Peatland Restoration Quality

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Introduction

Water table depth is an indicator of the health of a peatland. A high water table promotes a healthy peatland, enabling it to act as a net carbon sink. Disturbance through draining and planting forestry alters the hydrology of a site and impacts these gaseous exchanges, making the peatland a net carbon source. The restoration of afforested peatland aims to reverse these negative influences by raising the water table through the removal of forestry and blocking drains and furrows. One aim of my study is to measure water table recovery and therefore peatland restoration quality with regard to three different tree felling and restoration techniques on afforested blanket bog.

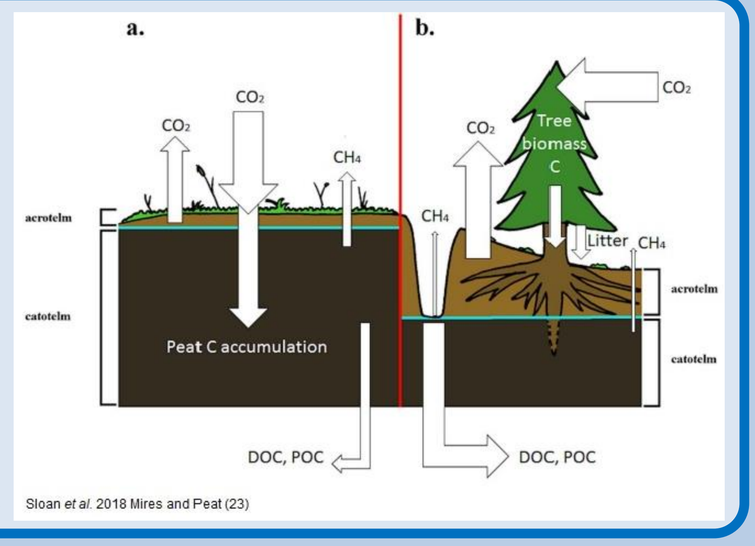

Figure 1. Peatland water table depth affects greenhouse gas flux.

Methods

- The research area was FLS Benmore Forest, near Lairg, Sutherland. Through its land management plan, large areas of afforested commercial conifer plantation are undergoing peatland restoration.
- 3 felling and restoration methods are being investigated (n = 2 sites each):
  - Mulching and ground smoothing.
  - Multiple drifts felled into one and ground smoothing.
  - Conventional harvesting.
- Each site has 5 dipwells installed at random locations.
- Water table depth measurements (to measure water table recovery and therefore peatland restoration quality) are taken every 4 weeks.

Mean water table depth by site

Mean water table depths (on these drained afforested sites) were associated with yield class (growth in m^3/ha/year). Wetter sites produce lower yield class, and the trees will then be mulched or felled as multiple drifts into one. The dryer sites produce higher yield classes and a larger crop, so will be conventionally felled.

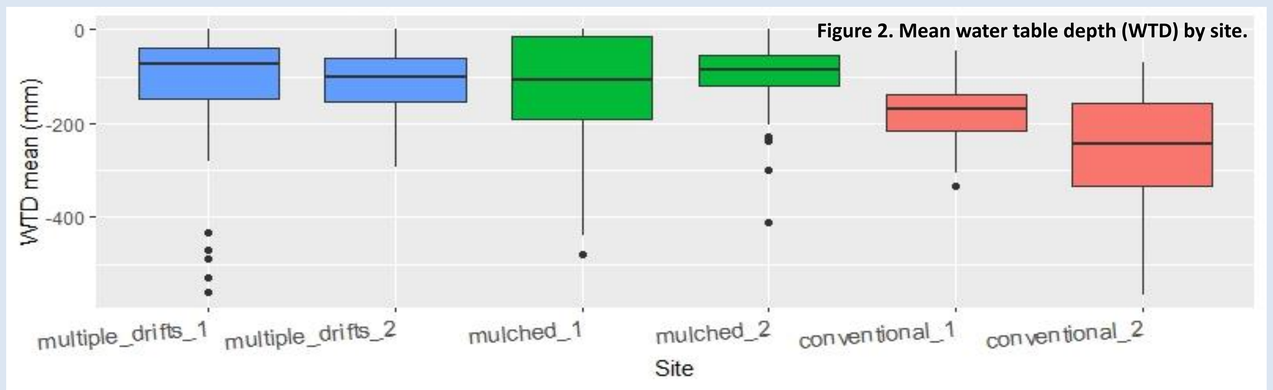

Figure 2. Mean water table depth (WTD) by site.

Water table response to rain

The water table is showing a clear seasonality, so deeper in the summer months and shallower in the wetter, winter months. The sites with a higher mean water table depth do not show large variations in depths – having a more stable water table. All sites responded with a significant drop in water table during a drought period in June 2023, particularly the drier conventional sites. This has implications for water quality as more nutrients are released when the peat dries out. The site 'multiple_drifts_1' (top left) has a greater variance in depths, so will be investigated further to understand why.

Figure 3. Rainfall and mean water table depth (WTD) by site.

Dates when felling and restoration works were ongoing. Restoration on the multiple drift sites has been completed. Restoration on the four other sites is due to start autumn 2023.

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