Developing a peatland management portal for priority upland habitats in the UK

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Rezatec, supported by the European and UK Space Agencies, is developing a **landscape intelligence service** to assist a range of UK-based stakeholders in the more sustainable management of their peatland resource.

The Issues

Water provision

- Decades of extraction, drainage and over-grazing in peatlands have led to a degraded ecosystem (Fig. 1)
- This results in high costs at Water Treatment works to mitigate levels of particulate and dissolved organic matter in water supplies
- Compliance with national/European legislation[1] may also be compromised
- Reduced water holding capacity in upstream catchments may lead to flooding downstream[2]

Fig. 1 [Left] Blocked drain in degraded Northern Irish peatland, generating carbon emissions when the substrate dries. [Right] Relatively intact raised bog in Wales, providing carbon storage services.

Carbon storage

- Ecosystem degradation leads to aerobic decomposition and peat erosion
- In turn causing carbon emissions and preventing carbon sequestration
- In order to gain funds for restoration and more sustainable peatland management through compliance with the UK Peatland Code[3], a cost-effective method of monitoring peatland condition is required

The Solution

Fig. 2 Gathering peat depth measurements in Exmoor National Park, October 2015.

A cost-effective, rapid and repeatable method for mapping peatland integrity

….through combining open-source satellite-derived data sets with strategic ground surveys, and displaying them through an online portal.

Table 1 Key data layers generated and displayed through the bespoke portals (Figs. 3 & 4).

Key Data Product	Layer description	Component layers	Method
Peat Depth	Depth of peat substrate across the area of interest (AOI)	Field data on peat depth (Fig. 2), Shuttle Radar Topography Mission (SRTM)	Peat depth measurements, collected in strategic field locations by Rezatec/the Client/other sources, are combined with EO-derived topographic variables to predict depth across the AOI
Peatland Integrity Index	Assessment of hydrological and floristic conditions that are conducive to peat accumulation	Relative Soil Moisture, Combined Vegetation Indicator, Anthropogenic impact layers*, Woodland, Exposed Soil	Component data layers, inferred to have an impact on peatland condition, are assigned relative thresholds according to influence, then summed to produce a high level indicator
*Drains, Upland Vegetation Management, Peat Cuttings	Density of drainage channels, presence of vegetation burning, mowing and grazing, and peat cutting in 500m^2 grid cells	Optical imagery used for assessments	Semi-automated approach used to assign a density (i.e. 0-3) and presence/absence score to each grid cell according to presence of features in satellite imagery
Water Quality Risk	Depicts the locations likely to negatively influence water quality	Relative Soil Moisture, Flow Accumulation, Drains, Woodland	Component data layers are assigned relative thresholds to indicate favourable versus unfavourable influence on water quality, which are then summed to yield a high level indicator

The Portal

Displayed are the landscape management portals developed with Scottish Water (Fig. 3) and South West Water (Fig. 4), mapping peatland integrity across their water catchments. The characteristics of various data layers and features are demonstrated in Figs. 5 and 6.

