

Mapping the Jewels in the Crown of Welsh Peatlands, Tales from the Lowland Peatland Survey of Wales

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1. Background

The Lowland Peatland Survey of Wales (LPSW) is a strategic conservation assessment of the Welsh lowland peatland resource based on the characterisation, mapping and evaluation of plant communities. Initiated in 2004 with fieldwork finishing in 2022.

2. Methodology

In the field, NVC (National Vegetation Classification) has been used to map plant communities directly onto orthorectified aerial photographs at the scale of 1:2500. Quadrat records usually 2m x 2m (or in the case of some tall-herb fen or swamp vegetation 4m x 4m) are collected to support the map and provide detailed information on the plant communities and notable species records are recorded as target notes. A series of peat depth measurements using peat probes are collected to help understand the peat body and provide measurements for the new Wales Peat Map, and a series of photographs are taken to characterise the site.

Field maps are digitized in ArcGIS and translated into SSSI or habitat feature maps, which are used to generate vegetation community and feature extents. Maps are accompanied by series of site reports. Figure 1 shows an example of creating a map.

Full methods are given in 'Lowland Peatland Survey of Wales Survey Manual, 2nd Edition', Bosanquet, S., Jones, P., Reed, D., Birch, K., & Turner, A. NRW, (In Prep.)

3. Survey Statistics

300 sites have been surveyed, split between 163 SSSIs (27 also SACs), and 137 non-statutory sites. This is about 70% of known Welsh lowland peatlands, and maps cover area of about 6,413 ha. 5,500 quadrat records have been collected along with about 20,000 photos. Figure 2 shows geographical distribution of sites.

Area (ha)	Number of sites	%
>200	5*	1.6
100-130	2	0.7
50-99.9	21	7
30-49.9	27	9
10-29.9	102	34
5-9.9	60	20
1-4.9	69	23
<1	14	4.7
Total	300	100

* Doesn't include large bog NNRs Cors Caron, Cors Fochno & Welsh parts of Fenn's and Bettisfield Mosses, which only had quadrats of bog communities.

Sites vary enormously in size, from small acidic basin mires of <1 ha such as Salbri on Anglesey, to extensive valley-head systems of >200 ha such as Crymlyn Bog near Swansea, though the majority of sites fall between 1 and 29.9 ha, as shown in Table 1.

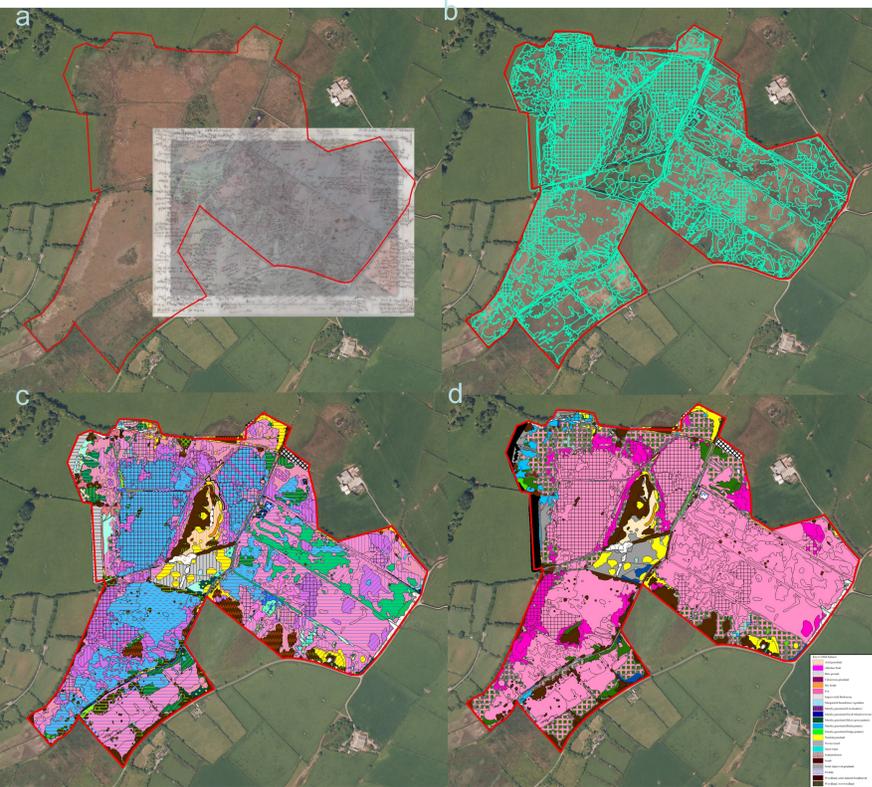


Figure 1. Example of creating a vegetation map of Cors Bodeilio NNR, Anglesey. a) Aerial photograph and field map; b) Digitized field map; c) Coloured NVC map; d) Translation of NVC map to SSSI habitat features.

