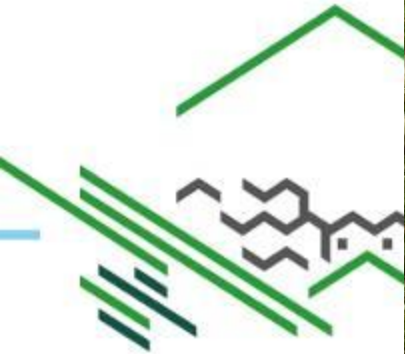


Mapping the Jewels in the Crown of Welsh Peatlands

**Kathryn
Birch,
Technical
Specialist,
Terrestrial
Habitats**



Talk outline

- Brief overview of Lowland Peatland Survey of Wales
- Applications of LPSW
- Survey highlights

Corsydd Pared y Cefn-hir



Rhyd y Fen



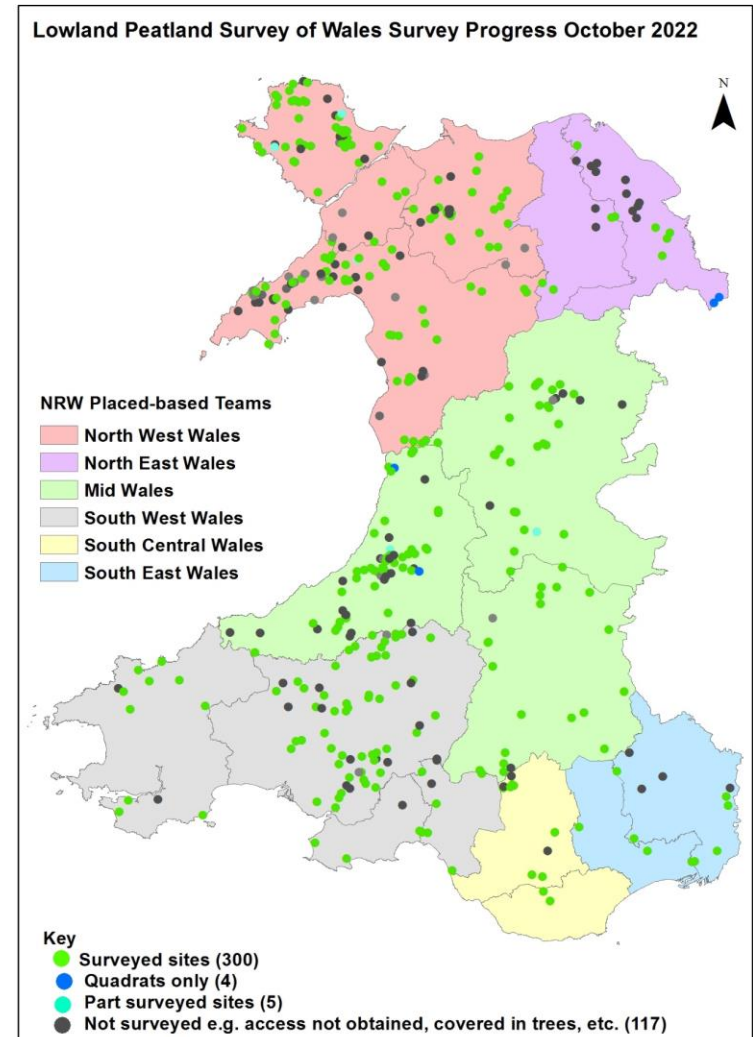
Tomentypnum nitens

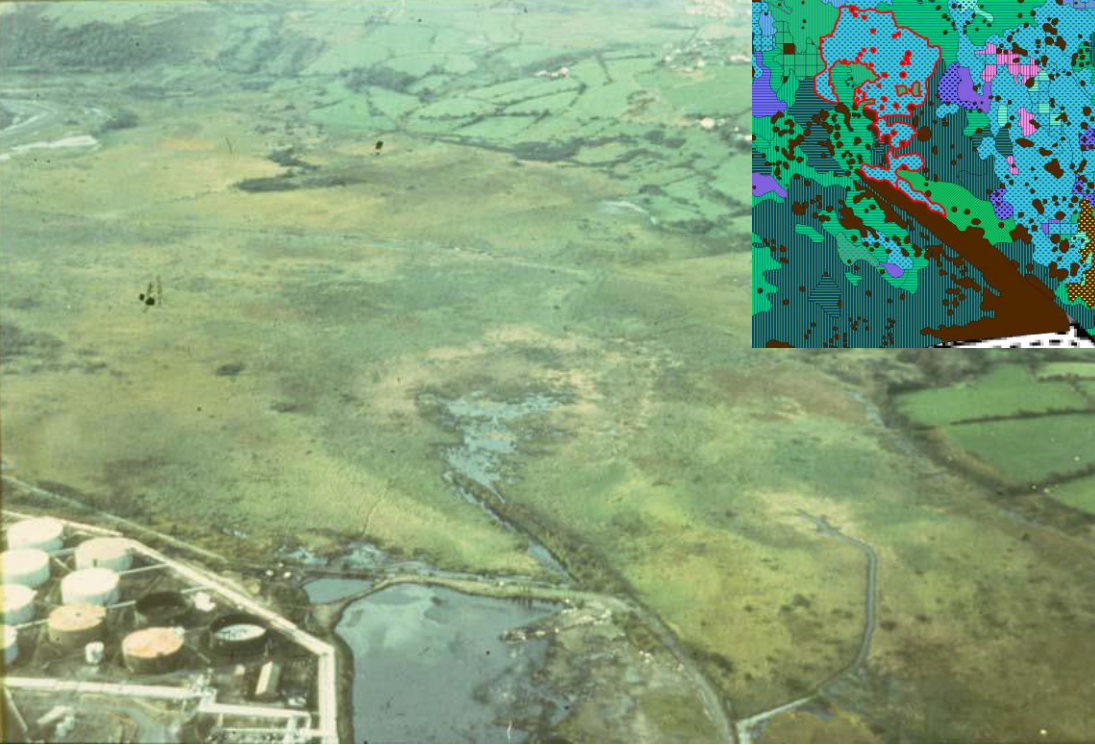


Ophrys insectifera

Strategic aim and purpose

- Started 2004 – 2022
- Characterise, quantify and evaluate the habitat cover of lowland peatlands in Wales
- Support and inform statutory site protection, management and monitoring
- 300 sites NVC surveys
- 70% of known Welsh lowland peatlands
- 163 SSSIs (27 also SACs) and 137 priority non-statutory sites
- 6,413 ha
- Collected about 5,500 quadrats





Site variety

Oblique photograph of the Llandarcy Spur, Crymlyn Bog (1982) showing open water caused by oil pollution induced die-back of vegetation. (from Headley, 2004).

Insert from 2009 vegetation map (rotated 90° so west is at the top) shows this area (outlined in red) is now occupied by *Carex paniculata* (**S3**).

Size of peatland 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 |



Salbri, small acidic basin mire, Anglesey



Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales

Vegetation Survey



Creating a map – field map

LOWLAND PEATLAND SURVEY OF WALES

SURVEY MANUAL

S.D.S. Bosanquet, P.S. Jones, D.K. Reed,
K.S. Birch & A.J. Turner

CCW Staff Science Report No 13/3/2



Sam Bosanquet and Dave Reed surveying Ceredid Dda common, Ceredigion, with the magnificent backdrop of the Cors Caru West Bog. September 2010.

