RESTORATION OF A SPHAGNUM-DOMINATED PEATLAND IMPACTED BY A MINERAL ROAD BY THE BURIAL UNDER PEAT LAYER METHOD

Kathy Pouliot[1] and Line Rochefort[2]

[1] Peatland Ecology Research Group (PERG) and Centre for Northern Studies (CEN), Université Laval, Québec, Qc, G1V 0A6. [2] Full professor, Researcher and Chairholder of the Industrial Research Chair in Peatland Management, Peatland Ecology Research Group (PERG) and Centre for Northern Studies (CEN), Université Laval, Québec, Qc, G1V 0A6.

Contact: kathy.pouliot.2@ulaval.ca

The electric power transmission lines network spans across the territory of the province of Québec on 34 000 kilometers and some of its sections inevitably go through peatlands. For equipment maintenance, mineral roads sometimes have to be constructed. By introducing alkaline material into the acid peaty substrate, the concentration, ionic form and ratio of nutrients are modified and may lead to a transformation of the composition and diversity of the vegetation and favor the propagation of invasive species. Furthermore, these access roads threaten the ecological integrity of bogs by changing the nature of the substrate, which can affect their hydrological connectivity.

A restoration project has been conducted on two peatlands where access roads built from mineral material were constructed under power lines: at Sainte-Eulalie and Chénéville (in the Centre-du-Québec and Outaouais regions, respectively). We examined if burying mineral material in a bog is an effective method to restore the peatland conditions that were prevailing before the disturbance. The restoration by the “Burial Under Peat Layer Method” (BUPLM) consists in excavating and burying the mineral material *in situ*, beneath the underlying peat material. The surface is then mechanically flattened and revegetated using diaspores from the adjacent untouched peatland. In order to allow comparison, half of the road at the Chénéville site has been restored with this method, and the other half by removing the mineral material and replacing it with horticultural peat. In Sainte-Eulalie, only the BULMP was applied. We hypothesize that the BUPLM is efficient at confining the nutrients introduced by the mineral material underneath the peat layer, at recreating a surface elevation similar to the adjacent areas and at re-establishing typical peatland vegetation.

The water pH and electrical conductivity are convenient proxy analysis to characterize a peatland. Water samples have been collected in transect at different distances from the buried road and at different depths in the peat. We noticed an increase of pH values close to the road (within 15 meters) 1 year after the BULPM method was applied. This was probably due to the soil disturbance during the execution of the method (Fig. 1: Chénéville). 3 years post-BULPM, pH decreased to become similar to references values (natural *in situ* comparison ecosystem and literature) (Fig. 1: Sainte-Eulalie). Concerning the electrical conductivity values, the effect of the buried mineral material is perceptible within the first 5 meters from the road after 1 year (Fig. 1: Chénéville) and is limited to the width of the buried road 3 years post BULPM (Fig.1: Sainte-Eulalie).

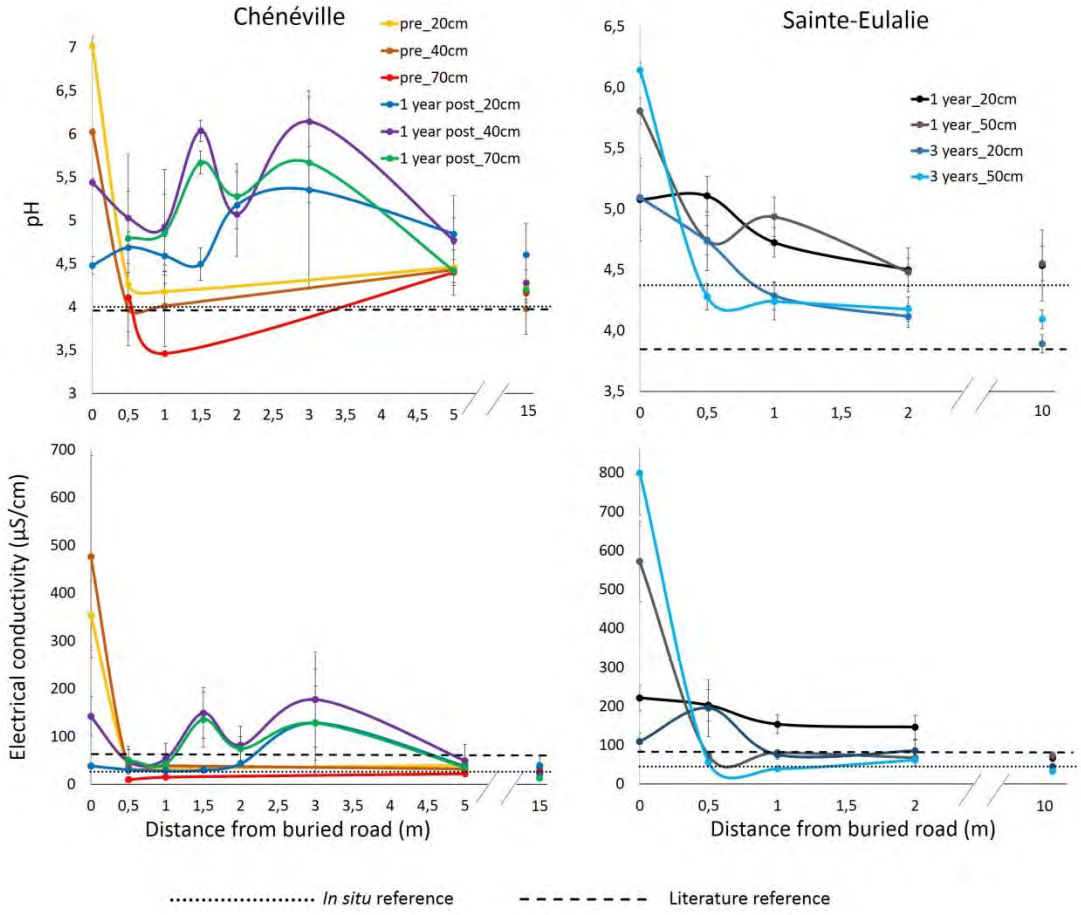

Figure 1 - pH and electrical conductivity values of Chénéville and Sainte-Eulalie.

The plant cover and species surveys conducted in the areas where was the mineral material ,1 to 3 years post-BULPM, and in the reference ecosystem (the adjacent undisturbed right-of-way) showed that transferring donor material is an efficient revegetation technique when the donor site is dominated by typical peatland species. Indeed, Chénéville restored sector presented a mean moss

cover of 33% 1 year post-BULPM and Sainte-Eulalie had a total moss cover of around 5% 3 years post-BULPM. Finally, topography was measured with a laser level on transects on both sites, revealing that 1 year (Chénéville) and 3 years (Sainte-Eulalie) post-BULPM, no significant elevation differences between the restored sectors and the adjacent peatland is perceptible (< 13 cm).

In light of the results obtained with the chemistry, vegetation and topography surveys, we consider that the BULPM is comparable to the conventional method of complete mineral material removal. It is even more economical and causes considerably less circulation on the site to restore. Indeed, applying the BUPLM in peatlands involves no organic material supply, less or no transport of mineral material out of the site and less heavy machinery. These elements can be particularly profitable for restoration in remote areas.

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