Geophagy by Snowshoe Hares in Northern Alaska

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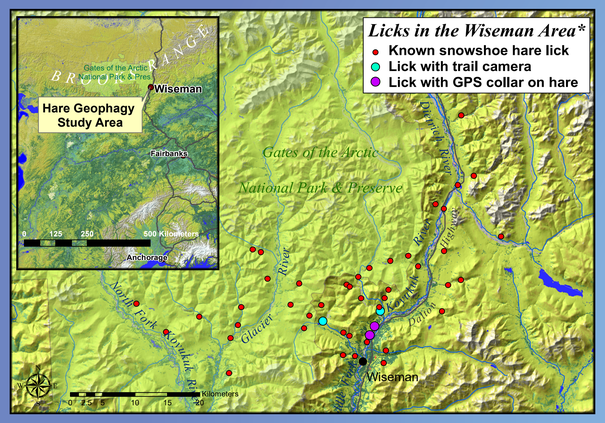
Introduction

Geophagy, the consumption of mineral soil, has been reported in a wide range of species, including birds, ungulates and primates, and is particularly prevalent among generalist herbivores. Geophagic behaviors among vertebrates have been attributed primarily to the acquisition of mineral nutrients when forage plants provide insufficient supplies of these resources, well as detoxification of plant secondary metabolites.

Geophagy by snowshoe hares in the Brooks Range is prevalent during the increasing and peak population phases of the hare cycle, coinciding with heavy browsing of vegetation. Here, we use trail cameras and GPS collars to investigate movement patterns, visitation rates, and timing of visits by snowshoe hares in lick areas.



Study Area



The focus of the study lies just north of Wiseman, a small village on the Middle Fork Koyukuk River in the Central Brooks Range of Alaska. Numerous licks, both large and small, dot the landscape in this region, some of which are accessible to snowshoe hares throughout the winter.

The inset map shows the study area within the context of Alaska. Mineral licks accessible to snowshoe hare are distributed in a broad band within the study area.*

Two trail cameras recorded snowshoe hare geophagy (blue dots). One was in lowlands east of Nolan Lake near the border of Gates of the Arctic National Park. The other was on the floodplain/terrace edge of the Hammomd River north of Wiseman.

GPS collar data were obtained from hares captured in the vicinity of Confederate and Union Gulches along the Hammond Road north of Wiseman (purple dots).

Trail Cameras



The Nolan Flats lick is mound about the size of a large beaver lodge, a relic from mining in the area years ago. The surrounding vegetation is largely willow and sedge. Hares visiting this lick can be quite exposed.



The Hammond River lick is a small bank about 60 cm high. Large spruce trees border the bank, with alders edging the floodplain, offering relatively good cover for hares.

GPS Collars



The Confederate Gulch lick is a cutbank along the Hammond Road north of Wiseman. GPS data were obtained from a hare captured near this lick.



The Union Gulch lick lies just beside the Hammod Road north of Wiseman. GPS data were collected from a hare captured near here.

**We'd like to thank Jack Reakoff of Wiseman for sharing his knowledge of the mineral licks located in his "back yard," and providing the locations of most of the dots on this map.*

Methods

Trail Cameras

Bushnell 8MP Trophy Cam HD Hybrid trail cameras** with night vision were positioned at sites suspected to be licks used by snowshoe hares due to evidence of geophagy. Cameras were programed to take 1 photo and 10s video, with a 5s interval between triggers. Photos were examined and tallies made for how many times hares visited the licks each day and whether the visits took place during daylight or darkness.





GPS Collars

Seven snowshoe hares were live-trapped using 26" x 9" x 9" Tomahawk live traps and fitted with ATS G10 UltraLITE GPS Logger collars** that have a 13g GPS added to an 8g VHF transmitter. The collars were programed to collect a data point every 5 minutes. Data were analyzed in R and GPS locations plotted in Google Earth. Of the 4 collars from which date were obtained, we examine 2 in this poster, one from a hare at Union Gulch, and the other from Confederate Gulch.