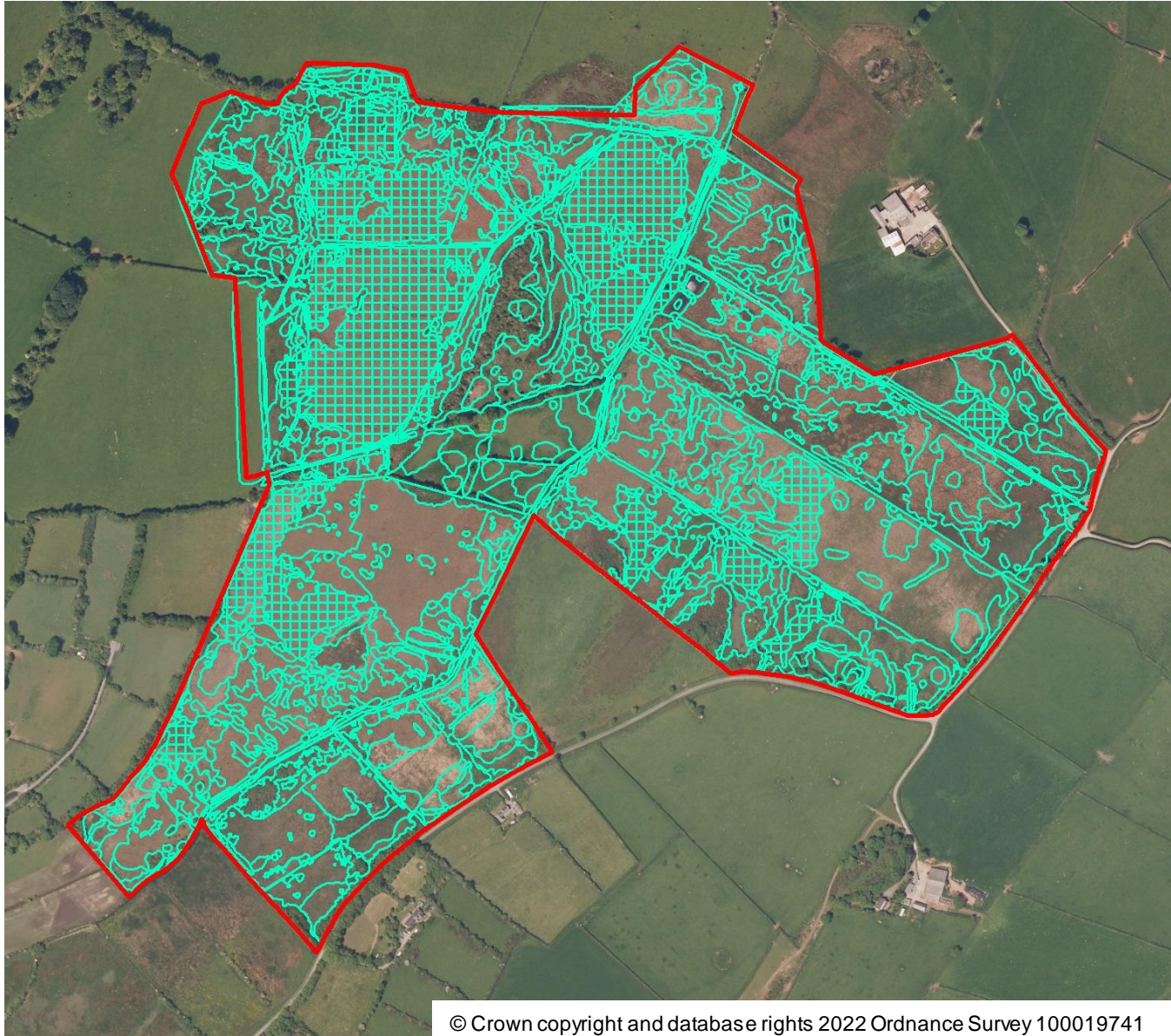
© CCGGCCW 2013

You may use and reproduce this document free of charge for non-commercial and internal business purposes, except where other copyright is stated. You may reproduce it in any format or medium, provided that you do so accurately, acknowledging both the source and CCW's copyright, and do not use it in a misleading context.