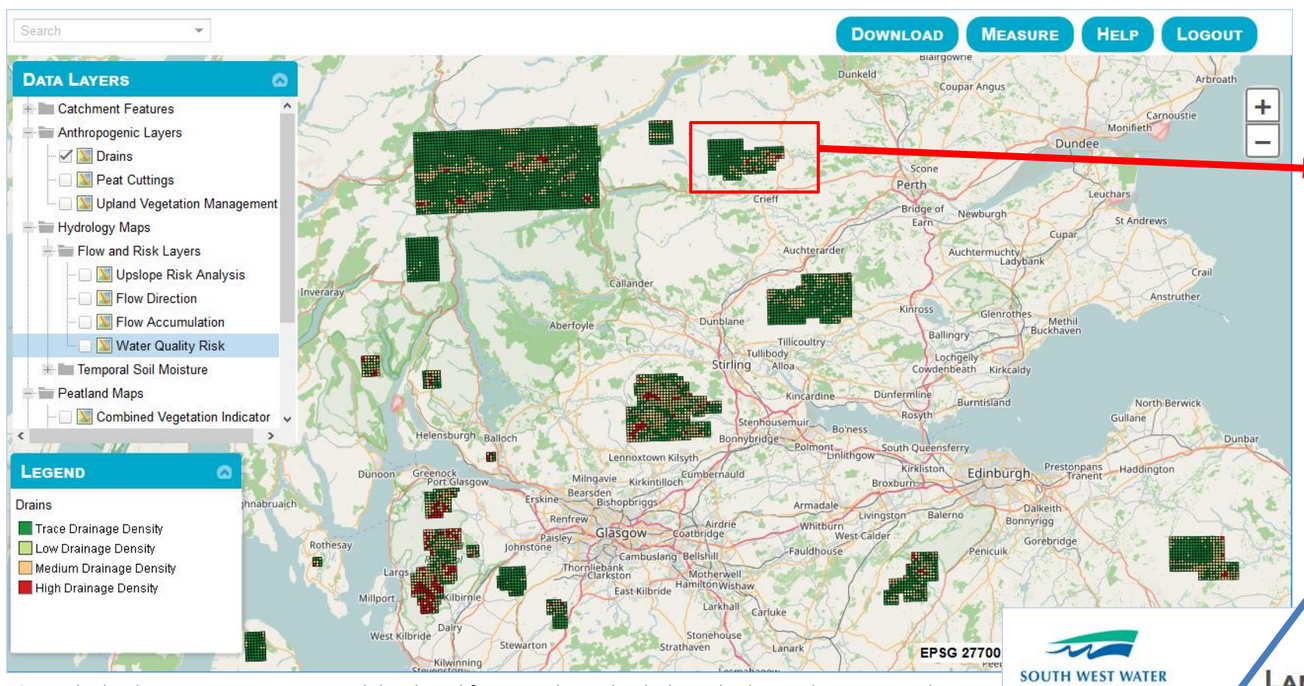

Fig. 3 The landscape management portal developed for Scottish peatlands, here displaying the *Drains* grid as part of the set of data layers contributing to an assessment of peatland integrity and other key features of some of Scottish Water's catchments in southern Scotland.

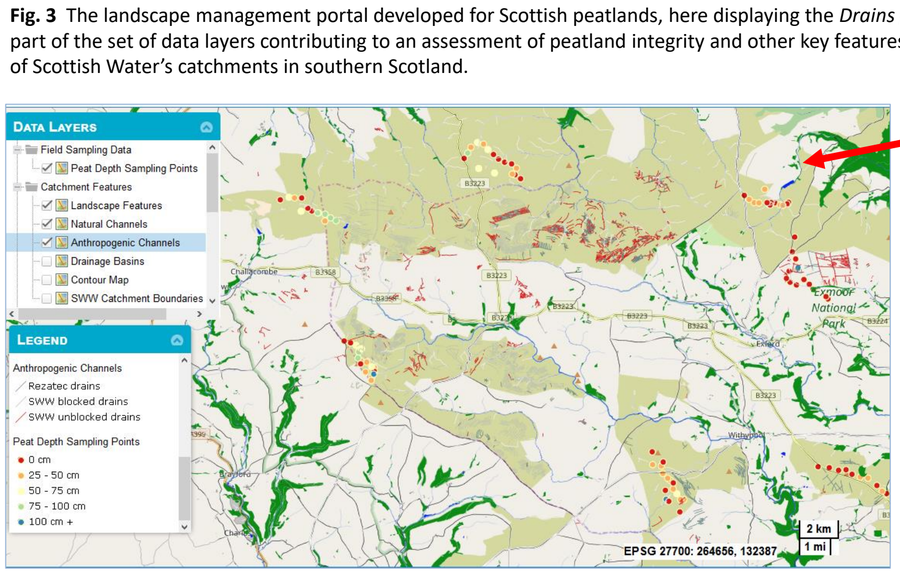

Fig. 6 An example of some of the strategic field data collected across Exmoor National Park (*Peat Depth Sampling Points* represented as coloured circles, indicated in the legend) in order to map peat depth and distribution and abundance of key vegetation indicators, e.g. *Sphagnum* spp.. Additional layers displayed are *Landscape Features* (water, road, urban, forest), *Natural Channels* and *Anthropogenic Channels*.

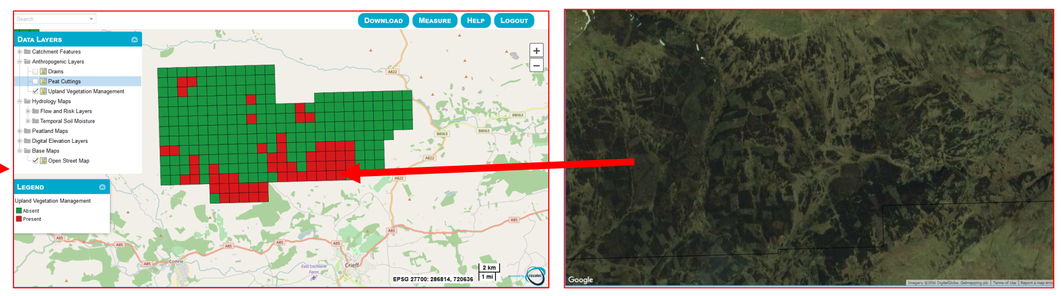

Fig. 5 An example of a catchment with the Upland Vegetation Management layer displayed (one of the suite of Anthropogenic layers) (left), and the underlying vegetation management characteristics that this derived layer represents, as demonstrated via Google Maps for the southeast corner of this catchment (right).