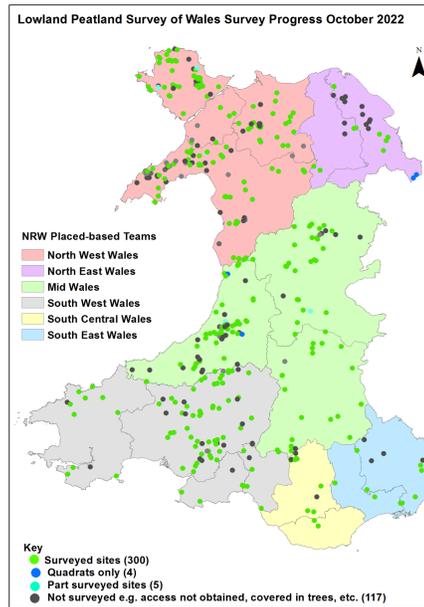


Figure 2. Distribution of LPSW Sites.

Pembrokeshire's peatlands look really poorly covered compared with the rest of West Wales. This is because most of the peatlands of North Pembrokeshire were covered by the Lowland Grassland Survey of Wales that preceded LPSW.

5. Example of practical application of survey data

Survey data offer a sound basis for management planning, monitoring and the practical implementation of management, and was heavily used by the Anglesey and Llŷn Fens LIFE project. For example, Figure 4 shows how the NVC maps were used to identify which kind of pre-grazing mowing management should be undertaken, namely sensitive hand-cutting (areas of alkaline fen with long-established *Schoenus* tussock patterning and micro-gradients related to pH) or more efficient machine harvesting on more robust *Cladium*-dominated calcareous fen.

Management on large peatlands has routinely focused on a few known hotspots, but our comprehensive mapping has revealed previously unknown patches of important habitat that have subsequently been taken into management and saved from dereliction.

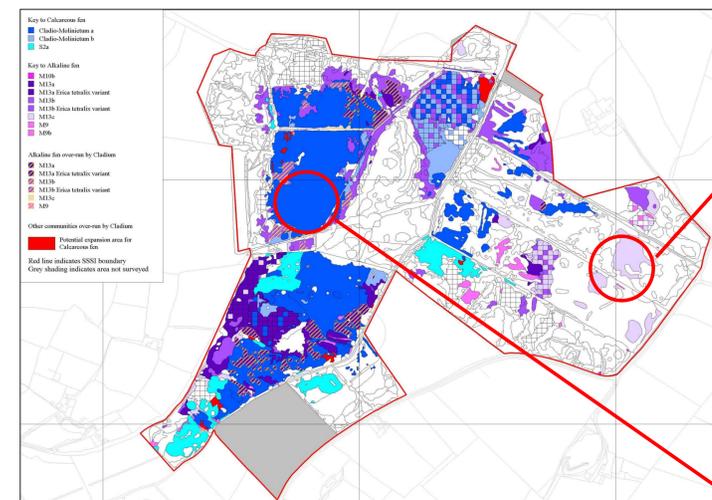


Figure 4. Derivative of the NVC map showing plant community elements of the two designated European (Annex I) Habitats, alkaline fen and calcareous fen with *Cladium mariscus* and species of the *Caricion davallianae*. This information is used to plan restoration work – see images to right and main text.

4. A closer look at the map legend

A fully coloured up Peatland NVC map can initially look like a confusing mix of colours and patterns, but with a little time and understanding of NVC, it becomes possible to pick out the important features such as the calcareous and alkaline fen. Other useful categories can include other Annex 1 features, degraded Annex 1 features and scrub. These groupings can be used to inform management and monitoring.

Figure 3 highlights some of the important communities on the legend for the Cors Bodeilio NVC map shown in figure 2c.