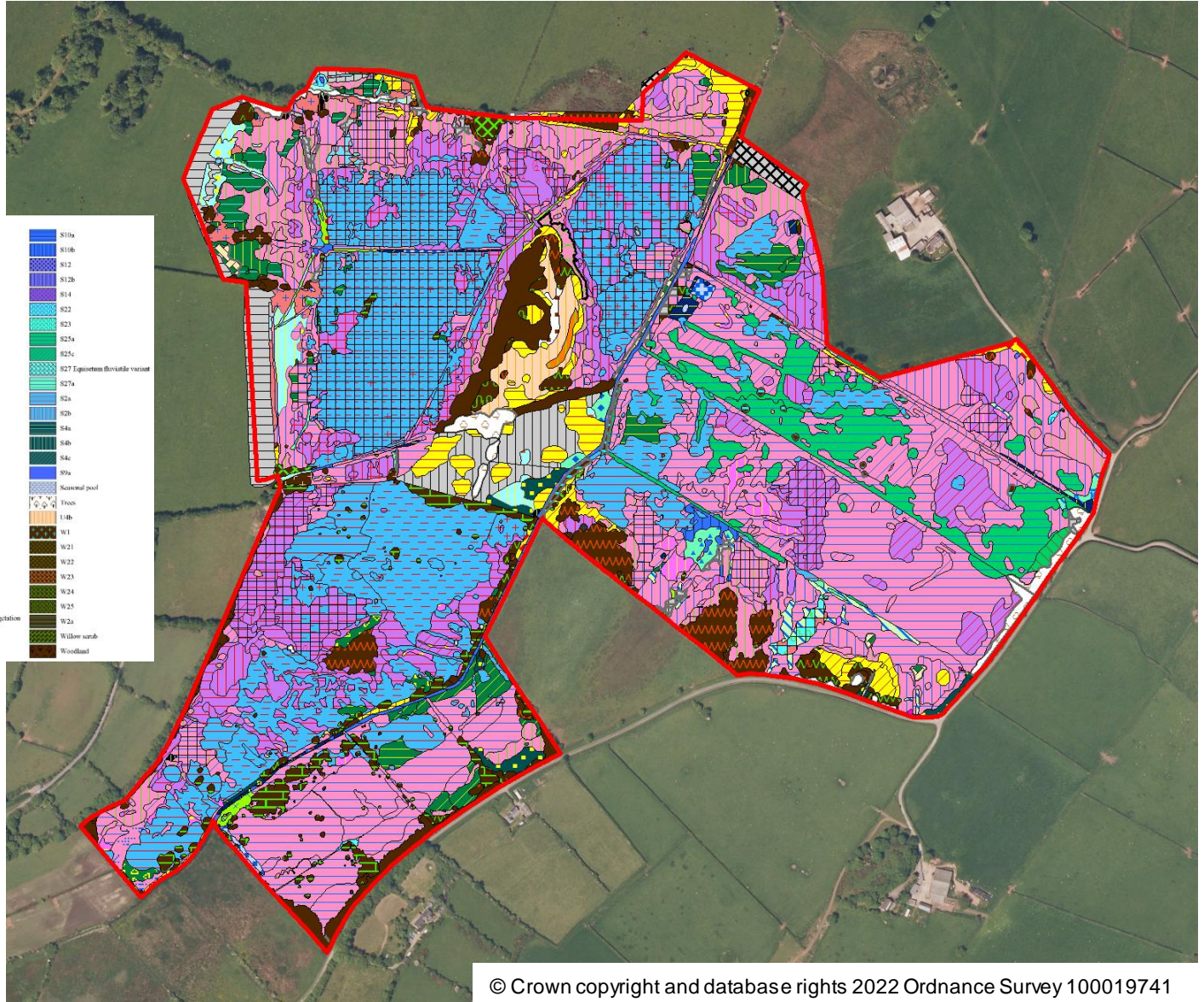
**Cors
Bodeilio
SSSI,
Anglesey**

Creating a map – outline map



**Cors
Bodeilio
SSSI,
Anglesey**

Creating a map – final map



**Cors
Bodeilio
SSSI,
Anglesey**

Creating a map - legend



Calcareous Fen

Alkaline fen

Alk/calc fen, context dependent

Other Annex I habitat




Heavily degraded Annex I habitat

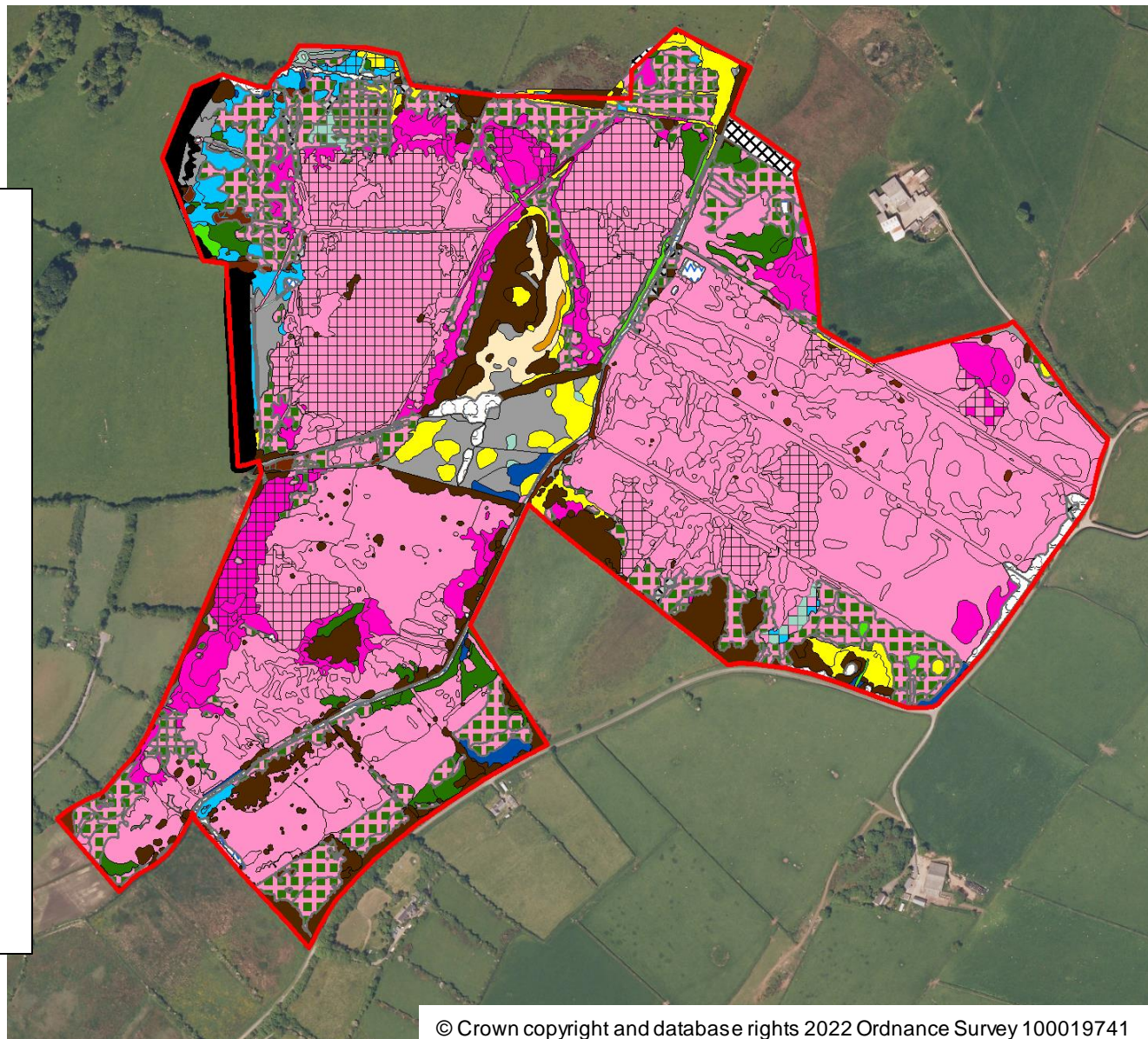
Scrub



Creating a map – SSSI Features

Key to SSSI features

| | |
|---|---------------------------------------|
|  | Acid grassland |
|  | Alkaline flush |
|  | Bare ground |
|  | Calcareous grassland |
|  | Dry heath |
|  | Fen |
|  | Improved & Built areas |
|  | Marginal & Inundation vegetation |
|  | Marshy grassland (Fen meadow) |
|  | Marshy grassland (Iris & Meadowsweet) |
|  | Marshy grassland (Moor-grass pasture) |
|  | Marshy grassland (Rush pasture) |
|  | Marshy grassland (Sedge pasture) |
|  | Neutral grassland |
|  | Not accessed |
|  | Open water |
|  | Scattered trees |
|  | Scrub |
|  | Semi-improved grassland |
|  | Swamp |
|  | Woodland, semi-natural broadleaved |
|  | Woodland, wet woodland |



Survey outputs – Site Report

Data

Vegetation maps

Vegetation community & habitat feature extent

Quadrat records

Species records

Photographs

Evaluation & description

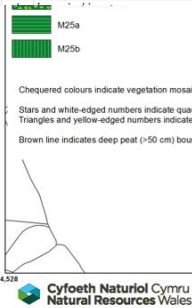
Vegetation & Features

Feature condition

Management needs

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | |
|---|---|---|---|---|---------------------------|------------|--------|--------|-----|-----|--------|------------|---------------|--------|---------------|--------|-----|-----|--------|--------|-----|-----|-----|
| | | | | | Vegetation type | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 |
| | | | | | Input as Variant | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 |
