

## THE DIVII PROJECT: SUPPORTING INFORMATION PACKAGE

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### PROJECT CONTACTS

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**Contact for:**

- Analysis/methods and results
- Applying this methodology to your area/questions of interest
- Tagging protocol & template requests
- R Data frame & code requests

**Steve Andersen**, *Wildlife Biologist*  
Gwich'in Renewable Resources Board  
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**Contact for:**

- Camera array design/co-development with traditional & local knowledge holders
- Data sharing inquiries
- Questions about local management applications (Gwich'in Settlement Area)
- Questions about the divii traditional knowledge study

### KEY PROJECT TAKEAWAYS

1. Cameras **add a tool to the monitoring toolbox** and can supplement data between years of aerial survey. In our case, they do not replace aerial surveying in full.
2. For sampling demography specifically, the aim was to get as many samples as possible. Therefore, design focused on sites with **high known use** by sheep, including both key seasonal neonatal areas & seasonal movement trails. **Different research questions will require different array designs.**
3. Local & traditional knowledge was paramount to successful camera placement. Site selection was informed by multiple knowledge sources & field verification:
  - i. Community workshop: identified key sheep areas/known use areas/ known high-use trails
  - ii. Biologist then looked at terrain features and historic survey data to narrow down camera site selection
  - iii. Field reconnaissance / verification of these potential sites was done collaboratively with biologist & community members. Access for camera maintenance was a major consideration as well: cameras needed to be accessible to service in the winter via snowmobiles, and community members played a large role in this work.

- iv. Cameras installed; first year was a “pilot” to make sure cameras were in a good location/position. Data collection started in earnest in 2019 after adjustments were made.
- 4. Tagging & data management is the most time-consuming element of the project.
  - Use of MegaDetector AI in the tagging process resulted in an average **efficiency gain of approximately 50-60%**, mainly by eliminating unnecessary review of empty photos.
  - When only tagging sheep demography and nothing for other species, I am tagging at a rate of approximately **4,500 photos/hour**. This rate is very site-dependant and can also fluctuate greatly depending on how many sheep detections you are getting.
  - Our array produces about **100,000 photos/year = 20 to 40 hours of tagging**

#### Benefits of monitoring with cameras

- “Eyes on the land” approach to monitoring
- More population information than single-day snapshot, like an aerial survey
- Can compliment & supplement aerial surveying data, especially for populations that are infrequently surveyed
- Gets community out on the land; great opportunity for collaboration

#### Cautions

- Divii project design does not produce a population estimate
- Time-intensive for data management/analysis (though AI is streamlining this significantly)
- Depending on your monitoring goals, this method is not necessarily a replacement for an aerial survey program

### IMPORTANT RESOURCES

**Thesis (Goward, 2024):** The best resource for the divii project (publication currently under review), including detailed methodology & results: [Using remote camera traps to monitor population demographics and community ecology of Dall's sheep 2024](#)

**Tagging template:** The Timelapse template can be made available upon request. Customization per your study questions will be important. Contact Sydney for more information.

**Tagging protocol:** Available upon request. Contains standardized step-by-step guidance on how to use the tagging template, and how to consistently apply sheep classification methods when tagging.

# THE DIVII PROJECT

This research project is part of the Divii Community-Based Monitoring Project. We have been using wildlife cameras to monitor divii (Dall's sheep) in the Black Mountain (Chigwaazraii) area. The research will help inform future management decisions.



## Why use cameras?

- community involvement
- 24/7 data collection, rather than a one-day snap-shot survey
- collects data on all animals, not just divii
- less disturbance to wildlife than helicopter surveys


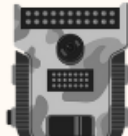

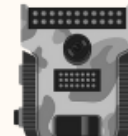

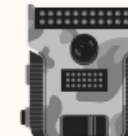







## Research Question #1: How is the herd doing? Can we tell with cameras?

By counting the number of lambs per ewes and rams per ewes, we can estimate if the herd size is stable, declining, or increasing. This is the first time cameras have been used instead of helicopter surveys to get this data, ever!

## Results

The cameras did a great job! Both cameras and helicopters found similar population trends across the 3 years.

	 	 	 
	2019	2020	2021
 ram: nursery	✗	✓	✓
 lamb: nursery	✓	✓	✓
population trend	 increasing/stable	 declining	 stable

Thank you to our project partners and all community member participants!

GTC, ERRC, NRRC, TRRC, GGRRC, GNWT, Yukon Government, Polar Knowledge Canada

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## Research Question #2: How are grizzly bears and divii interacting on the land?

We looked at photos of sheep and bears, and the time and date they were taken to ask if bears are following sheep, and if sheep are avoiding bears. Animals sometimes use the land at different times in the day, as one way of avoiding each other.

## Results



- Grizzly bears more closely track nursery groups (ewes & lambs) than rams, especially early in the spring when lambs are most vulnerable to predators
- Nursery groups avoid grizzly bears all summer



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