DARTMOOR

Detailed landscape-scale peatland mapping using airborne remote sensing data

- It is estimated that Dartmoor National Park has 158 ±101 km^2 (15800 ha) of peat >0.4 m deep storing 13.1 megatonnes of carbon[1].
- An area of 29 km^2 (2900 ha) or 9.2 % of the peat extent was identified as significantly and directly ecohydrologically degraded by erosional gullies, peat cuttings, drainage ditches and bare peat[2].
- Functionally intact blanket bog covers 3.6 km^2 (360 ha) or 0.8 %, however, it is fragmented and often surrounded by ecohydrologically degraded peat[3].
- The maps produced provide an unparalleled level of detail across the whole of the moorland (444 km^2, 44,400 ha) facilitating effective and targeted restoration planning, management and monitoring.
- An interactive map of the identified features and peat extent is available to view online (**https://maps.dartmoor.gov.uk/peatland.html**).

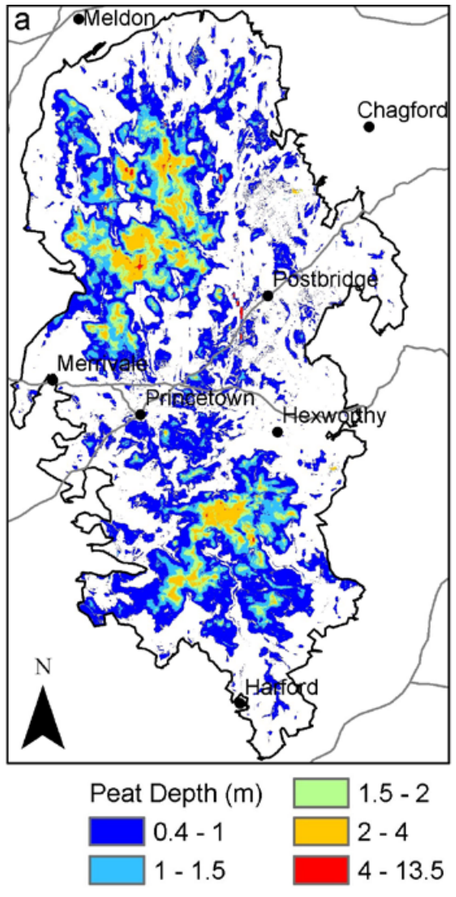

Figure 47 Peat depth (metres) modelled across Dartmoor from airborne radiometric and LiDAR data.

Dartmoor National Park Authority and South West Water commissioned the mapping of Dartmoor's peatlands to provide information about the extent and condition of the peat soil to facilitate effective and targeted restoration planning, management and monitoring.

A novel method was developed using airborne radiometric and LiDAR data to model peat depth and extent at an appropriate resolution (10 m) to facilitate landscape management. This model estimated Dartmoor to have an area of 158 ±101 km^2 (15800 ha) of peat >0.4 m deep (Figure 47) storing 13.1 megatonnes of carbon (8.1–21.9 Mt. C)[1]. Much of this area (60 km^2, 6000 ha) is overlain by grassland which would have been missed if vegetation cover was used to map peat extent.

Additionally, airborne LiDAR and aerial images (Red/Green/Blue spectra and Compact Airborne Spectrographic Imager) were combined (Figure 48) to identify and quantify land surface features contributing to, or as a consequence of peatland degradation including: anthropogenic drainage ditches and peat cuttings; erosional gullies and bare peat areas.

Peat cuttings (Figure 49) were found to cover an area of 26.6 km^2 (2660 ha) concentrated in the four main areas of historic commercial cutting (Rattlebrook Hill, Walkham Head, Blackbrook Head and Brent Moor) with some smaller zones in other more disparate areas of deep peat[2]. Drainage ditches, totalling 427 km in length, were recorded, closely spaced in areas of deep peat and often associated with peat cuttings[2]. Extents of bare/sparsely vegetated and vulnerable peat were found to cover a total area of 0.9 km^2 (90 ha). These areas were found to be predominantly located on flatter/convex parts of the landscape often with erosional gullies arising out of the dendritic complex. In total, erosional gullies were mapped as covering a total of 7.85 km^2 (785 ha). Combining multiple datasets to map these features has significantly increased our understanding of the spatial distribution and connectivity of these features within the landscape.