| | | | | | Condition class | Ulex palli | Myrica | Myrica | - | - | grassy | Encod-poor | Sphagnum-poor | Myrica | Sphagnum-poor | Myrica | - | - | Myrica | Myrica | - | - | |
| | | | | | In All Wales Data as Grid | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 | M17 |
| | | | | | Square | 44 | 42 | 42 | 42 | 42 | 42 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | | | | | Site number | | | | | | | | | | | | | | | | | | |
| | | | | | Site name | | | | | | | | | | | | | | | | | | |
| | | | | | Quadrat number | | | | | | | | | | | | | | | | | | |
| | | | | | Grid Reference | | | | | | | | | | | | | | | | | | |
| | | | | | Distances (m) | | | | | | | | | | | | | | | | | | |
| | | | | | Surveyor | | | | | | | | | | | | | | | | | | |
| | | | | | Date | | | | | | | | | | | | | | | | | | |

| M17 | M18 | M19 | N18 | N19 | Card |
|-----|-----|-----|-----|-----|---------------------------------|
| 37 | 49 | 37 | 38 | 4 | <i>Deschampsia flexuosa</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Elaecharis multicaulis</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Elaecharis palustris</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Elaecharis quinqueflora</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Elaecharis angustata</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Eriophorum fluitans</i> |
| 5 | 3 | 2 | 20 | 4 | <i>Eriophorum angustifolium</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Eriophorum gracile</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Eriophorum longifolium</i> |
| 6 | 3 | 1 | 1 | 4 | <i>Eriophorum vaginatum</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Festuca arvensis</i> |
