

**PHASE I HABITAT
SURVEY**



**Pentwyn,
Llanbister Road,
Powys**

A Report for
Radnorshire Wildlife Trust

Report Information	
Project name	Phase I Habitat Survey, Pentwyn
Project reference:	KG2022/037
Status:	Final Date of Issue: 19 th September 2023
Produced by:	Katie McMinn BSc (Hons) MCIEEM
Reviewed by:	Joseph McMinn MSc MRSB
Prepared for:	Radnorshire Wildlife Trust

Contents

1	Introduction.....	4
2	Methodology	4
3	Baseline Ecological Conditions.....	5
4	Summary of habitats and areas of interest	20
5	References	23
6	Appendix 1: Photographs	24
7	Appendix 2: Treescapes across Pentwyn.....	26

Figures

Figure 1: North area of Pentwyn, highlighting the band of habitat mosaic along the River Lugg. Red arrows indicate dingles flowing to River Lugg. Red dashed line indicates upper limit of semi-natural/natural habitat mosaic.	20
Figure 2: North area of Pentwyn, Fron-felen wood. Red dashed line indicating the area of woodland, bracken and scrub that extends as a band along a south-facing slope.	20
Figure 3: South area of Pentwyn, Nant yr Gyn along the west and north of the area. Red dashed line indicates current upper extent of semi-natural habitats. Solid red arrow indicates area offering potential to connect neighbouring woodlands through developing a habitat mosaic along the watercourse.	22
Figure 4: Map of Pentwyn showing potential wooded/scrub habitat corridor across the Site (red dashed line), linking neighbouring and within boundary wooded features.	26

Plates

Plate 1: Oaks Coppice, mature oak with bluebell ground flora.	24
Plate 2: Looking across Nant yr Wyn to Fron-felen Wood (top-left corner).	24
Plate 3: Earth bank with acid grassland and bracken (Field 15).	24
Plate 4: Bracken and acid grassland bank (Field 15).	24
Plate 5: Semi-natural grassland over bank (Field 1).	24
Plate 6: Semi-natural grassland, degraded marshy grassland (Field 24).	24
Plate 7: Marshy grassland, swamp, and marginal vegetation along the Nant yr Wyn (Field 27, looking east).	25
Plate 8: Marshy grassland (rush), semi-improved neutral grassland, and larch plantation (Field 4, looking east).	25
Plate 9: Marshy grassland, bracken (over acid grassland) and willow scrub (Field 6, looking east).	25

1 Introduction

This report has been produced for Radnorshire Wildlife Trust to provide a phase I habitat survey report for the land of Pentwyn, Llanbister Road.

Pentwyn was purchased by Radnorshire Wildlife Trust in October 2021 with the long-term vision of restoring the land for nature.

This report has been commissioned to:

- Identify the phase I habitat groups present within the Pentwyn farm boundary.
- Produce a digital map of the phase I habitat locations to inform long-term monitoring and landscape management.
- Identify habitats and features of ecological interest for targeted survey and land management.

The surveys were conducted by Katie McMinn BSc (hons) MCIEEM, she holds a Cyfoeth Naturiol Cymru/ Natural Resources Wales (NRW) great crested newt survey licence: S091458/1 and NRW bat survey licence: S091457/1. Katie is experienced in conducting extended Phase I Habitat surveys and National Vegetation Classification (NVC) surveys, bat surveys and great crested newt surveys. KG Ecology are a registered practice, listed in the Chartered Institute of Ecology and Environmental Management (CIEEM).

Site Location

Pentwyn is a 65 hectare hill farm located on Llanbister Road, B4356, Powys LD1 5UT. The farm is located at NGR: SO 1833 7265.

Pentwyn farm extends north of the B4356 to Cnwch Bank. The east boundary follows the River Lugg. The farm on the south side of the B4356 the land borders Fron-hir Wood to the west and Troedrihwfedwen to the south.

2 Methodology

The desk study was conducted in May 2023. Ordnance Survey maps and aerial photographs were used to provide context of the Site location, current and historic land use and identify localised habitat features to inform the field survey. A botanical assessment, conducted in 2021 of Pentwyn for RWT was used to aid and inform the walkover survey (Drewett. D, 2021).

Field Survey

The field surveys were conducted across three days through May and June 2023 by Katie McMinn.

Phase I Habitat survey

A Phase I Habitat survey was conducted across the land of Pentwyn. The survey used the standard methodology as set out by the JNCC Phase I Habitat Handbook. Each field, including the length of each boundary, was walked over with areas of similar habitat mapped as corresponding phase I habitat category. The dominant species within each habitat area were recorded and brief notes taken to aid assigning areas of habitat to a phase I habitat category. Target notes were used for smaller or notable features of interest.

Access down some of the steep slopes across Pentwyn was limited or avoided to ensure surveyors moved safely across the site. There are areas along the River Lugg on the north of the site that were not accessed due to lone-working.

Photographs and GPS were used as appropriate to inform mapping and reporting process.

Mapping: The information gathered by the field surveys was used to produce digital maps within QGIS software.

Habitats and features were mapped out using polygon, line, and point map features with vertices of different mapped features linked using the 'snap' tool. The area of habitat polygons was calculated, the accuracy is limited due to the absence of a width measurement for line features, such as hedgerows, but provides an approximate total area for each habitat category identified.

