

ECOLOGICAL AND ENVIRONMENTAL FACTORS INFLUENCING THE USE OF MINERAL LICKS BY STONE'S SHEEP

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Study area: Cassiar Mountains, northwestern British Columbia

PROJECT CONTACTS

Gordon R. Emery, RPBio – Wildlife Biologist, BC Ministry of Water, Land and Resource Stewardship, Smithers, BC, Gordon.emery@gov.bc.ca

C.J. Johnson, PhD, RPBio – Professor, University of Northern British Columbia, johnsoch@unbc.ca

Bill Jex, RPBio, - Wild Sheep Foundation, bjex@wildsheepfoundation.org

STUDY OVERVIEW

This study examined how sheep physiology, mineral availability, and landscape features influence mineral lick use by Stone's sheep using GPS collar data, and statistical modeling.

KEY STUDY TAKEAWAYS

- ~80% of Stone's sheep in the study used known mineral licks.
- Use in our study was driven by nursing status, mineral composition (Mg, Na), and elevation.
- Mineral licks are critical habitat features for Stone's sheep and play an important role in post-parturient nutrition and the growth of lambs.
- Stone's sheep would likely benefit from the identification and protection of mineral licks across their range.
- Understanding seasonal patterns of use and travel corridors to licks can support land-use decisions that minimize negative effects to Stone's sheep.

PROJECT SOURCES

SHEEP PHYSIOLOGICAL VARIABLES

Physiological condition variables included:

Age – determined at the time of capture and adjusted for each year.

Nursing Status – Determined through VIT monitors and Enns et al. (2024) models to determine parturition timing and included the 60-day period post parturition.

NDVI – NASA MODIS satellite measure of greenness. This was calculated from collar locations sheep selected for in the time periods.

MINERAL LICK CONTENT VARIABLES

Mineral samples were collected from inside excavations to limit contamination from feces or urine. We collected 23 samples and had them analyzed at ALS lab in Vancouver for 34 macro and micro elements (mg/Kg).

MINERAL LICK LOCATION VARIABLES

We used elevation (m), Anthropogenic influence ($e^{-\alpha d}$), distance to escape terrain to see if use was affected by mineral lick landscape position.

CONSIDERATIONS FOR FUTURE PROJECTS

- Deploy remote cameras at previously identified mineral lick sites to document visitation rates, group composition, sex/age classes, and time spent at licks.
- Targeted vegetation sampling aligned with Stone's sheep movement data would improve our understanding of seasonal nutrient availability and clarify whether there are specific forage limitations that are influencing mineral lick use.

CAUTIONS AND MANAGEMENT IMPLICATIONS

- Anthropogenic licks in our study may pose unknown health risks to sheep and further investigation at the mine site is required.
- Mineral licks are critical habitat features that support sheep health including ewe and lamb, health, and growth post parturition, therefore, sheep would likely benefit from the identification and protection of mineral licks across their range.
- Because mineral licks may contribute to reproductive success, seasonal timing restrictions that reduce disturbance during peak use (June–July) should be considered a mitigation tool.
- Understanding how Stone's sheep move across the landscape to access mineral licks, including key travel corridors, can help identify areas of risk. This information should then be integrated into land-use planning and decision-making to reduce risk while maintaining access to critical mineral resources.

KEY REFERENCES

G.R. Emery, C.J. Johnson, and B. Jex. 2026. Ecological and physiological factors influencing the use of mineral licks by Stone's sheep (*Ovis dalli stonei*). *Canadian Journal of Zoology*. **104**: 1-12.

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Grace E. Enns, Bill Jex, and Mark S. Boyce. 2024. Stone's sheep (*Ovis dalli stonei*) lambing and nursery habitat selection. *Canadian Journal of Zoology*. **102**(8): 691-707. <https://doi.org/10.1139/cjz-2023-0028>