| 65 | N4 | 39 | 33 | 4 | <i>Festuca ovina</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Festuca pratensis</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Festuca rubra</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Glyceria declinata</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Glyceria fluitans</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Glyceria maxima</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Glyceria minima</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Holcus lanatus</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Holcus mollis</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Scaligeria serotina</i> |
| 79 | N4 | N4 | N4 | 4 | <i>Ammonia angustata</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Ammonia arvensis</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Ammonia biflorata</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Ammonia bulbosa</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Ammonia complanata</i> |
| N4 | N4 | N4 | 11 | 4 | <i>Ammonia effluvia</i> |
| N4 | N4 | N4 | N4 | 4 | <i>Ammonia inflata</i> |
| 33 | 50 | 41 | 34 | 4 | <i>Ammonia spuriotata</i> |



CYFOETH NATURIOL CYMRU NATURAL RESOURCES WALES

Lowland Peatland Survey Site Report

| | | |
|---|--|--|
| Site name Cors y Hendre | Site number SJ03/04P | Grid reference SJ050389 |
| Area of search Clwyd | Unitary authority Denbighshire | NRW Team North |
| Designation None | Site area (ha) 5.4 | No. of compartments 3 |
| Date of survey 16/08/2016 & 08/11/2018 | Surveyors K.S. Birch, L. Ruffino & P.S. Jones | Altitude (m aOD) 190-200 |
| No. of photos 27 | No. of quadrats 8 | No. of comm. (DAFOR) lists 0 |
| Situation type Basin mire | | |

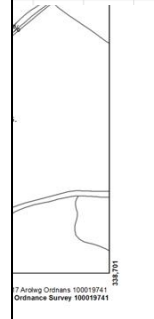
Permission to survey:

Access permission was organised with the landowner via telephone by Kathryn Birch.



