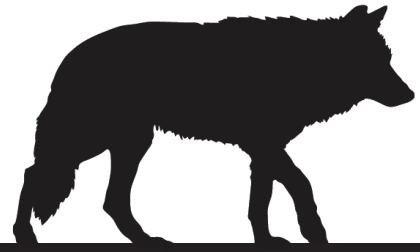


Nowhere to hide: linear features invite predators into caribou calving grounds



Predators and prey have adapted over millenia to use their landscape to their advantage. The long-term stability of predator-prey systems relies on the availability and effectiveness of refugia - places where prey can avoid their predators and find temporary safety¹. Alterations to the landscape may compromise the effectiveness of prey refugia, with consequences to populations of rare or threatened species^{2,3}.

Within boreal forests, threatened woodland caribou have traditionally used peatlands as refugia to avoid predators, such as wolves and bears. However, linear features such as seismic lines and roads may be compromising this strategy by altering the spatial behaviour of caribou and their predators.

This study

To find out whether linear features are compromising caribou refugia, we collected data on caribou and their predators during the calving season. We studied six boreal caribou ranges in British Columbia with an average linear feature density of 4.04 km/km². Fifty-six female caribou, 23 wolves, and 19 black bears were tracked with GPS collars. We then examined their response to linear features at two spatial scales. At the fine scale, we assessed how linear features influenced each species' habitat selection between successive GPS locations. At the large scale, we assessed how each species responded to variation in linear feature density within their home ranges.

Our findings

Female caribou with calves tended to avoid linear features but could not avoid them completely because of the extensive network of linear features within their ranges. Female response toward linear features also had potential demographic effects as females that used linear features more, also had higher probability of calf mortality.

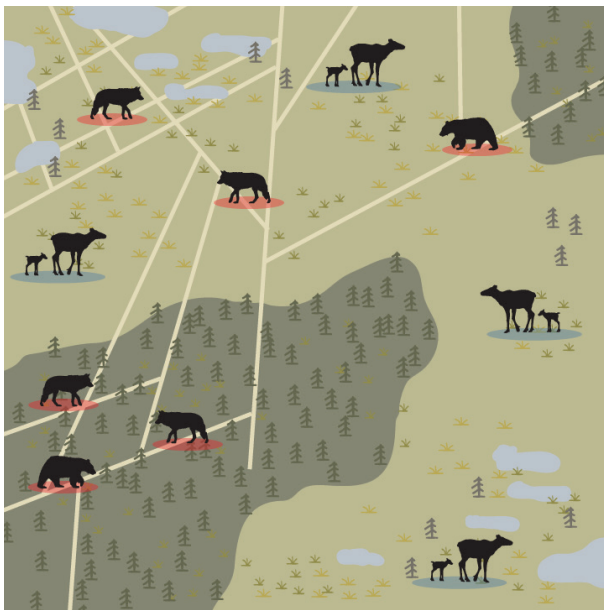


Fig 1. At the fine scale, female caribou generally avoided linear features. Wolves selected strongly for linear features in peatlands and avoided peatlands that lacked linear features. Bears showed a similar, though less strong, effect.

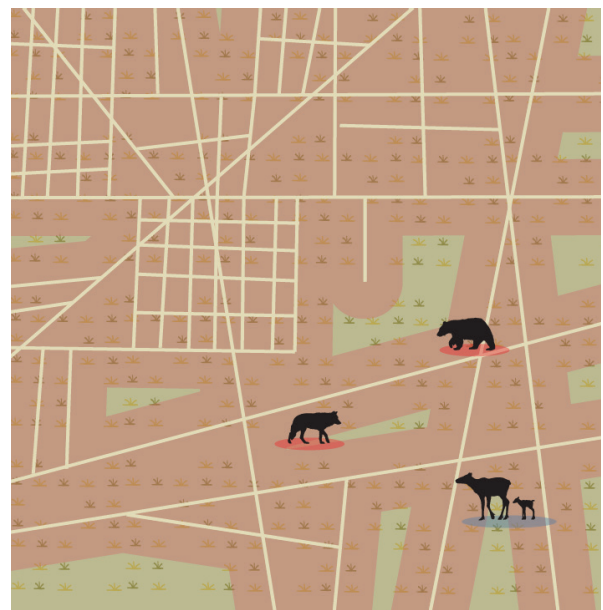


Fig 2. At the large scale, female caribou generally selected areas with lower linear feature density, but completely avoiding exposure was not possible. Wolves and bears showed weak avoidance for higher linear feature density in peatlands, possibly due to predators only requiring a few lines to effectively search an area or because of ongoing human activity.

So what?

By increasing the spatial overlap between predators and woodland caribou, linear features reduced the effectiveness of peatlands as a refugia for woodland caribou. Mitigation efforts should focus on limiting or restoring linear features that lead into and occur within peatlands.

We found that not only did predators select linear features in all landcover types, but linear features facilitated movement into and out of peatlands, which are traditionally refugia for caribou. Prey can sometimes cope with changing predation risk by altering their behaviour, and female caribou appeared to demonstrate some flexibility in their habitat use by avoiding linear features during calving. However, the extensive nature of linear feature development in peatlands meant caribou could not escape them completely. For now, linear features appear to have provided predators a leg-up over their prey.

Woodland caribou recovery is a shared responsibility of all energy sector operators. Recovery will require a collaborative, range-wide approach, involving multiple management actions. The Chair will work to continue to define recovery and develop alternative criteria for restoration.

Project supporters

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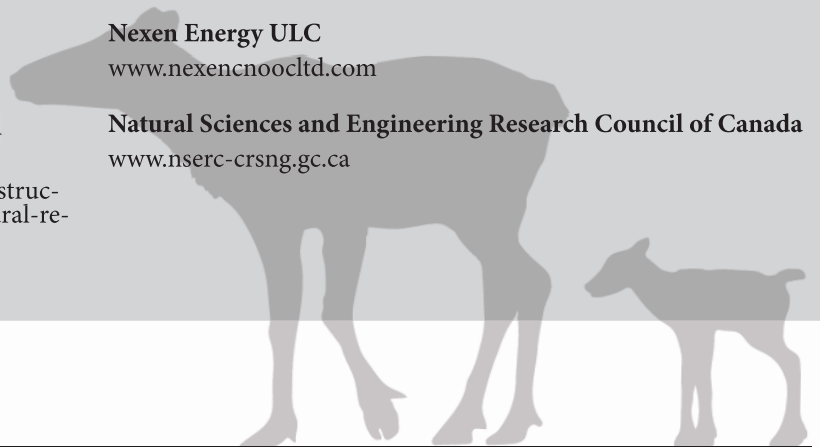
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Natural Sciences and Engineering Research Council of Canada
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