Files for QGIS were saved under the following file names:

- PentwynFarm_LayerBoundary
- PentwynHabitat_Line
- PentwynHabitat_Polygon
- PentwynHabitat_TargetNotes

3 **Baseline Ecological Conditions**

Local landscape

One pond was identified within 500m of the Site, and five ponds 500m-1km of the Site, using OS map, aerial imagery, and field survey. The ponds in the local area include natural pools scattered across Cnwch Bank and ponds near farm buildings.

Pentwyn is in a rural area south of Beacon Hill, a large expanse of common land with heather moorland, which reaches a high point of 547m. The hills to the south of Pentwyn are largely grazed fields with scattered blocks of deciduous woodland extending to Radnor Forest, a large area of coniferous plantation, deciduous woodland, and common land.

The source of the River Lugg is located on Pool Hill, north of Pentwyn. The stream forms a linear feature, largely treelined, leading out southeast from Pentwyn. The heart of Wales train line creates a tree-lined linear feature running through the landscape south of Pentwyn.

Pentwyn is located between approximately 280m to 390m above Ordnance datum.

Phase I Habitats

Habitats identified by the field survey are set out below, in order of Phase I habitat category coding.

Where useful, the grid reference for individual habitat block locations is provided. See the QGIS PDF files and digital maps for additional information for habitat location and extent. See Appendix 1: photographs and the separate PDF, Appendix 3 for Phase I Habitat maps for additional information.

The total area of each habitat across Pentwyn is given for each habitat category. The area is an estimate based on digital mapping which has inaccuracies due to the use of both line (such as hedgerows) and polygon (such as grassland) features, which distort actual boundary lines of a habitat from on the ground.

A1.1.1 Deciduous semi-natural woodland

Area of broad-leaved semi-natural woodland across Pentwyn: 2.1 ha

Semi-natural woodland across Pentwyn is made up of three defined blocks of semi-natural broad-leaved woodland. The three woodlands are all adjacent to grassland fields with connectivity created by hedgerows and scattered individual trees within the Pentwyn boundary, and woodland blocks in neighbouring ownership.

Datamapwales¹ was used to view information on the status of each woodland block relating to ancient semi-natural woodland and plantation on ancient woodland sites (PAWS).

Name/location	Grid reference (approx. centre)	Description
Linear woodland along east edge of Field 1 and Field 2.	SO 18388 73012	Ancient semi-natural woodland. Woodland which extends down the sides of a dingle flowing to the east boundary of Pentwyn, down to the River Lugg where it connects to linear woodland and trees features of the river. The woodland develops from a hedgerow in Field 2 composed of hawthorn, hazel, and rowan, into an oak and ash dominated woodland on the northeast slope of Field 1. Mature trees within the wood include sycamore, beech, and birch. The woodland has a sparse, grazed understorey of grasses, fern sp., and herbs.
Fron-felen Wood	SO 18084 72937	Ancient semi-natural woodland. A mature oak dominated woodland with occasional mature ash and larch trees. Occasional hazel and hawthorn in the understorey. The ground flora includes bluebell, tussocks of tufted hair-grass, and lesser celandine. Fron-felen wood is directly against a woodland, under neighbouring ownership, with similar species community against its west boundary.
Oaks Coppice	SO 18135 72356	Ancient semi-natural woodland. Oak dominated woodland with no understorey. The ground flora is scattered bracken with abundant bluebell throughout the woodland.

A1.1.2 Coniferous plantation

Area of coniferous plantation across Pentwyn: 3.2ha

Coniferous plantations across Pentwyn are made up of five separate areas.

The areas of plantation are widely spread across Pentwyn, and all associated with former areas of broad-leaved woodland or located within existing broad-leaved woodland.

Name/location	Grid reference (approx. centre)	Description
Fiddler's plantation	SO 18090 73476	A large, c.1.9ha triangular block of semi-mature/mature larch plantation at the north boundary of Pentwyn. Ground flora is sparse grass throughout the area. Fiddler's Plantation is located on slopes leading down to the River Lugg. The slopes either side of the plantation are comparatively natural habitats of marshy and dry semi/unimproved grassland, scattered/continuous bracken, and native scrub. In combination these form a linear habitat feature along the route of the River Lugg and connecting dingles, along the east boundary of Pentwyn.
Plantation block at the east boundary of Field 4	SO 18461 73166	c.0.2ha triangular block of semi-mature/mature larch plantation against the east boundary of Pentwyn, leading down to the River Lugg. The ground flora is very sparse. The east boundary is against native scrub and trees with the

¹ [New map | DataMapWales \(gov.wales\)](https://www.gov.wales/DataMapWales)

		east boundary against semi-improved neutral grassland and marshy grassland.
Small area of conifer against south boundary of Field 4	SO 18354 73061	There is a small c.0.1ha, linear block of semi-mature/mature conifer, spruce, against the south boundary of Field 4. The conifer stand is part of the broad-leaved woodland of Field 1 and 2, along the north boundary of the woodland.
Pentwyn Coppice	SO 17983 72454	Plantation on ancient woodland site. A rectangular c0.8ha block of semi-mature/mature larch plantation to the west boundary of Pentwyn. Ground flora is sparse grass throughout the area. In proximity to the additional larch block in Field 23 and Fron-hir Wood, a wet alder and broad-leaved woodland in neighbouring ownership c.70m to the northwest.
Plantation block to west of Pentwyn Coppice, Field 23	SO 17846 72386	Small c0.2ha rectangular block of larch plantation in the southwest corner of Field 23. The ground flora is scattered grasses and herbs including Yorkshire fog, bluebell, pignut, and wood sorrel.
Plantation block north of Pentwyn yard	SO 18328 72765	c.0.2ha narrow, linear block of larch with a sparse grass ground flora. There are broad-leaved trees, including Salix sp. along the stream of the north boundary and small block of mixed woodland against the northeast corner.