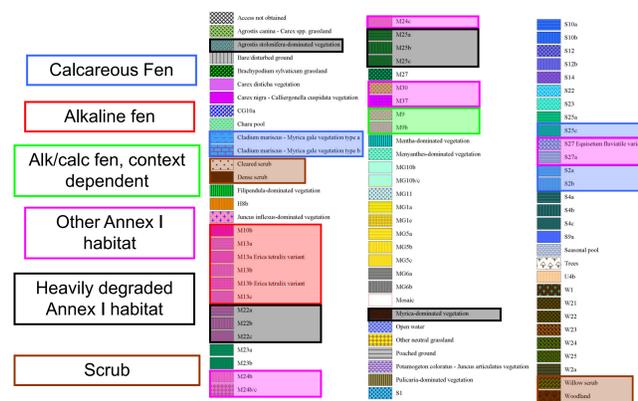


Figure 3. Cors Bodeilio NVC map legend.



Hand cutting (strimming) and raking of sensitive M13 alkaline fen with *Schoenus* tussocks.



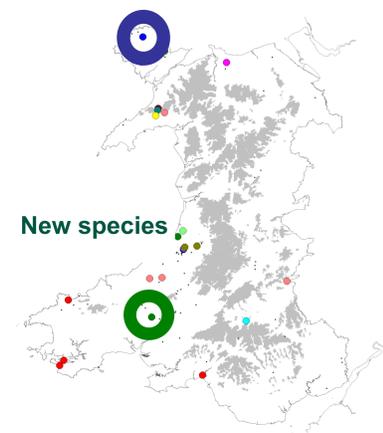
Machine cutting and harvesting of derelict calcareous fen using the LIFE project wetland harvester.

6. Highlight outputs to date

- Many important new sites have been discovered or at least re-evaluated. We have more than doubled the number of lowland raised bog sites in Wales (a priority Annex 1 habitat) to c. 55 sites.
- Survey evidence has established the justification for at least 10 new notified SSSI.
- Survey outputs have served a critical function in guiding restoration effort, notably as part of the Anglesey & Llŷn Fens LIFE Project and New LIFE for Welsh Raised Bogs.
- Peatland survey data have served as the cornerstone for Article 17 reporting, SoNaRR, and WFD assessment programmes. Survey data underpins statutory monitoring programmes.
- Survey data have informed the development of key strategy documents, notably the Snowdonia Peatland Strategy and the National Action Programme for Welsh Peatlands.
- The development of priority habitat inventories for 'Red-list' Welsh peatland habitats.
- Survey data also feed into vice-county flora projects across Wales and many notable records have been forthcoming as shown in Figure 5, including the first Welsh records for *Sphagnum riparium*, and a suite of sites for rarities like *Pallavicinia lyellii*.



Figure 5. *Sphagnum riparium* (top), *Pallavicinia lyellii* (bottom).



- Amblystegium radiale*
- Campylodictyon elodes*
- Cephalozia pleniiceps*, *Sphagnum riparium*
- Cryptothallus mirabilis*
- Hamatocaulis vernicosus*
- Hamatocaulis vernicosus*, *Sphagnum angustifolium*
- Hamatocaulis vernicosus*, *Sphagnum platyphyllum*
- Pallavicinia lyellii*
- Pseudobryum cinclidioides*, *Scapania paludicola*
- Riccia beyrichiana*
- Scapania paludicola*
- Scapania paludicola*, *Sphagnum subsecundum*
- Sphagnum angustifolium*
- Sphagnum platyphyllum*
- Sphagnum subsecundum*

7. Accessing LPSW data

Spatial data can be viewed on the Welsh Peatlands Data Portal, part of NRW's Wales Environmental Information Portal: [Welsh Peatland Data Portal | Wales Environmental Information Portal \(arcgis.com\)](https://wales.gov.uk/wales-environmental-information-portal)

Spatial data can be download from the Welsh Government Lle, A Geo-Portal for Wales <https://lle.gov.wales> - Phase 2 Lowland Peatland Survey of Wales (gov.wales) and will soon be on DataMapWales <https://datamapwales.gov.uk>

Site reports, quadrat data and spatial data can be requested from NRW through the website <https://naturalresourceswales.gov.uk/evidence-and-data/accessing-our-data/request-environmental-data> or by contacting Kathryn Birch (e-mail address below).

Printed site reports will soon be available to view in the NRW library in Bangor.

8. Future Applications

LPSW data is being used to train the algorithms for the semi-natural habitat element of the Living Wales Remote Sensing Project and will be useful to ground truth and test the resulting maps.