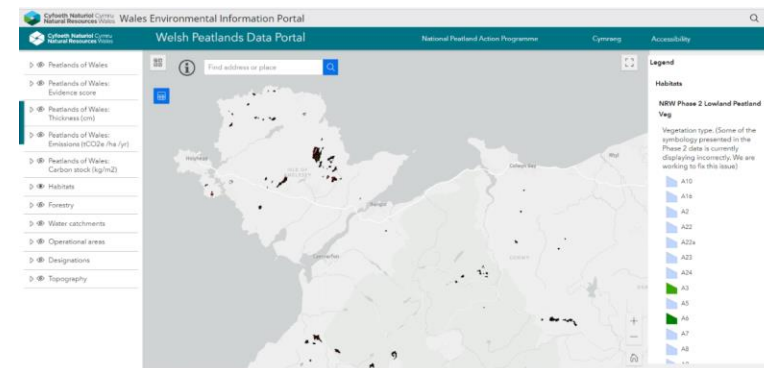
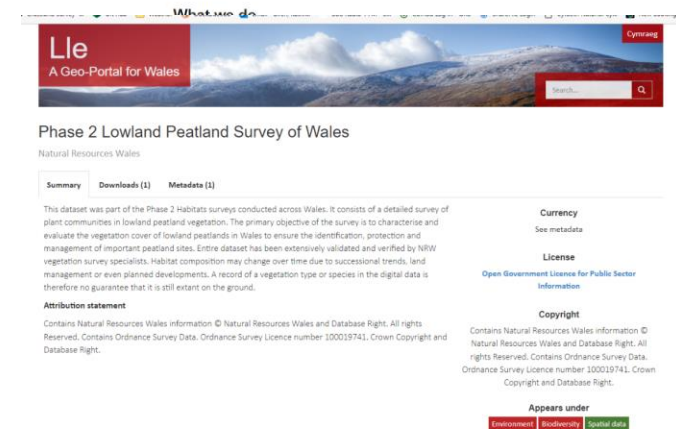
Bog vegetation on Cors y Hendre characterised by a high cover of heather and encroachment with trees.

| Grid | Grid | Grid |
|----------|------------|------------|
| Q22 | Q2 | Q2 |
| SH 60401 | SH 92619 | SH 92619 |
| 44887 | 65189 | 65189 |
| 2.2 | 2.2 | 2.2 |
| SB | KB | KB |
| 011 | 02/08/2012 | 09/06/2011 |



How to access LPSW data

- Spatial data can be viewed on NRW's Peat Portal and downloaded from Welsh Government's Lle, A Geo-Portal for Wales,
- Soon to be replaced by DataMapWales,
- Full series of Printed Site Reports will be available to view in NRW's library in Bangor,
- Site reports and quadrat data can be requested from NRW through the website or by contacting Kathryn Birch,
- **Lowland Peatland Survey of Wales Survey Manual, 2nd Edition**, Bosanquet, S., Jones, P., Reed, D., Birch, K., & Turner, A. NRW, (In Prep.),
- Final report – 2023?



<https://naturalresourceswales.gov.uk/evidence-and-data/accessing-our-data/request-environmental-data>

Primary Applications (1)

- **SSSI notification and definition of features.** SSSI selection guidelines are heavily reliant on NVC data to provide the basis for comparative evaluation of sites.
- **SSSI management and restoration planning.** NVC data provide an essential resource for planning site management work by defining the core elements of interest features and their location within sites. NVC data provide the core evidence base for a wide range of projects, both justifying the requirement for such projects and guiding the deployment of management actions.”.
- **Natural resource assessment and SMNR.** NVC data provide an accurate mapped representation of habitat condition which in turn correlates strongly with ecosystem service provision. NVC data thus play a significant role in quantifying and characterising natural resources across a range of spatial scales.
- **Biodiversity duty.** The definition of habitats under section 7 of the Environment (Wales) Act 2016 is heavily dependent on NVC information: accordingly, the spatial mapping of these habitats to support Area Statement and PSB work has an inherent requirement for NVC level information. Delivery of NRW’s Strategic Steer for Biodiversity to 2022 has a number of critical dependencies on accurate habitat survey data.