***Mention of trade names does not constitute endorsement.*

Results: Trail Cameras



Nolan Flats Lick
A total of 718 photos were taken October 4, 2017, to February 15, 2018. Over this $4^{1}/_{2}$ month period, hares visited the lick an average of 1.15 times per day and came only at night. Use appeared to decrease over time however (see table below).





Hammond River Lick This camera recorded 6,504 photos (and videos) from August 18 to September 13 (when the batteries died), and from October 4 to November 27, 2017. Hares visited this lick at all times, day and night. On average, hares visited 6.8 times per day, 66.9% of the time at night. The table below summarizes daily visitation rates by month.

Daily Visitation Rates by Snowshoe Hares to Licks by Month
(as determined by trail camera photos)

Nolan Flats

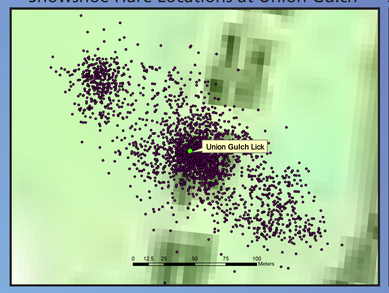
Month	#Visits/Day	% Night
October	2.8	100%
November	1.0	100%
December	1.0	100%
January	0.4	100%
February	0.3	100%

Hammond River

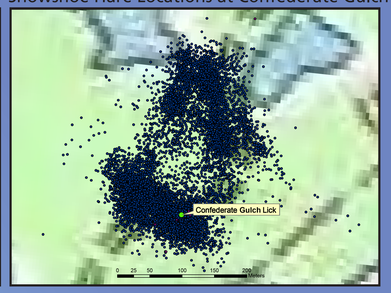
Month	#Visits/Day	% Night
August	5.6	29%
September	9.0	52%
October	9.3	65%
November	3.8	95%

Results: GPS Collars

Snowshoe Hare Locations at Union Gulch



Snowshoe Hare Locations at Confederate Gulch



Visitation to the lick by the individual hare occurred approximately once every 1-2 days.



A snowshoe hare consumes soil at the Union Gulch lick near the Hammond Road north of Wiseman, Alaska.



One snowshoe hare sits at the Confederate Gulch lick bordering the Hammond Road north of Wiseman while another crosses the road.

Discussion & Conclusion

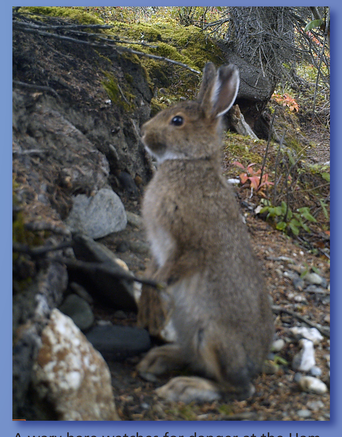
Trail Cameras

» *There may be significant differences in lick use by snowshoe hares depending on the amount of cover available.*

Hares at the Nolan Flats lick did not spend extra time hanging around, and visited only at night. They usually came and were gone within a minute or less, although a couple stayed for over 5 minutes. At the Hammond River lick, while most visits also were under a minute, hares were recorded day and night, and several times hares consumed soil for 10 minutes or more. On occasion, a hare would sit under the camera tree for a half hour or more to rest during the day.

» *There may be seasonal differences in visitation rates to licks.*

This may stem from changing nutritional needs or from the accumulation of snow making visits more difficult or unsafe. Hares at Nolan Flats lick were able to dig out the lick after heavy snowfall.



A wary hare watches for danger at the Hammond River lick.

GPS Collars

» *Individual hares show an affinity to licks within their home ranges.*

» *Individual hares visit licks on a regular basis.*

Several questions are still left unanswered, however. Among them: how far will a hare travel to visit a lick? We hope to answer this and other questions as we continue to study snowshoe hare geophagy in the Brooks Range.



A lynx checks out the Nolan Flats lick.