Moose refugia from predation by wolves near mines in the Athabasca oil sands

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Areas near human disturbance may become prey refugia when predators avoid human activities more than their prey leading to decreased predation rates and/or increased prey population growth. Alberta's Athabasca oil sands region (AOSR) is home to moose (*Alces alces*) and wolf (*Canis lupus*) populations and is characterized by extensive human disturbance including open pit mines, tailings ponds and industrial facilities. We examined the extent to which moose could be released from predation near Alberta's Athabasca oil sands due to wolf avoidance of mining infrastructure. Using moose and wolves GPS telemetry, we compared the use of natural habitats and distance to mining features to the availability of these variables. We split mining features into high human-use facilities and low human-use pit mines and tailings ponds. We binned distance to mining features variables into distance buffers covering the range of moose home range diameters resulting in buffers of < 2.5 km, 2.5-5 km and 5-10 km. Moose models included an interaction between distance to mining features buffers and the distribution of wolves to assess whether moose exposure to wolves varies with proximity to human activity. We compared a habitat model including forest cover type, streams and rivers to a disturbance model using AIC. The model fitting habitat and distance to facilities was top-ranked for both species. Moose selection for areas near facilities was higher than wolves. Wolves avoided areas within 10 and 5 km of facilities but exhibited an equivocal response within 2.5 km. Moose exposure to wolves increased with distance to mines indicating that use of areas in proximity to human disturbance releases moose from predation by wolves. Human induced prey refugia could increase moose population growth and increase human-moose conflict. Additionally, moose dispersal out of the refuge areas could produce subsequent increases in the wolf population.

Biographical Notes:
Eric Neilson's research focuses on changes to species interactions in the context of human disturbance. He completed his MSc at Oxford Brookes University in 2010 where he investigated pileated gibbons (*Hylobates pileatus*) in Cambodia, where deforestation, hunting and industrial development are continually changing the forest landscape. He began a PhD in Dr. Stan Boutin's lab in the fall of 2013 for which he is using an extensive spatial dataset to examine wolf (*Canis lupus*)-moose (*Alces alces*) interactions in the Athabasca oil sands. In particular, he is testing alternative hypotheses describing variable responses of wolves to mining features to identify changes to wolf hunting strategies and the possibility of prey refugia for moose.