Monitoring Calving Locations Of Southern Mountain Caribou In Response To Landscape Change

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Objectives

Caribou are highly sensitive to human activities and this has been identified as a major cause of caribou decline. Because caribou commonly display fidelity to home ranges and calving locations[1], habitat disturbance in these areas could create ecological traps[2]. Survival and reproductive success could also decline if females reduce calving site fidelity and calve in areas where they are less familiar with food distribution, escape cover, and predation risk[2].

Consequently, the goal of this study is to understand the effects of anthropogenic disturbance and changing landscape conditions on calving locations of southern mountain caribou in west central Alberta.

Do caribou display fidelity to a physical location or to certain habitat conditions following landscape change?

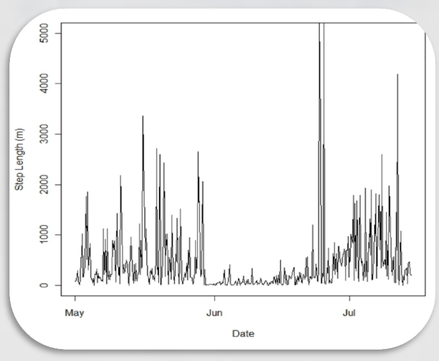
Methods

Study Area

Our study area includes the range of two southern mountain populations of woodland caribou: Narraway (NAR) and Redrock Prairie Creek (RPC) (Figure 1).

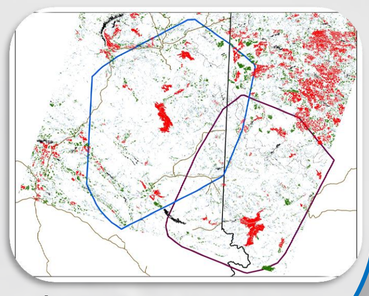
Identify Calving Locations

We used telemetry data of adult female caribou from 1998 to 2013 restricted to a 4-hr sampling schedule from May 1st and July 14th. We used the individual based modelling (IBM) approach developed by DeMars et al.[3] that evaluates competing hypotheses of parturition status based on a sudden and marked reduction of normal female movement rates.



Site Fidelity & Landscape Change

We calculated the distance between successive calving locations to estimate calving site fidelity. Next, we calculated the proportion of 4 disturbance types and 14 landcover types within a 100-m and 500-m radius of each calving site to detect changes in habitat condition between sites.



Preliminary Results

We identified the calving status of 31 NAR females (45 events) and 29 RPC females (43 events). There were 34 (75.6%) calving events and 11 (2.4%) non-calving events within the NAR herd compared to 26 (60.5%) calving events and 17 (39.5%) non-calving events within the RPC herd. All the NAR calving sites and half of the RPC calving sites were predicted to occur in British Columbia (Figure 1).

The calving season for both NAR and RPC averaged across all years was May 21 to June 14, with June 1 as the peak calving date.

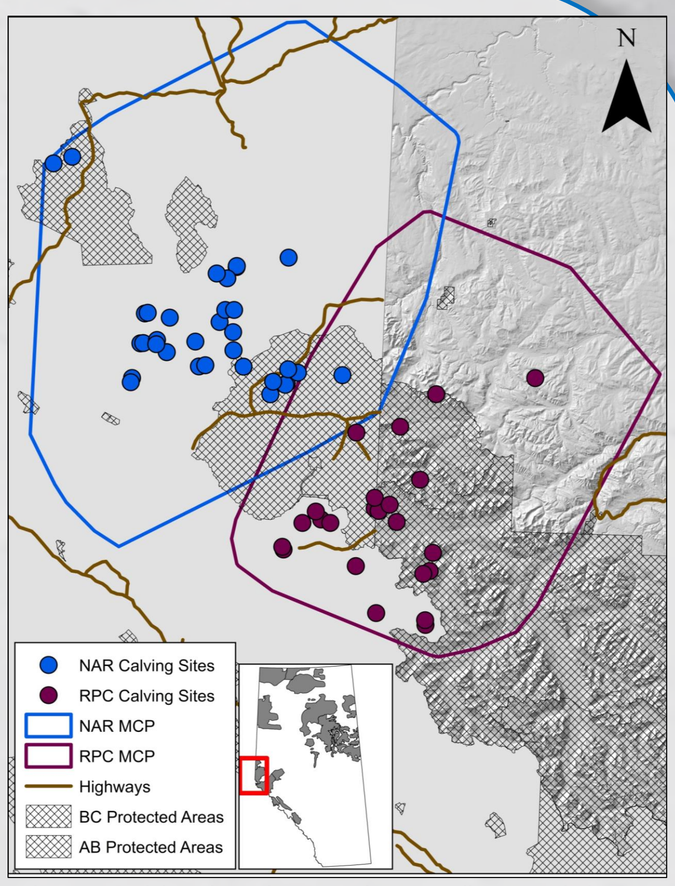


Figure 1. Calving sites of NAR and RPC caribou populations.