A2.1 Dense scrub

Area of dense scrub: 0.4ha

The two areas that fit best within the definition of 'dense scrub' are both located in areas of additional scattered native trees, generally under 5m in height, that form a wider linear habitat of scattered native scrub and trees along the slopes of the River Lugg along the east boundary of Pentwyn.

Name/location	Grid reference (approx. centre)	Description
Field 6, north boundary	SO 17960 73548	There is a stand of dense, goat willow scrub in Field 6, against the north boundary and the River Lugg. The willow stands in a wet area of marshy grassland.
Field 5, east boundary	SO 18334 73339	There is a stand of native bushes and trees in Field 5, within a dingle leading to the River Lugg. The dingle has steep sides, which are dominated by hazel and hawthorn.

A2.2 Scattered scrub

Area of scattered scrub: 1ha

The areas that fit best within the definition of 'scattered scrub' are located on north- and east-facing slopes that form a wider linear habitat of scattered native scrub, trees and woodland along the slopes of the River Lugg along the east boundary of Pentwyn.

Name/location	Grid reference (approx. centre)	Description
Field 15	SO 18198 72939	Scattered gorse bushes over acid grassland and within bracken.

Field 4 and 5, east boundary	SO 18206 73493, SO 18318 73395, SO 18449 73283	Scattered scrub extends along the slopes of the River Lugg, along the east boundaries of Fields 4 and 5. The areas of scattered scrub vary in density, forming dense scrub and woodland in places along the River Lugg and small dingles. The scrub is made up of native species including willow, hawthorn, hazel and rowan over, and opening up into, scattered bracken and marshy grassland leading down to the River Lugg.
------------------------------	--	--

A3.1 Scattered trees

Area of scattered trees: 0.1ha

Name/location	Grid reference (approx. centre)	Description
Field 5	SO 18333 73413	There is an area of scattered native, broad-leaved trees, generally over 5m in height, against the River Lugg, at the east boundary of Field 5. The trees are within an area of scattered scrub that runs alongside the River Lugg.

Grasslands

Note on Grassland habitats: The following habitats are grouped by habitat definitions within the constraints of Phase I Habitat Survey Handbook.

Unimproved, semi-improved and improved describes the level of agricultural improvement through repeated grazing, mowing, fertilising, drainage, or herbicide treatment. Categorising grasslands was based on the species present in the sward at the time of the survey, landscape features and aerial photographs.

Species diversity within a sward was not always a key indicator for unimproved habitats.

The extent of grasslands (particularly natural and marshy grasslands) is skewed due to continuation of grassland habitats as ground flora under other habitat categories such as bracken or scrub. Grassland under scrub and bracken may retain similar characteristics to adjacent open grasslands or grade to more shade tolerant species, particularly in the case of dense bracken cover.

B1.1 Unimproved acid grassland

Area of unimproved acid grassland: 0.09ha

This category excludes acid grassland present under, and categorised as, bracken or scrub.

These areas of unimproved acid grassland across Pentwyn are in areas inaccessible to machinery. As such it is unlikely the grassland has been subject to agricultural improvement outside of manure from grazing animals and can be placed under 'unimproved'. Degradation of the acid grassland is mostly due to their limited extent and over-grazing.

Name/location	Grid reference (approx. centre)	Description
Field 15, SW	SO 18169 72920	Bands of acid grassland scattered down a sloping, S-facing, bank with areas of exposed earth with grassland within dense bracken. Herb species include sheep's sorrel, common bird's-foot-trefoil, and rosebay willowherb with Yorkshire fog.

Field 15, NE	SO 18252 72999	Bands of acid grassland located on a steep, SE-facing earth bank with open and bare ground. Herb species include sheep's sorrel, trailing St John's wort and common bird's-foot-trefoil.
Field 2	SO 18155 73114	Linear bank against a track on NE boundary, between semi-improved grassland and the hedgerow boundary. There is an earth bank with indicators for acid grassland including sheep's sorrel, yarrow, tormentil, field woodrush and common bird's-foot-trefoil.
Field 2, Target Note 8	SO 18268 73020	Small bands of exposed soil down a low, track-side bank. Possible traits or remnants of acid grassland with lesser trefoil and common bird's-foot-trefoil.
Field 6, Target Note 11	SO 18007 73498	Areas of acid grassland within a mosaic of marshy grassland and scattered bracken.

B1.2 Semi-improved acid grassland

Area of semi-improved acid grassland: 4.3ha

This category excludes acid grassland present under, and categorised as, bracken or scrub.