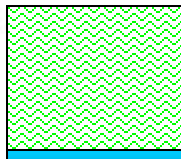
Primary Applications (2)

- **Implementation of key instruments & mechanisms, including EIA regs & Glastir.** Habitat definition within the EIA regs and under the Glastir woodland creation options is heavily dependent on NVC characterisation.
- **Statutory reporting – Article 17, SoNaRR.** The majority of Annex 1 habitats are defined according to their component NVC communities. NVC data are essential for supporting NRW's assessments of habitat area, distribution and structure and functions for Article 17 reporting and SoNaRR.
- **Protected sites monitoring.** NVC data define the priority elements of interest features on protected sites. Common Standards Monitoring attributes are often specific to individual or groups of NVC communities and thus NVC survey is a general prerequisite for effective site condition monitoring.
- **Water Framework Directive planning, implementation and reporting.** Terrestrial NVC data provide the basis for defining the location and state of Groundwater Dependent Terrestrial Ecosystems which provide one of the key tests of groundwater body status.
- **Future applications.** LPSW data is being used to train the algorithms for the semi-natural habitat element of the Living Wales Remote Sensing Project & will be useful to ground truth and test the resulting maps.



Peat cutting and past management

Fresh Sphagnum
peat

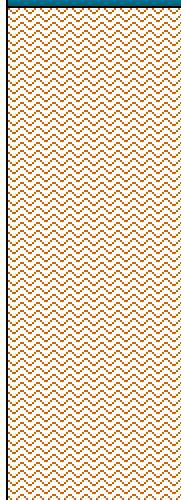


Depth (cm)

65

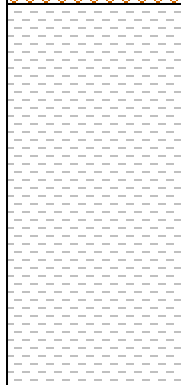
85

Well humified
peat, dry at
top and
oxidised



375

Lacustrine clay



























Cutting peat at Cefn Coch, Cwm Tylo, Gwynedd, c. 1925.

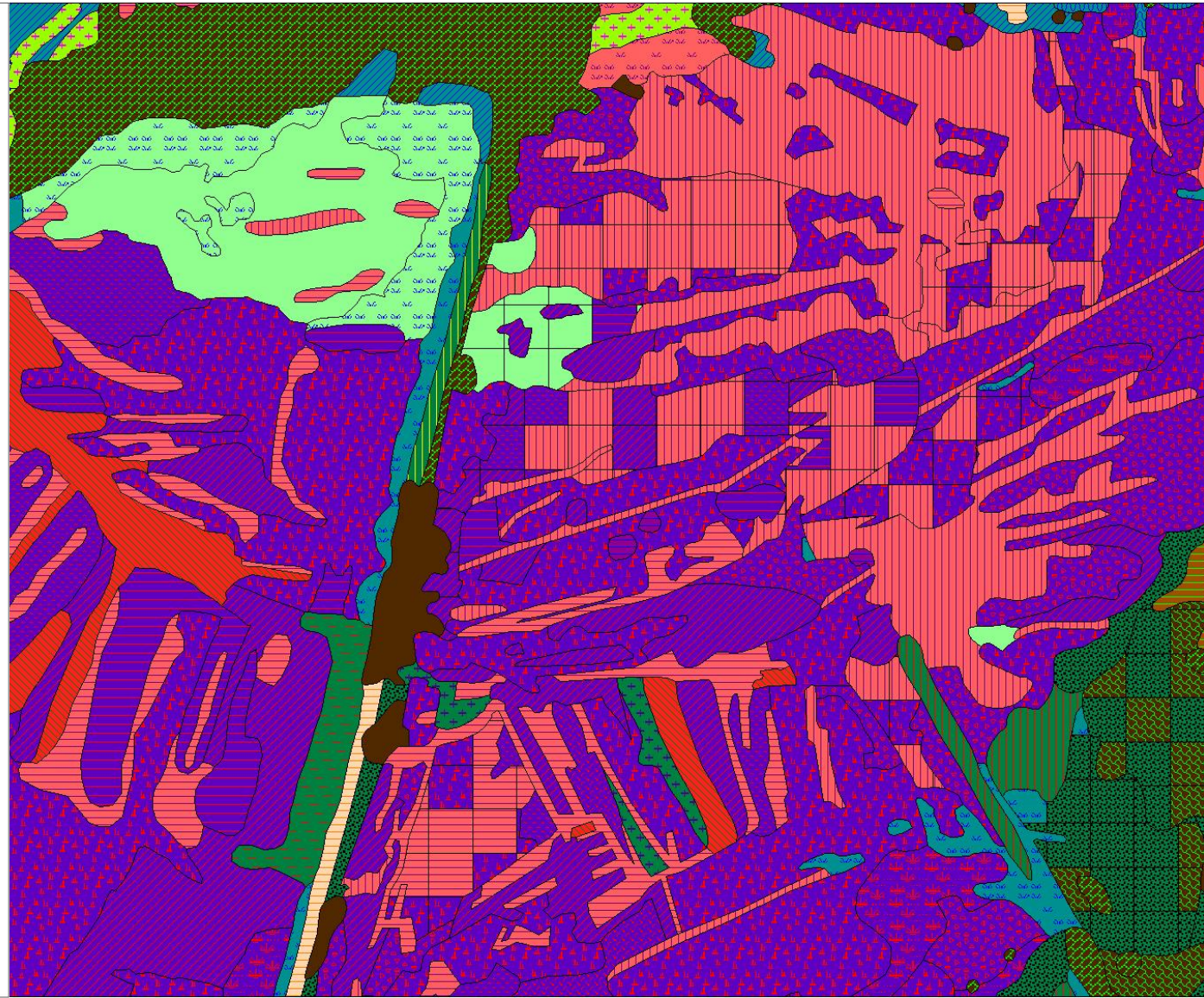
Photograph by William Meredith, Bala. Image courtesy of NMW.



