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Peatland in the Field

Highlands Rewilding shares their story on surveying peatland depth and condition.

Why should we care about peatlands?

Peatlands – characterised by partially decayed plant materials due to their wet, oxygen depleted conditions - cover roughly 20% of Scotland's land area (Scottish Government, 2020). These comprise our greatest carbon store as well as providing a plethora of other ecological and societal benefits. The extent and condition of peatlands indicate habitat availability, peat volume and carbon storage, and importantly, whether these can be improved via management interventions. These factors are critical to meeting Scotland's restoration targets to become nature positive and reach net zero (Scottish Government, 2020; 2024). To help achieve this we need comprehensive data from both in the field and remote sensing techniques.

Figure 1: Peatland at Bunloit Estate.

Where and how to probe?

Picture yourself walking out onto a peatland (e.g. Figure 1). The ground is wet, undulating with tufts of Heather and Purple Moor-grass, and occasional splashes of colour from Sphagnum moss. You need to survey this peatland's depth and condition – where do you start?

Peatland surveys start behind the screen. Areas to survey should be guided by previous habitat surveys, such as from a National Vegetation Classification (NVC) or visual assessments of remote sensing imagery. A survey grid can then be placed over the area-of-interest in a GIS to guide surveyors in the field (e.g. Figure 2). Intersections on the survey grid are then targeted for sampling. In typical peatland surveys grid granularity is determined by survey objectives: grant funding for peatland restoration requires sampling every 100 m (NatureScot, 2021); forestry operations are typically every 50 m (Scottish Forestry, 2021); and sampling can be as fine as every 10 m for infrastructure developments such as windfarms (Scottish Government et al., 2017). During our surveys we sampled at 50 m intervals (e.g. Figure 2) and further refined this to 25 m where geomorphology was more varied. Armed with a map of the survey grid loaded onto an in-field GIS device, a peat probe and soil auger – the survey can now begin.

Figure 2: Example 50 m grid sampling points inside defined peatland area.

Peat depth surveying is simple. An extendable narrow probe is pushed into the peat until reaching either the mineral soil or until you've run out of extension rods. During these surveys we could measure up to 4 m peat depth – easily achievable for a lone-surveyor –, however peat has been known to extend to 9.8 m in Scotland (Payne, 2016). To check you are sampling peat, rather than other soil types, residual peat on the probe can be assessed, or a soil auger is useful, particularly for determining the peatland edge.

How did we survey peatland condition?

We classified peatland condition using a two-tier system. This system was adapted from the best-practice guidance provided by PeatlandACTION. To improve efficiency of data recording in the field, condition classifications were assigned codes. As a minimum,

sample points were categorised as either (1) near-natural, (2) modified, (3) drained or (4) actively eroding (Table 1) to highlight overarching peatland health.

Table 1: Tier one of the peatland condition classification system

Code	Classification	Description
1	Near-natural	Varied topography with hummocks, lawns and/ or pools. High species evenness and rich in Sphagnum species. Areas with few signs of grazing and trampling
2	Modified	Small areas of bare peat and evidence of human activities or disturbances. Poor species evenness and Sphagnum is rare (excluding *Sphagnum fallax*)
3	Drained	Sites with artificial drains or grips within 30 m or re-vegetated hagg systems. Low Sphagnum richness though S. fallax may be abundant
4	Actively eroding	Large areas of bare peat and unvegetated hagg systems present. Rare or absent Sphagnum and evidence of overgrazing or trampling. Presence of Hare's tail cotton grass (*Eriophorum vaginatum)* may indicate early stages of recovery.

Sites can, where appropriate, be further classified using tier two (Table 2) which describes the reason(s) for the peatland condition. For example, whether sites had been planted on, being currently drained, recovering after a period of active erosion, or a combination of factors.

Finally, dominant species of modified or drained peatlands were recorded, again in code form, where > 50 % of vegetation cover was of heather (H), Purple Moor-grass (M), Cottongrass (E), Sphagnum (S), other grasses (G) or combined rushes and sedges (R). Using this scheme, Figure 3 would be assigned 2.5R and 3.1R having been planted on and within 30 m of a drain.

Figure 3: Site with condition scores 2.5 and 3.1, and dominated by rushes

Table 2: Tier two of the peatland condition classification system– sub-divisions

Code	Classification	Description
1.1	Flooded peat	Site under standing water
1.2	Bog	> 25 % Sphagnum or other bog species
1.3	Fen	> 25% fen species
2.1	Over-grazed	
2.2	Burnt	
2.3	Industrial extraction	Bare peat due to mechanical extraction
2.4	Domestic extraction	Cut with linear steps or rigs and furrows
2.5	Planted	Planted with trees
2.6	Invaded	Invaded by scrub and/or tree regeneration
2.7	Felled plantation	Recently felled, often with brash and areas of bare peat
3.1	De-watered	Signs of drainage, vegetation present and Sphagnum poor
3.2	Wet	Drained but still wet
4.1	Ongoing erosion	Areas of bare peat, haggs and/or exposed mineral soils
4.2	Stable/ recovering	Areas where Hare's-tail Cottongrass is colonising bare peat

Review of approach

Applying this system means that lots of informative data can be easily and efficiently recorded in the field. These results can also be simply processed to align with different schemes (e.g. PeatlandACTION grant proposals) and compared to remote sensing data products such as the James Hutton Institute Peatland Condition Mapping, and associated greenhouse gas emission codes (JHI, 2024). More importantly, this allows the collection of vital information for site-specific long-term peatland management and restoration.

References

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