These areas of unimproved acid grassland across Pentwyn are in areas inaccessible to machinery. As such it is unlikely the grassland has been subject to agricultural improvement outside of manure from grazing animals and can be placed under 'unimproved'. Degradation of the acid grassland is mostly due to their limited extent and over-grazing.

Name/location	Grid reference (approx. centre)	Description
Field 7 and 8	SO 17781 73495, SO 17943 73399	<p>A c.2.3ha area of semi-improved acid grassland against the north boundary of Pentwyn. The grassland covers an undulating area with two wetter areas: a tree-lined stream and marshy depression. The grassland slopes northward, surrounding two wetter areas of marshy grassland. The grassland has distinctly drier areas than marshy grassland features.</p> <p>At the top of the slopes are areas of marshy grassland degraded to 'SI neutral grassland' due to grazing intensity (Target Note 12). This includes an area at the top of Field 7 that extends into Field 3. The area includes scattered rush tussocks and tufted hair-grass within a sward with a range of grass species. Herbs include occasional bog stitchwort.</p> <p>The dry grassland is characterised by sweet-vernal grass, red fescue, and creeping bent grasses, with a range of species indicating semi-improved acid grassland. There are scattered tussocks of tufted hair-grass. Herbs decrease in frequency to the west (Field 8). Herb species through the sward include lesser stitchwort, wood-rush sp., cuckoo flower, common bird's-foot-trefoil, and tormentil.</p>
Field 5	SO 18398 73266	<p>A c.1.9ha area of semi-improved acid grassland, against the east boundary of Pentwyn. The area is disconnected from the north extent of this habitat (Field 6, 7 and 8) by Fiddler's Plantation and has stronger indicators of agricultural improvement across areas of grassland at the tops of the slopes.</p> <p>The grassland slopes east, down to the River Lugg, extending under the bracken and scrub features towards the base of the</p>

		<p>slopes. The areas are dominated by grass species including abundant Yorkshire fog, with red fescue, sweet vernal-grass, and bent species.</p> <p>There is scattered soft rush, sedge species and field wood-rush. Herbs include occasional lesser stitchwort, greater bird's-foot-trefoil and tormentil. There is variation and grading across the habitat in the frequency and diversity of species of herbs present, moving between semi-improved grassland, semi-improved acid, and marshy grasslands.</p>
--	--	--

B2.1 Unimproved neutral grassland

Area of unimproved neutral grassland: 0.2ha

The areas of unimproved neutral grassland identified within Pentwyn are areas that do not appear to have been subject to agricultural improvement, largely due to inaccessibility or location. Groups of species included in this habitat category are grazed rush (soft rush and jointed rush) and Yorkshire fog grasslands which cannot be categorised under marshy grassland.

Within Pentwyn, 'unimproved' neutral grassland was identified along three tracks. The grass and herb communities along the tracks best fit unimproved-neutral grassland due to the low frequency or absence of rush, low agricultural improvement and grazing of these areas and poor fit to other, wetter habitat categories.

Name/location	Grid reference (approx. centre)	Description
Field 23, track	SO 17858 72416	Track leading W-E across Field 23. A wet track with seasonal pool of water. Yorkshire fog dominates the grassland with occasional soft rush. Wetter areas have frequent lesser celandine and lesser stitchwort.
Field 14, track	SO 18127 72851	Track leading N-S down Field 14. A wet track leading south from the former ruins in Field 15. A sucken track, lined by hedgerows and larger trees. The grassland within the track is a mixture of Yorkshire fog with <i>Glyceria</i> species with herbs including opposite-leaved golden saxifrage, redshank, a <i>Persicaria</i> species, and brooklime. Due to the wet nature of the track the grassland falls between unimproved neutral and marshy grassland.
Field 1, east boundary	SO 18428 72974	A shaded track running N-S along the base of a wooded slope. The sward contains abundant Yorkshire fog with scattered bracken. Herbs include crosswort, bluebell, creeping Jenny, meadow vetchling, greater stitchwort, and pignut.

B2.2 Semi-improved neutral grassland

Area of semi-improved neutral grassland: 7.9ha

The areas of semi-improved neutral grassland identified within Pentwyn can be generalised as sloping ground that has been mostly inaccessible to agricultural machinery, reducing the impacts of agricultural improvement. The grasslands have mostly been subject to impacts from grazing and drainage. Some areas are close to 'semi-improved grassland', but have characteristics, herb frequency or diversity to categorise as 'neutral'. Some areas have features of semi-improved acid grassland, or grade into grassland under bracken or scrub with acid grassland characteristics.

