

# Moose and Predator Numerical Response to Anthropogenic Features

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Landscape disturbance is typically synonymous with habitat loss and fragmentation, and subsequent biodiversity loss. However, the effects of landscape disturbance vary among species and disturbance types; multiple disturbances also act synergistically, resulting in cumulative effects of different resource sectors on species. In Canada's oil sands, petroleum extraction interacts with logging and road-building to create an extensively disturbed landscape. This anthropogenic disturbance is implicated in woodland caribou declines, mediated by predators and apparent competitors; however, the specific responses of different species to the changing landscape are poorly known. We investigated the numerical response of moose, wolves, bears, and other species, to natural and anthropogenic features within Alberta's northeast boreal forest. We used three years of camera data collected using a systematic stratified design in ca. 3000 km<sup>2</sup> study area near Winefred and Christina Lakes, Alberta. We modelled the number of months of species occurrence as an index of abundance, against natural

and anthropogenic features using an information-theoretic approach. For every species, anthropogenic features were a key component of the best-supported model, indicating their importance in shaping species distribution. Some species were positively, and others negatively, associated with landscape disturbance, and anthropogenic and natural features had similar effect sizes on species abundance. Increasing landscape fragmentation and permeability are likely changing wildlife community dynamics in the oil sands, favoring generalist predators and browsers, and possibly altering ecosystem processes. A reclamation program that targets only seismic lines but ignores the effects of forest harvesting, road infrastructure, and other petroleum extraction features is unlikely to be effective at mediating those mechanisms of woodland caribou declines that involve moose, deer, and predators. We therefore recommend a more integrated approach to mitigating the impacts of anthropogenic disturbance on wildlife in Alberta's oil sands.

### **Policy Area**

Biodiversity; Species conservation; boreal caribou

### **Knowledge Gap**

predator and prey use of anthropogenic features associated with oil and gas developments

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