letters will be sent out to various clubs soliciting access to these trophy horns. This task will be undertaken by U of A and private partners.

Habitat/Landscape Evaluation – Satellite data provides us with an opportunity to classify and map habitats in the Northern Rockies. Appropriate images will be identified, acquired, analyzed and mapped. Comparison of these maps may give us some insight into the changing vegetation conditions in the region and their suitability for Bighorn Sheep. A U of A student, with expertise in remote sensing and GIS, will be recruited to undertake this task beginning in 2014.

Potential Funding

There was an extensive discussion about potential sources of funding for these research efforts. Funds generated by the Minister's Permit were identified as one source of money. Sixty percent of the revenue generated by a Minister's special permit is to be directed to management and research on the species to which the tag applies.

Other sources of funding include the provincial agencies and private organizations.

Broadening Participation

The attendees recognized that additional interested parties should be included in the discussion. Most people thought that it was necessary to keep this group small to encourage real dialogue and that the conversation needed to center on common interests. Possible new partners include, but are not limited to, First Nations, conservation groups, the provincial and national park services, and policy makers. These groups will be approached over the next few months to determine their interest.

Communication

The U of A will take responsibility for facilitating the communications among the interested parties. Initially this will be done through a newsletter. The project will eventually host a website where results can be shared.

For more information about the ***Resilient Bighorn Sheep Project*** contact:

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