Name/location	Grid reference (approx. centre)	Description
Field 4	SO 18169 73434	<p>A c.2.4ha area of semi-improved neutral grassland against the east boundary of Pentwyn. The species present may be closer to semi-improved acid grassland, with neutral grassland features also present.</p> <p>The sward has strong indicators of agricultural improvement across areas of grassland at the tops of the slopes.</p> <p>The grassland slopes east, down to the River Lugg, extending under the bracken and scrub features towards the base of the slopes. The areas are dominated by grass species including abundant Yorkshire fog, with red fescue, sweet vernal-grass, and bent species.</p> <p>There is scattered soft rush, sedge species and field wood-rush. Herbs include occasional lesser stitchwort, greater bird's-foot-trefoil, pignut, and tormentil. There is variation and grading across the habitat in the frequency and diversity of species of herbs present, moving between semi-improved indicators of neutral, acid, and marshy grasslands.</p>
Field I	SO 18327 73009	<p>Sloping area of ground within Field I with similar characteristics to the grassland details above.</p> <p>The grassland contains a higher frequency and increased diversity of species than that seen in the rest of the field, due to inaccessibility for agricultural improvement.</p> <p>There is a good range of grasses including sweet vernal-grass, cocksfoot and red fescue. Herbs identified within the sward were: pignut, bulbous buttercup, common bird's-foot-trefoil, germander speedwell, tormentil, bitter-vetch (<i>Lathyrus linifolius</i>), common knapweed, lesser stitchwort, and rough hawkbit.</p>
Field 14	SO 18051 72878	<p>South-facing slope against the north boundary of Field 14, against Fron-felen Wood.</p> <p>The grassland contains woodland and neutral grassland species. Species include scattered bracken, lesser celandine, barren strawberry, dog violet and bluebell.</p>
Field 24, 25, and 26	SO 18155 72683 SO 18046 72709 SO 18268 72739	<p>c.1.3ha of degraded marshy grassland due to grazing, drainage, and additional agricultural improvement intervention.</p> <p>This area extends along the south banks of the stream, Nant yr Wyn through Fields 24, 26 and 25, linking to a water source in Field 24 (SO 18197 72673). Areas of degraded marshy grassland continue in adjacent fields to the west, along the south side of Nant yr Wyn, in neighbour-owned fields.</p> <p>The habitat is dominated by grass, particularly Yorkshire fog, and has variation in rush frequency. There is a change from wet to dry ground indicators with the habitat category moving from semi-improved neutral grassland to improved grassland over dry, more accessible, areas further up the slopes that have much stronger signs of agricultural improvement.</p> <p>The sward is relatively species-poor, with scattered stands of soft and jointed rush, with creeping and meadow buttercup, lesser celandine, floating sweet-grass, cuckoo flower, and with rare frequency, lesser spearwort.</p>
Field 24 and 21	SO 17927 72550	North-facing slopes with connectivity to unimproved acid

	SO 17903 72380	grassland under bracken of Field 23 and the watercourse Nant yr Wyn. Both areas are slopes, less accessible to machinery. The areas show an increase in diversity of species and frequency of herbs which appear different to the grassland on flatter areas within their field. Field 21: herbs include pignut, common sorrel, and common bird's foot-trefoil, meadow- and bulbous buttercup. Field 24: herbs include abundant lesser celandine, with occasional lesser stitchwort, meadow buttercup, and common sorrel.
Field 20 (Target Note 7) and 21 (incl. Target Note 2, 3, 5 and 6)	SO 18260 72401 SO 18047 72346	Southwest-facing slopes, small areas of grassland less accessible to machinery. The areas show an increase in diversity of species and frequency of herbs which appear different to the grassland on flatter areas within their field. Field 20: increase in herb frequency, lesser celandine, yarrow pignut, and lesser stitchwort. Field 21: elements of woodland flora. Red clover, meadow and bulbous buttercup, bluebell, pignut, yarrow, lesser stitchwort. Grassland grades into areas of scattered bracken at the base of each slope.
Field 17	SO 18456 72646	Field 17 is degraded neutral/marshy grassland. It could be classified under 'semi-improved grassland', however it contains a low frequency of herbs with variation relating to dampness of soil. The sward is dominated by grass species. Herb species include meadow, creeping and bulbous buttercup, common sorrel, hogweed, lanceolate plantain, broad-leave dock. Very localised field wood-rush and pignut, and a rare frequency of meadow vetchling.

B4 Improved grassland

Area of improved grassland: 25.4ha

The areas of improved grassland identified within Pentwyn can be generalised gently sloping or flat land accessible to machinery and livestock. The ground has been subject to a range of agricultural improvements including drainage, historic re-seeding, and intense grazing.

The grass sward is uniform, grass dominated and species-poor. There is little variation between fields, although some fields are more apparent, showing a higher intensity of agricultural improvement, with a prominent low diversity in grass and herb species. Across most fields there is little variation within a field boundary, small changes on floral diversity were observed where slopes, banks or wet ground was present that has preserved a wider range of species or affected access by machinery and livestock.

Name/location	Grid reference (approx. centre)	Description
North section of Pentwyn: Field 4, 5, 9, 12, 13, 14, and 16.	SO 18322 73202, SO 18112 73309, SO 17778 73359, SO 18043 73020, SO 18021 73236,	Within the north area of Pentwyn improved grassland extends along the centre and west boundary of the farm. The improved grassland appeared uniform within each field boundary, except for Field 4 and 5. Within Field 4 and 5 the improved grassland grades into semi-

	SO 18076 72848, SO 18237 72856	improved neutral grassland as the slope increases to the east.
South section of Pentwyn: Field 18, 19, 20, 21 (incl. Target Note 4), 22, 24, 25, 26, 32	SO 18390 72577, SO 18259 72588, SO 18192 72451, SO 17970 72356, SO 18143 72540, SO 18096 72583, SO 18301 72706, SO 18039 72653, SO 18303 72634	Improved grassland dominates the south areas of Pentwyn, south of the Nant yr Wyn watercourse. Improved grassland extends from the east boundary of Pentwyn, raising uphill to the west boundary to an elevation of 359m. There is little variation in sward diversity, the fields are defined by a grass dominated sward with low frequency and poor species diversity. Herbs include common sorrel, lesser celandine, buttercup species and tall ruderal species including nettle and thistle. Field 21: improved grassland with a low species diversity. There are scattered soft rush tussocks across the top of the field.