Evidence of peat cutting in the vegetation

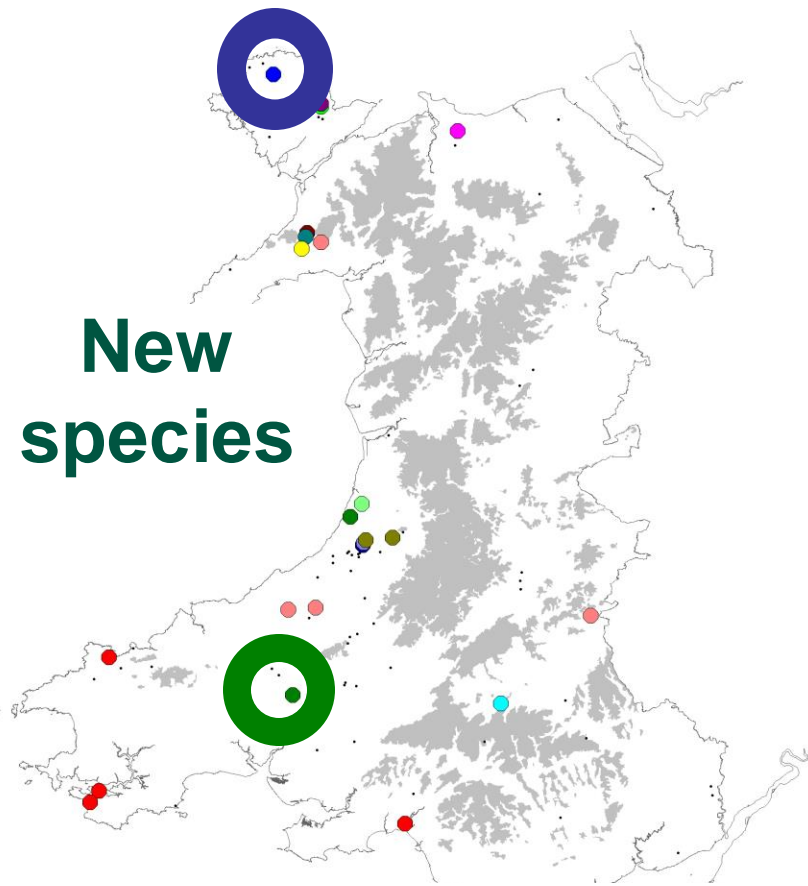
Key to vegetation types

| | |
|--|-----------------------------------|
|  | H12a |
|  | M1 |
|  | M15d |
|  | M17a |
|  | M17a Sphagnum fallax variant |
|  | M17c |
|  | M17c Sphagnum fallax variant |
|  | M18a |
|  | M23a |
|  | M23b |
|  | M25 Eriophorum vaginatum variant |
|  | M25 heathy variant |
|  | M25 species-poor |
|  | M25a Eriophorum vaginatum variant |
|  | M25b |
|  | M25c |
|  | M29 |
|  | M2a |
|  | M2b |
|  | M2b swampy variant |
|  | M3 |
|  | M4 |
|  | M4 Eriophorum vaginatum variant |
|  | M6c |



Highlight Outputs to-date

- Many important new sites have been discovered or re-evaluated e.g. 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 SSSIs.
- Survey outputs have served a critical function in guiding restoration effort, notably as part of the Anglesey & Llŷn Fens LIFE Project, New LIFE for Welsh Raised Bogs and the new LIFE Quake Project.
- Peatland survey data have served as the cornerstone for Article 17 reporting, SoNaRR, and WFD assessment programmes. Survey data underpin 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.



New species

- *Amblystegium radicale*
- *Campyliadelphus elodes*
- *Cephalozia pleniceps*, *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*

Thanks for listening! Questions

Thanks to Pete Jones & Sam Bosanquet for photos and slides