

## Water Table Position Mapping in an Irish Blanket Bog Site Using Vegetation Metrics and Hydrological Monitoring

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Healthy peatlands play a crucial role in maintaining ecosystem services, including biodiversity support, water regulation, and carbon storage. In Ireland, however, peatlands have been extensively degraded due to land drainage, peat extraction, and agricultural land use, resulting in altered hydrological regimes and increased greenhouse gas (GHG) emissions. Despite ongoing national and European efforts to restore peatlands and reduce emissions, a lack of detailed information on peatland drainage conditions remains a significant barrier to effective management.



Figure 1. Drone survey over site



Figure 2. Installed dip well

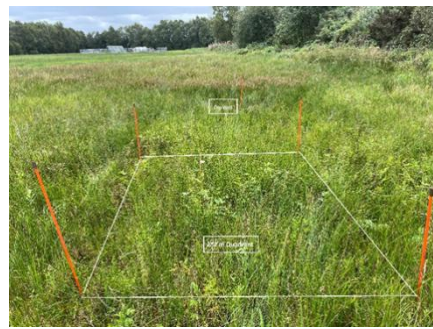


Figure 3. Quadrant vegetation survey

This study aims to enhance the assessment and mapping of peatland drainage status, shallow (mean annual water table depth (WTD) < 30 cm) and deep drainage (mean annual WTD > 30 cm) through the integration of high-resolution drone imagery (Fig.1), vegetation surveys, and hydrological monitoring. Seasonal field-based surveys were conducted to record vegetation composition, peat depth, and drainage features, while hydrological data were collected using dip wells (Fig.2) to monitor water table fluctuations. A scorecard was used to assess the site vegetation and drainage conditions and their relationship with water table position. Also, vegetation changes were observed near the installed dip wells using vegetation quadrant scoring (Fig.3).

The outcome demonstrates a strong correlation between vegetation and hydrological monitoring data for mapping the water table position in the blanket bog site. Spearman's test indicated significant correlations ( $p < 0.05$ ) of WTD with vegetation % cover (moss, shrub, and forb) and peat depth. These initial results suggest that vegetation and other hydrological features can act as a proxy to map the WTD across the blanket bog site due to their strong correlation. As a result, this will propose a cost-effective framework for large-scale peatland drainage assessment, contributing to improved peatland mapping, restoration prioritisation, and climate reporting in Ireland.

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