B5 Marshy grassland

Area of marshy grassland: 3.7ha

The areas of marshy grassland within Pentwyn are wetter ground with a high frequency of rush species within the sward. In the north area of Pentwyn scattered areas of marshy grassland are located along the north and east boundary, on slopes extending to the River Lugg. Across the south area of Pentwyn marshy grassland extends along the north bank of the Nant yr Wyn and around a drainage stream connecting to the Nant yr Wyn.

The extent of marshy grassland has been limited and degraded due to agricultural improvements, with drainage likely to be a significant factor. Many areas of the habitat surrounded marshy grassland are semi-natural neutral grassland, which includes grazed or degraded marshy grassland.

Name/location	Grid reference (approx. centre)	Description
Field 6, 7, and 8	SO 17977 73508, SO 17885 73415, SO 17821 73445	<p>Three areas of marshy grassland along the north boundary of Pentwyn, leading down to the River Lugg.</p> <p>The areas of marshy grassland are within similar areas of semi-improved neutral grassland. The areas are associated with natural drainage features and additional wet woodland/scrub habitat.</p> <p>The marshy grassland in Field 6, appears to be a natural, relatively unimproved wetland feature within a mosaic of bracken, acid grassland and willow scrub. The area contains a high diversity of grass, herb, sedge, and rush species including creeping soft-grass, marsh valerian, tormentil, and greater bird's-foot trefoil.</p> <p>The habitat mosaic of Field 6 continues upstream along the River Lugg on Cnwch bank (SO 17881 73531). Drainage streams from Field 7 and 8 bring the marshy grassland up the slopes into these two fields.</p> <p>The marshy grassland areas of Field 7 and 8 have frequent jointed/soft rush cover, with abundant Yorkshire fog. The areas also contained sweet vernal-grass and crested dog's-tail grasses. Herbs through the sward included great bird-foot's-trefoil, bog stitchwort, lesser stitchwort, marsh bedstraw, and sedge</p>

		<p>species.</p> <p>The northwest corner of Field 7 is a wet, marshy area against a stream. The area is overhung by willow. The sward is dominated by jointed and soft rush with brooklime, marsh bedstraw, and bog stitchwort.</p> <p>All these areas are connected as one mosaic by their drainage channels and the course of the River Lugg.</p>
Field 5 and 4	SO 18240 73427, SO 18419 73138, SO 18448 73034	<p>Three areas of marshy grassland within a mosaic of habitats on slopes leading down to the River Lugg.</p> <p>The areas of marshy grassland are within similar areas of semi-improved neutral grassland. The areas are associated with natural drainage features, and border areas of bracken and native scrub.</p> <p>There are areas of grazed rush (grazed marshy grassland) across Field 5, within areas mapped as semi-improved neutral grassland and improved grassland.</p> <p>There is a defined area of marshy grassland towards the northeast of Field 5, bordering scattered bracken. The area contains sharp-flowered rush with sedge species and herbs including marsh bedstraw, and greater bird's-foot-trefoil.</p> <p>In Field 4 marshy grassland extends down from a line of hazel, along the north side of a bracken covered gully. The area is dominated by rush species. The sward contains sedge species with meadow buttercup and marsh bedstraw. The area has a defined edge, turning to drier semi-improved neutral grassland.</p>
Field 27 and 28	SO 18072 72751, SO 18262 72772	<p>There is a continuous area of marsh/marshy grassland along the north banks of the Nant yr Wyn. The marshy grassland extends up the slope of the fields 27 and 28, grading into semi-improved grassland. There are areas of swamp and marginal vegetation, forming a mosaic of wet habitats alongside the stream.</p> <p>The marsh and marshy grassland vary in species composition between areas dominated by sharp-flowered and soft rush tussocks and areas of meadowsweet and common valerian.</p> <p>Herbs through the marsh area include meadow vetchling, marsh marigold, greater bird's-foot-trefoil, willowherb sp., and field horsetail.</p> <p>There are areas of short, open vegetation and bare ground under the branches of willow trees against the stream. These areas have creeping buttercup, opposite leaved golden saxifrage and lesser spearwort.</p>
Field 18	SO 18345 72489	<p>Field 18 has a drainage channel which turns into a seasonal stream with marginal vegetation draining into the Nant yr Wyn at the southeast corner of the field. There is an area of marshy grassland along the west edge of the drainage channel, most pronounced across a slope against the west hedgerow. The area of the slope is covered in soft rush tussocks and Yorkshire fog with water held in track hollows. Herbs through the rush sp. include creeping buttercup, meadow buttercup, lesser spearwort, and cuckoo flower.</p> <p>East of the drainage channel the sward is improved grassland.</p>

Target Note 1, Field 23.	SO 17834 72430	Marshy grassland under continuous bracken. Yorkshire fog grassland with frequent meadowsweet, lesser celandine, rush species, wood-rush species.
--------------------------	----------------	---

B6 Poor semi-improved grassland

Area of poor semi-improved grassland: 10.5ha

This habitat category has been used to identify and map areas of grassland that fall between improved and semi-natural neutral/acid grassland. The swards of these fields are uniform, and grass dominated with a frequency of herbs that moves it away from improved grassland but diversity of herbs that prevents allocation of a likely soil type.

