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Wildlife Forage and Composition Cover on Pipeline Corridors in Alberta: Implications for wildlife conservation

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The energy industry in Alberta has transformed boreal forest landscapes through construction of pipelines, roads, and seismic lines. In particular, pipeline construction and maintenance modifies site hydrology, availability of sunlight, and historically involved re-seeding sites with non-native grasses. These widespread local disturbances may affect boreal vegetation communities, which has important consequences for wildlife species such as woodland caribou and grizzly bears.

Objectives

We examined vegetation differences between pipelines and surrounding forests, including forage species used by ungulates (caribou and moose) and bears. We predicted that shade-intolerant and disturbance-tolerant species (tall shrubs, graminoids, forbs) would dominate on pipelines ('online'), while shade-tolerant and disturbance-intolerant species (low shrubs, lichens, bryophytes) would dominate in surrounding forest ('offline').

Methods

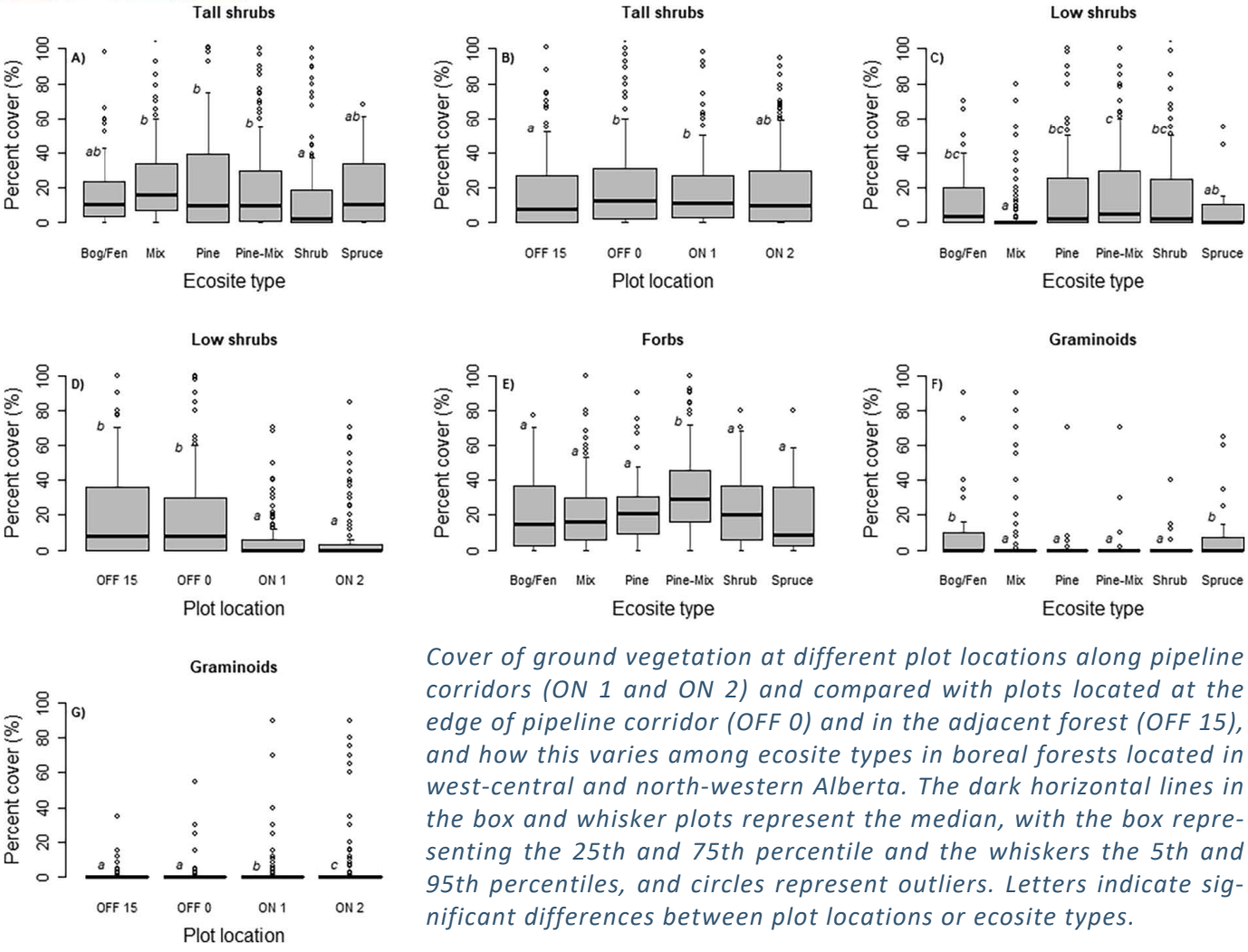
In the summers of 2014-2015, we sampled 150 inactive pipeline sites in north-western and west-central Alberta. At each site, we measured vegetation cover and type at 4 subplots: two online, one offline, and one at the forest edge. We then categorized sites into six forest types: bog/fen, pine, mixedwood, pine mixedwood, shrubby, and white spruce. We compared vegetation type both among plots and across forest types, as well as looked for overall differences in vegetation communities and species indicative of forest type and plot location.

Results

Relative to surrounding forest and forest edges, pipelines had lower cover of total vegetation, low shrubs, lichens, and bryophytes. With the exception of total vegetation cover, this was true both when considering all vegetation as well as targeting species identified as bear and ungulate forage species. Conversely, total graminoid and targeted graminoid cover was higher on pipelines, while targeted tall shrubs were higher on forest edges relative to surrounding forest but not relative to online. When comparing the overall vegetation communities online and offline, there were clear differences in composition. Numerous important forage species were indicative of offline vegetation communities, while only sedges were indicative of online communities.

Conclusions

Pipeline construction and subsequent reclamation efforts have significantly altered vegetation communities in the boreal forest, resulting in more uniform vegetation at disturbed sites across different forest types. These changes may have important seasonal consequences for bear and caribou forage, as well as make pipeline corridors more attractive as movement corridors for predators. One promising solution to this persistent disturbance is functional



Cover of ground vegetation at different plot locations along pipeline corridors (ON 1 and ON 2) and compared with plots located at the edge of pipeline corridor (OFF 0) and in the adjacent forest (OFF 15), and how this varies among ecosite types in boreal forests located in west-central and north-western Alberta. The dark horizontal lines in the box and whisker plots represent the median, with the box representing the 25th and 75th percentile and the whiskers the 5th and 95th percentiles, and circles represent outliers. Letters indicate significant differences between plot locations or ecosite types.

restoration of pipelines through the re-establishment of vegetation communities in the surrounding forest. This would promote the regeneration of natural boreal understory plant diversity as well as move towards removing the linear feature footprint left by pipelines on the boreal forest landscape.

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