

***B.C. Mountain Goat Workshop, Prince George, BC 2005***

**Project Title:** The importance of mineral licks to ungulates in north-central BC

1. **Project Leader(s):** Jeremy Ayotte, Kathy Parker
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4. **Project location:** Tuchodi watershed, Northern Rockies Prov. Park, Muskwa-Kechika Manage. Area  
Coastal:  Transition:  Interior:
5. **Project timeframe:** Start (month/year): 09/02 End (month/year, or ongoing): 06/04
6. **Project status:** Data collection  Analysis  Write-up  Publication
7. **Project objectives:** (briefly describe the primary objectives of your project)  
1) Document seasonal use of licks, 2) Determine properties of lick soil, 3) Estimate elemental concentrations in forage
8. **Project descriptors** (select all that apply):  
Research  Habitat Use:  Forestry Interactions:   
Management  VHF collars:  Oil & Gas Interactions:   
Inventory  GPS collars:  Mineral Exploration:   
Predation:  Harvest:  Aerial Disturbance:   
Habitat Modeling:  Population Dynamics:  Human Disturbance:   
Other: Elemental nutrition

**8. Project description** (provide a brief description of your project including methods and main findings or results to date):

Research was conducted at three dry licks that were all near valley bottom on the east slope of the Northern Rocky Mountains 120 km SW of Ft. Nelson. We conducted behavioural observations (May-Aug, 2002) of 3 dry lick areas (used by mountain goats and Stone's sheep) to document hourly and seasonal lick use. Mountain goats appeared to travel to licks more in the morning than the afternoon, but did not show any pattern in time leaving the lick. They also travelled to the lick during all hours of the night, which contrasts to the use of licks by Stone's sheep that tended to leave the lick to return to the alpine during daylight hours. It also appeared that more mountain goats travelled to the lick on the main trail than away, which was opposite to the use of trails by Stone's sheep (more sheep used main trails when travelling away from the lick than when travelling to the lick). Female mountain goats on average spent longer time at the lick and licked for a higher proportion of that time than males although these differences were not significant. In terms of seasonal use of licks, two peaks in lick use were common to both Mountain goats and Stone's sheep (although data was highly variable across the spring and summer). The first peak in early July, may have been related to the late-greening of alpine forage, and the second in early August may have been influenced by high lactation demands combined with a reluctance to travel down to valley bottom until their young were

old enough that the threat of predation was acceptable. We then used our behavioural observations to quantify the lick area in terms of intensity of use in order to select high- and low-use sites within the lick area. We collected soil samples from 10 controls, 10 low-use and 10 high-use sites at each lick. Methods of soil analyses generally pertained to theories on lick function and specifically related to the digestive physiology of the ruminant. Sodium and carbonates were the two soil properties that we found concentrated in almost all licks. Magnesium and sulphates were also high in some of the licks. In order to assess whether these elements that are high in the lick soil were also low in the diet, we collected forage samples across elevation and time. Sodium, which was high in all dry lick soils, was also low in the diet of mountain goats compared to the maintenance requirements of captive wild and domestic ruminants and the lactation demands of cattle. In conclusion, I combined behavioural and chemical data to assess the importance of mineral licks to mountain goats and generally found that lick use is a complex interaction between physiological demands, forage composition, and the properties of licks soils. Consequently the use of licks is variable over time and among individuals, and it appears that licks may serve multiple functions. Specifically, licks are sources of supplemental sodium (especially during high physiological demand such as lactation) and sources of carbonates for pH buffering during the transition to spring forage. Managers should consider that lick use is a fundamental component of mountain goat foraging strategies as access to licks may allow weak individuals an opportunity to improve their condition in a relatively short amount of time.

**9. Project documentation** (provide a list of citations for all progress, final, or published reports)

1) Progress reports and a final report are kept at the Muskwa-Kechika Management Area resource library:

Muskwa-Kechika Management Area

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- 2) Ayotte, J. 2004. The importance of licks to ungulates in north-central BC. Masters thesis. University of Northern BC, Prince George BC.
- 3) Ayotte, J. [submitted]. Use of natural licks by four ungulate species in north-central British Columbia. [Ecoscience]
- 4) Ayotte, J. [submitted]. Chemical composition of lick soils: potential benefits for ungulates. [Ecoscience]

