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Effects of *Eriophorum vaginatum* on N_2O emissions at a restored peatland

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Restoration of peatlands extracted for horticultural peat production includes both deliberate and accidental introduction of a wide range of plant species, including vascular plants and bryophytes. The roots of vascular plants provide a channel for the movement of greenhouse gases (GHG) including N_2O in many soil ecosystems, and may stimulate production of N_2O or have other effects via the release of root exudates that are then taken up by soil microorganisms such as heterotrophic denitrifiers.

Here we carried out a field study in order to evaluate the effects of *Eriophorum vaginatum*, an abundant sedge at the harvested peatland at Seba Beach, Alberta, Canada, (53˚27'17.2"N 114˚52'52.0"W) where restoration efforts began in late 2012, and is the dominant ground cover in some areas. We hypothesized that *E. vaginatum* would increase net N_2O production from peat compared to areas of bare peat or moss.

We measured net GHG exchange for CO_2, CH_4, and N_2O over one growing season (May-September 2015) using static chambers within this peatland to compare between plots containing *E. vaginatum* and plots lacking vascular plants. Plots were located along a transect of increasing water table, in order to discriminate between the effects of *E. vaginatum* and the prevailing hydrological conditions on N_2O fluxes.

Net fluxes of N_2O from the peat to the atmosphere were observed throughout the experimental area, as well as fluxes in the opposite direction, in which the peat removed N_2O from the atmosphere inside the chamber. Non-zero fluxes were highly variable in both occurrence and magnitude, though a small number of plots accounted for the majority of measured fluxes. Neither aboveground biomass of *E. vaginatum* nor its presence in a plot was correlated with either frequency or direction of N_2O flux measurements. Other factors, such as water table fluctuations and temperature may be stronger drivers of these microbially-mediated processes than vegetation at this stage of the restoration.