Across the north area of Pentwyn poor semi-improved grassland has a similar distribution, and is largely alongside fields of improved grassland, following the incline of the hill and covering areas most accessible by machinery and livestock. The fields are dominated with grass species with little variation across each field, with small areas of increase herb frequency or diversity.

In the south area of Pentwyn poor semi-improved grassland is more scattered, located in areas of gently sloping ground in fields of improved grassland where there was a slight change in the frequency of species, potentially indicating a lower impact from agricultural improvement.

Name/location	Grid reference (approx. centre)	Description
Field 1, 2, 10, 11, 13, and 15	SO 18391 72889, SO 18168 73047, SO 17967 73135, SO 17880 73267, SO 18020 73234, SO 18249 72937	<p>Poor semi-improved grassland covers the central and south area of the field. There is a range of grass species including sweet vernal-grass, Yorkshire fog, crested dog's-tail, red fescue, and bent species alongside perennial ryegrass. The sward was herb-poor but included field wood-rush, meadow/bulbous/and creeping buttercup.</p> <p>Field 2 grass dominated with herbs through the sward, areas of dry bank with species indicating acid grassland.</p> <p>Field 10 and 11 have a grass dominated sward with a low diversity of herbs present throughout. Herbs in the sward include bulbous and meadow buttercup, red clover, lesser trefoil, and field wood-rush. In Field 10 there were two locations with a rare frequency of yellow rattle (Target Note 9 and 10).</p> <p>Field 13 has a similar, uniform and grass dominated sward to fields 10 and 11.</p> <p>Field 15 has a mosaic of bracken, tall ruderal and poor semi-improved grassland across its southeast area. The poor semi-improved grassland is dominated by grass species including Yorkshire fog, perennial ryegrass, crested dog's-tail, cock's foot, and bent species. Other species present at a low frequency include lesser celandine, and field wood-rush.</p>
Field 18, 22, 27, and 28	SO 18284 72496, SO 18074 72536, SO 18010 72769, SO 18197 72787	<p>Field 18 has a drier area of grassland, west of the marshy grassland near its centre. The appears to have a lower frequency of species to the marshy grassland area lower down the slope.</p> <p>Field 22 is largely improved grassland, there is a north-facing slope near the Pentwyn plantation which appears to have an</p>

		<p>increase in species frequency and diversity. Locally frequent species include lesser stitchwort, lesser celandine, and pignut.</p> <p>Fields 27 and 28 grade from marshy grassland to poor semi-improved grassland as you move up the slope, away from the Nant yr Wyn. The sward is dominated by grass species including abundant Yorkshire fog, bent species and red fescue. Additional species throughout the sward include lesser celandine, meadow buttercup, thistle sp., broad-leaved dock, and nettle.</p>
--	--	---

CI.1 Continuous bracken

Area of continuous bracken: 3.5ha

Areas have a continuous cover of bracken across the area, it is the dominant species over sparse ground flora or grassland.

Across the north area of Pentwyn continuous bracken is associated with the northeast and east-facing slopes leading down to the River Lugg. The bracken forms part of a natural mosaic of natural habitats lining the watercourse. Habitats linking to the bracken include scrub, unimproved grassland, and marshy grassland/wet habitats. The areas of bracken are within areas with lower accessibility for machinery and livestock.

In the south area of Pentwyn continuous bracken is within one area, Field 23 on a north facing slope between areas of plantation and broad-leaved woodland.

Name/location	Grid reference (approx. centre)	Description
River Lugg - Northeast and east facing slopes	SO 18258 73451, SO 18413 73317, SO 18428 73082	The bracken is within and blends into areas of scattered and continuous scrub further down the slopes leading to the River Lugg. Moving up the slopes, the bracken gives way to grassland. The areas of bracken are unimproved with a good diversity of species in the ground flora, including acid grassland.
Stream along Fields 3, 2 and 1	SO 18197 73125, SO 18252 73085	There is a steep slope at the south boundary of Field 3 with scattered trees and bracken over unimproved grassland similar in species composition to adjacent semi-improved grassland. The slope extends down to a small watercourse/drainage channel with sloping sides (across Field 2 and 3). The bracken extends down the slope of Field 3 to a hedgerow/treeline and continues up the south slope of the channel within Field 2. Within Field 2 the bracken runs along the edge between the hedgerow/treeline and poor semi-improved grassland of the field, separated by a track. The bracken contains areas of wet, marshy grassland formed by water-filled tracks and small areas of acid grassland. The wetter areas have species including bog stitchwort, marsh bedstraw and rush species.
Field 15	SO 18187 72966	The northern area of Field 15 is a south-facing sloping bank covered in bracken. The bracken has sparse vegetation growth underneath, including creeping soft-grass and scattered fox glove. The slope has sections of bare soil and narrow terraced steps. The bracken is broken in places with narrow strips of acid grassland, gorse scrub and scattered trees.