Distance between calving sites was calculated for females with successive calving events (NAR n=12; RPC n=5) (Table 1). NAR females showed stronger fidelity to calving sites (average distance 2.6 km) than RPC females (average distance 19.1 km).

Conversely, exploratory analysis of habitat conditions suggests an increasing preference of alpine habitat by RPC females (Figure 2b). Overall, caribou appear to avoid calving near anthropogenic disturbance (Figure 2a,b). Further analysis is required to confirm these observations.

Table 1. Distance between calving sites.

Herd	AID	Year 1	Year 2	Distance (km)
NAR	F708	2002	2003	1.11
	F713	2002	2003	0.25
	F721	2006	2007	0.70
	F738	2006	2007	0.72
	F740	2006	2007	0.05
	F742	2006	2007	1.07
	F757	2008	2009	4.94
	F759	2008	2009	2.89
	F761	2008	2009	3.12
	F774	2011	2012	3.34
	F776	2011	2012	10.79
	F777	2011	2012	2.55
RPC	F355	2002	2003	11.02
	F369	2004	2005	12.23
	F385	2006	2007	4.10
	F409	2008	2009	18.17
	F410	2008	2009	49.86

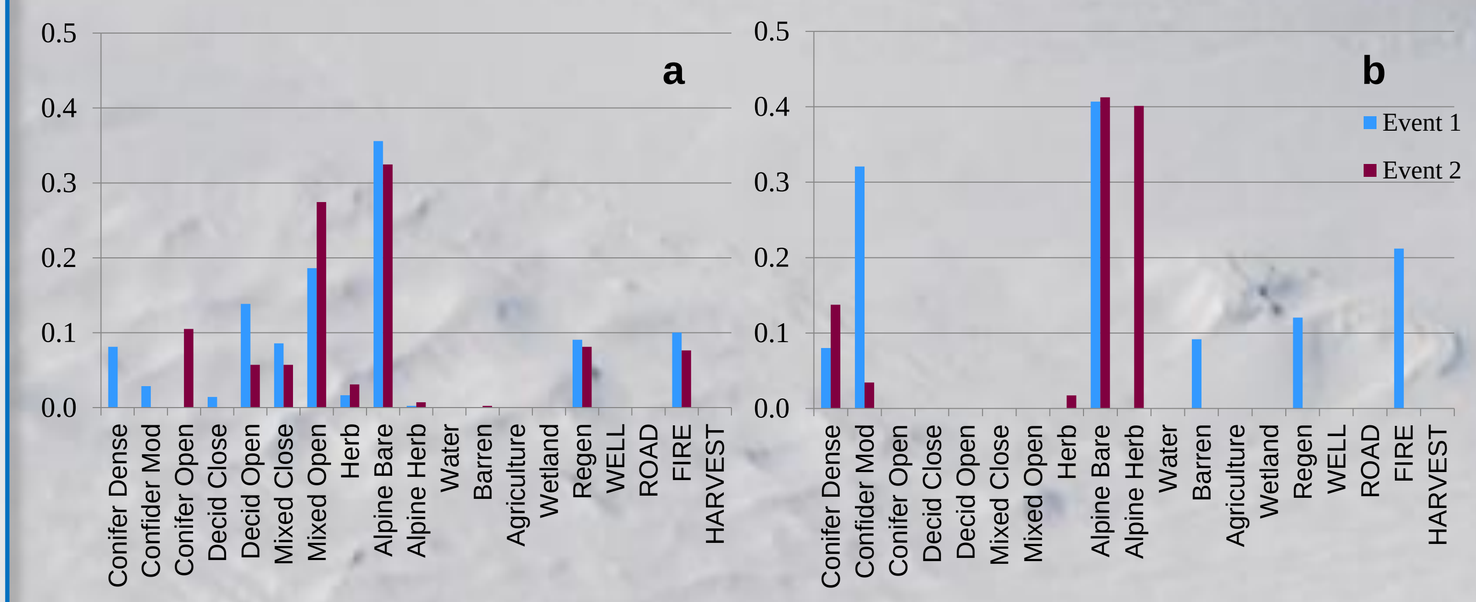


Figure 2. Average proportion of landcover type and anthropogenic disturbance within 100-m of successive calving sites for NAR (a) and RPC (b) caribou populations.

Future Work

Preliminary results suggest that the NAR population demonstrates greater fidelity to calving sites whereas the RPC population may have greater fidelity to alpine habitats. Further analysis, however, is required to investigate calving site fidelity in relation to annual landscape change. The results of this research will increase our knowledge of functional caribou habitat and the impacts of anthropogenic disturbance and could be used to guide current and future forest management and restoration practices across caribou range.

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Literature Cited

1. e.g. Rettie & Messier 2001; Schaefer et al. 2002; Wittmer et al. 2006
2. Faille et al. 2010
3. DeMars et al. 2013

Acknowledgments

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