DEEP PEAT EXTENT AND CONDITION MAPPING

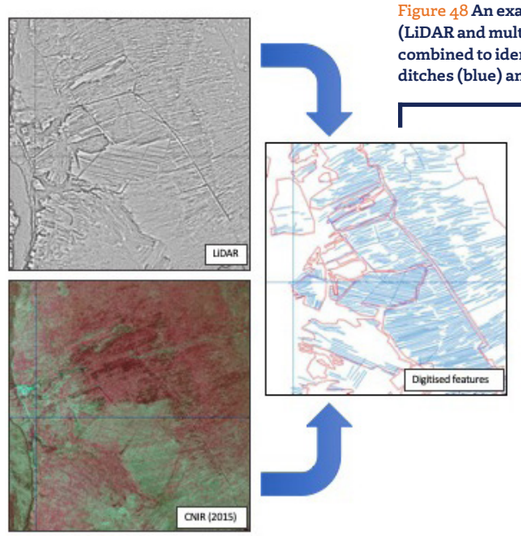

Figure 48 An example of how multiple datasets (LiDAR and multispectral aerial images) were combined to identify anthropogenic drainage ditches (blue) and peat cuttings (red).

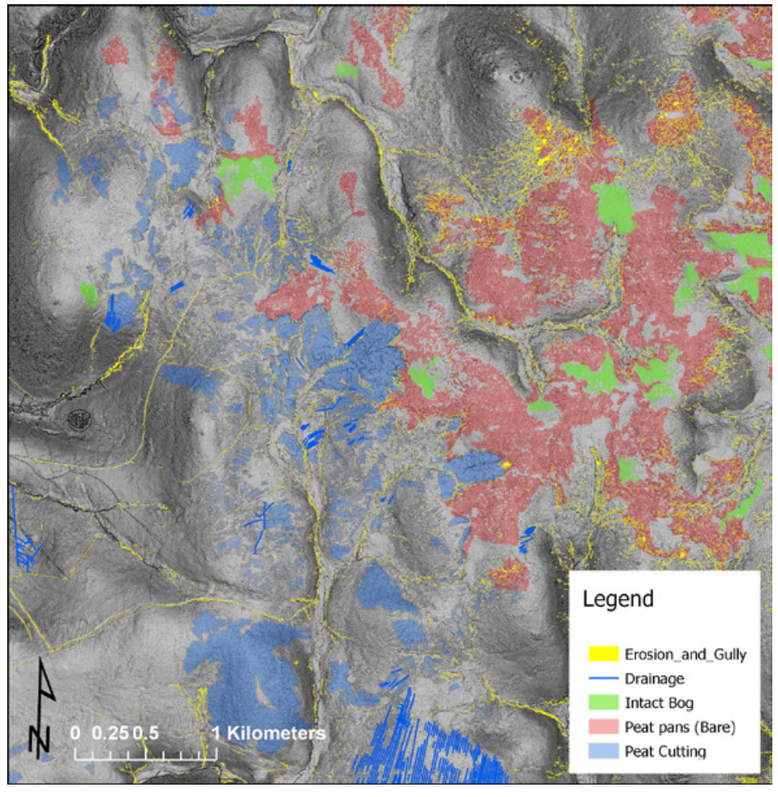

Figure 49 Overview showing the mapped features across the Merrivale Range area on Dartmoor, demonstrating how features relate to each other within the landscape.

The mapped features are known to lower the water table in the adjacent peat and therefore have an effect beyond their bounds. To estimate such effects, modelled zones were applied to the mapped features, dependent on the type of feature and its position in the landscape to estimate the total ecohydrologically degraded area present. It is estimated that 29 km^2 (2900 ha) of the peatland extent is significantly and directly ecohydrologically degraded by drains, peat cuttings, erosional gullies and bare peat[3]. Finally, structural information and aerial imaging were used to identify areas of functionally intact blanket bog covering an area of 3.6 km^2 (360 ha). These areas were shown to be fragmented and often surrounded by ecohydrologically degraded peat[3]. Identifying features (erosional gullies, drains, cuttings and bare peat) that are proximal to these functionally intact bogs has enabled areas to be prioritised for restoration interventions.

REFERENCES

The appendices are available to view at **www.exeter.ac.uk/creww/research/casestudies/miresproject**

1. Gatis, N. *et al.* Mapping upland peat depth using airborne radiometric and LiDAR survey data. *Geoderma* **335**, 78–87 (2019).
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