Alberta Conservation Association (ACA)

Date: 2014-2015

Project Name: Wildlife Habitat Initiative in Low Disturbance Zones – Habitat Resources and Movement Corridors in Southwest Alberta

Wildlife Program Manager: Doug Manzer

Project Leader: Mike Verhage

Primary ACA staff on project:

Robert Anderson, Francine Gagnon, Mike Jokinen, Doug Manzer and Mike Verhage

Partnerships

- Alberta Environment and Sustainable Resource Development
- Anatum Ecological Consulting
- Devon Canada Corporation
- Parks Canada

Key Findings

- Analyzed the chemical composition of soils collected from 18 mineral licks in southwest Alberta.
- Presented results on use of mineral licks by bighorn sheep and mountain goats at the Northern Wild Sheep and Goat Council conference in Colorado.
- Submitted a paper for inclusion in the Northern Wild Sheep and Goat Council conference proceedings.

Introduction

An important step in conserving wild places and species is to identify their location and relative value. This step is particularly important in low disturbed areas where human disturbance will erode these values, perhaps never to be recovered. In 2013/14, we monitored a subset of alpine mineral licks to determine seasonal variation in use by bighorn sheep and mountain goats. We also collected soil samples from 18 mineral lick sites to determine the chemical composition of soils. In 2014/15, we analyzed and summarized these data and incorporated it into our suggestions for buffer distances and timing restrictions for industrial disturbances near mineral licks.

Methods

In 2013/14, we monitored trail cameras at four alpine licks frequented by bighorn sheep and mountain goats. We recorded data from images and produced summary statistics on species assemblage, abundance, gender, age class (where possible), time of day, and time of year. We also determined the chemical composition of soils by collecting and analyzing soil samples taken from 18 lick sites and 18 reference sites. Specifically, we analyzed soil samples for the presence and quantity of 11 elements (calcium, cobalt, copper, iron, potassium, magnesium, manganese, molybdenum, sodium, phosphorus and zinc); all of these elements are considered to be attractants to wildlife at mineral licks (Jones and Hanson 1985 in Dormaar and Walker 1996).

We collected soil samples from the top 10 to 15 cm of the surface of several randomly selected microsites within the same lick and then combined them in a clear plastic bag to form one composite sample with an approximate volume of 500 ml of soil. Where possible, we took samples from areas where there were obvious signs of soil ingestion by wildlife (i.e., high density of wildlife prints; evidence of biting, licking or hedging). We avoided including standing water, rocks, vegetation (tree roots, pine needles, leaves) and soil with surface discolouration, feces or urine in the samples.

Results

We observed significant differences between the mean concentrations of elements found in soils at lick sites compared to reference sites for calcium, iron, magnesium and sodium (Figure 1). Roughly three times more sodium and 1.7 times more magnesium occurred in lick soils, which is consistent with other studies (e.g., Ayotte et al. 2006). We did not find significant differences between lick sites and reference sites for the remaining seven elements that we analyzed.

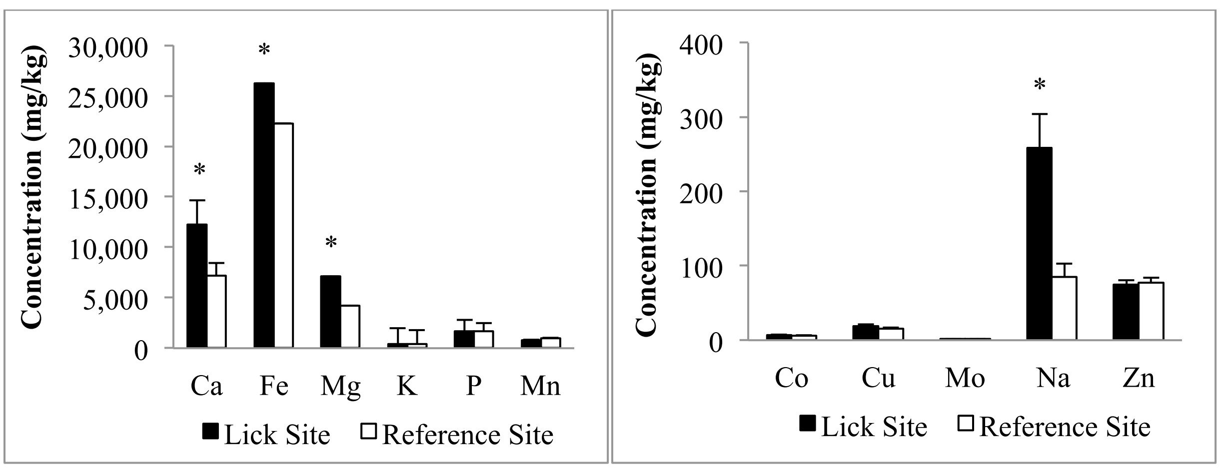

Figure 1. Mean concentrations (and standard errors) of elements in soil samples taken from 18 mineral lick sites and 18 reference sites in southwest Alberta, 2013. * Significant difference

Conclusions

Between 2011 and 2013, we detected mule deer, white-tailed deer, elk, moose, mountain goats and bighorn sheep using mineral licks. We also captured images of several carnivore species at lick sites including black bear, grizzly bear, cougar, wolf, coyote, fox and wolverine. Information on the duration and timing of peak use both seasonally and over a given 24-hour period will help guide land-use planning efforts where road development, recreational access, forest harvesting or mining activities are being considered. We view this work as a first step in a process of identifying key habitat features in low disturbance zones and working to conserve these wild places and the wild species that occupy them.

In 2015/16, we will incorporate results from the chemical composition of mineral lick soils and additional data collected from images of bighorn sheep and mountain goats into a report series. This series will summarize our work to date on seasonal variation in use of mineral licks by species. Additionally, we will provide suggested buffer distances and timing restrictions for industrial disturbances by completing a report on the ecological importance of mineral licks and suggested considerations for land-use planning.

Communications

- Presented results on use of mineral licks by bighorn sheep and mountain goats at the Northern Wild Sheep and Goat Council conference in Fort Collins, Colorado.

Literature Cited

Ayotte, J.B., K.L. Parker, J.M. Arocena, and M.P. Gillingham. 2006. Chemical composition of lick soils: Functions of soil ingestion by four ungulate species. Journal of Mammalogy 87: 878–888.

Dormaar, J.F., and B.D. Walker. 1996. Elemental content of animal licks along the eastern slopes of the Rocky Mountains in southern Alberta, Canada. Canadian Journal of Soil Science 76: 509–512.

Jones, R.L., and H.C. Hanson. 1985. Mineral licks, geophagy and biogeochemistry of North American ungulates. Iowa State University Press, Ames, IA, USA. 301 pp.

Photo Captions

Like five hungry customers all lined up at the cafeteria, these bighorn sheep consume substrate by digging, licking and chewing the soil at a small, carved-out cavity on the side of a high-altitude mineral lick. Photo: ACA

A nanny mountain goat and her kid share an alpine mineral lick on an exposed slope with a group of three bighorn sheep. Photo: ACA

A female bigho

rn sheep and a group of young lambs are captured by one of our trail cameras at a high-altitude mineral lick. Photo: ACA