The full set of data layers in the portal is listed here, with the ability to display their metadata & change layer transparency. The *Legend* below provides the key to the characteristics of the layer displayed.

Links to measuring tools, a Portal User Guide and a layer download function (see Fig. 3). Bespoke features can be added as desired by Client.

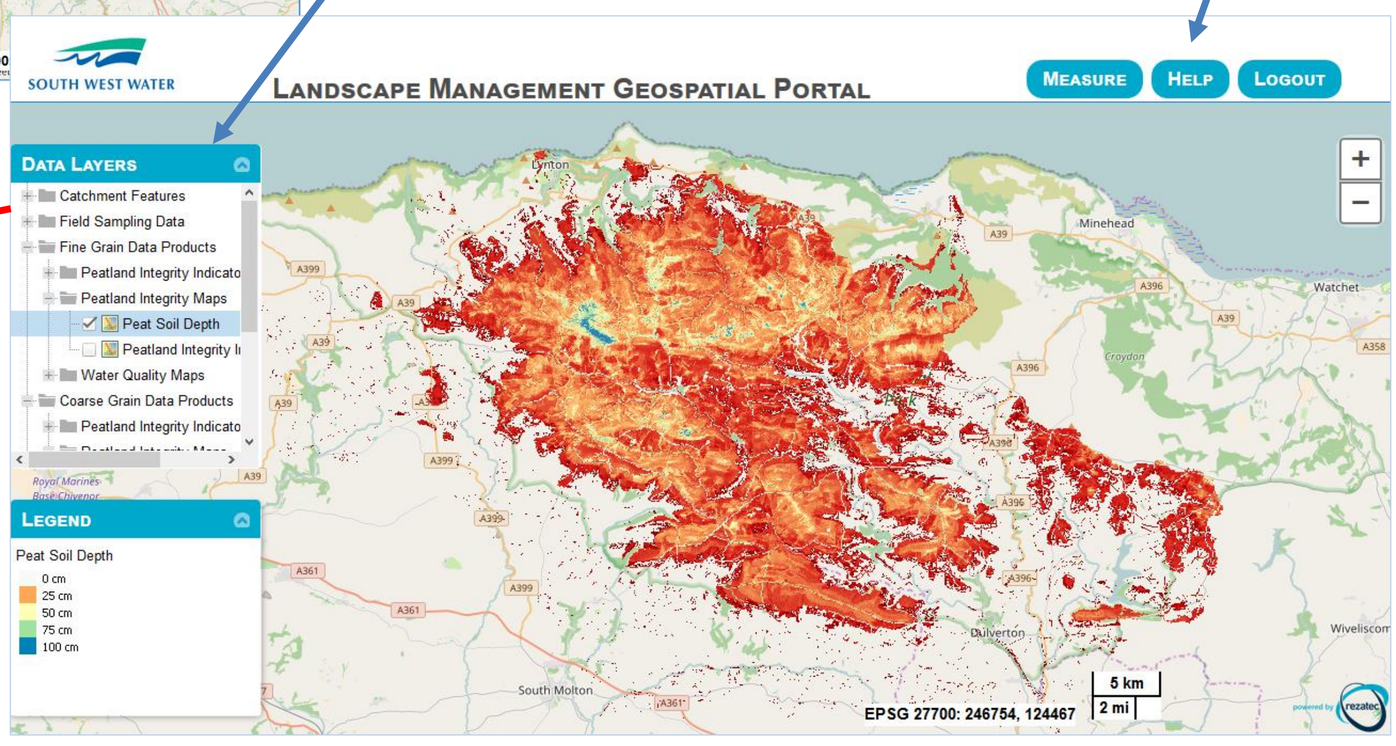

Fig. 4 The landscape management portal developed for Exmoor's upland habitats, here displaying the *Peat Depth* layer as part of the set of data layers contributing to an assessment of peatland integrity and other key features of the peatlands within Exmoor National Park.

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REFERENCES
[1]European Union Water Framework Directive - http://ec.europa.eu/environment/water/water-framework/info/intro_en.htm
[2]http://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/1-10%20Peatland%20Briefings%20-%205th%20November%202014.pdf
[3] Reed, M.S. *et al.* (2013) *Peatland Code Research Project Final Report, Defra, London.* http://www.cbd.int/financial/pes/unitedkingdom-peatland.pdf

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