Field 23	SO 17852 72443	<p>A north-facing slope covered in bracken with areas of wet, marshy grassland (below the track) and neutral grassland (above the track).</p> <p>Above the track grassland below the bracken contained bluebell, greater stitchwort, pignut, with abundant Yorkshire fog.</p> <p>Below the track the ground is much wetter with meadowsweet, bluebell, pignut, and a wood-rush sp. There is wood anemone along the north boundary of the field.</p>
----------	----------------	---

C1.2 Scattered bracken

Area of scattered bracken: 1.3ha

Areas have a scattered cover of bracken with ground flora underneath similar to adjacent grasslands.

Across the north and south areas of Pentwyn scattered bracken forms small and linear features mostly extending out alongside hedgerows and habitat boundaries.

Name/location	Grid reference (approx. centre)	Description
Field 2	SO 18200 73000	Narrow strip against south hedgerow. Scattered bracken over grassland with nettle.
Field 6	SO 17920 73544 SO 18013 73457	- Northwest corner, over unimproved grassland. - Southeast corner, over unimproved grassland.
Field 8	SO 17804 73406	Against south hedgerow.
Fields 10&11	SO 17951 73242	Narrow strip of scattered bracken against the east hedgerow. Over species-poor semi-improved grassland.
Field 12	SO 18108 73017	Narrow strip of scattered bracken against the east hedgerow. Over improved grassland.
Field 13	SO 18023 73338	Northeast corner of field, over semi-improved grassland.
Field 14	SO 18078 72819	Narrow strip of scattered bracken against south hedgerow. Over improved grassland.
Field 15	SO 18263 72986	Northeast corner of the field, south of the track. Over improved grassland.
Field 20	SO 18093 72366 SO 18094 72460 SO 18199 72519 SO 18258 72500	- Against hedgerow, southwest corner of field. Over grassland. - Against northwest hedgerow. - Against east hedgerow.
Field 21	SO 17908 72389 SO 18070 72336	Against north hedgerow. North-facing slope. Southeast corner of the field. Both areas over semi-improved neutral grassland.
Field 23	SO 17893 72413	Southeast area of Field 23. Area of felled larch, scattered bracken over neutral grassland.

C3.1 Tall ruderal

Area of tall ruderal: 0.7ha

Across Pentwyn, areas of tall ruderal are areas within grassland dominated by either nettle or broad-leaved dock.

The areas of tall ruderal are typically narrow bands of vegetation against hedgerows or fence lines. There are some small, defined stands of tall ruderal within fields of improved grassland, indicating past soil disturbance in localised areas.

Name/location	Grid reference (approx. centre)	Description
Field 1	SO 18450 72861 SO 18294 72986	- Small block of nettle against east hedgerow. - Strip against west hedgerow, nettle with scattered bracken and foxglove.
Field 5	SO 18176 73258	Narrow strip against south hedgerow.
Field 9	SO 17838 73349	Area of nettle around horse chestnut tree.
Field 15	SO 18210 72922 SO 18190 72904 SO 18279 72942	- Nettle, within footprint of former Fron-felin site. - Band of nettle against south hedgerow. - Area of nettle in centre of the field.
Field 17	SO 18409 72743	- Area of nettle and broad-leaved dock across north end of the field.
Field 18	SO 18280 72520 SO 18425 72499 SO 18367 72643	- Band of nettle and broad-leaved dock against north hedgerow. - Area of nettle and broad-leaved dock within field. - Band of nettle and broad-leaved dock against north fence.
Field 20	SO 18245 72519 SO 18168 72479	- x3 Bands of nettle against east hedgerow. - x2 Bands of nettle alongside former track.
Field 22	SO 18146 72521 SO 18080 72465	- Area of nettle within the field. - Small area of nettle within the field.
Field 25	SO 18267 72732	Band of nettle in north of field.
Field 27	SO 17924 72779	Broad band of nettle along the west hedgerow of the field.
Field 28	SO 18155 72792	Area of nettle against north hedgerow.

F1 Swamp

Area of swamp: 0.1ha

Across the north area of Pentwyn there is no habitat that clearly falls into this category.

Across the south area of Pentwyn areas of swamp are within the mosaic of wet habitats running alongside Nant yr Wyn.

Name/location	Grid reference (approx. centre)	Description
Field 27 and 28	SO 18120 72745, SO 18169 72738	Within the marsh and marshy grassland bordering the north banks of Nant yr Wyn are areas which have a prominent dominance by lesser pond sedge. Additional species present include marsh marigold, rush species and meadowsweet. The areas are wetter than the surrounding marsh. The areas of swamp border the watercourse, marginal

		vegetation, and areas of marsh/marshy grassland.
--	--	--

F2.1 Marginal vegetation

Area of marginal vegetation: 0.07ha

Across the north area of Pentwyn there is no habitat that clearly falls into this category.

Across the south area of Pentwyn areas of marginal vegetation are within the mosaic of wet habitats running alongside Nant yr Wyn.

Name/location	Grid reference (approx. centre)	Description
Field 24, 26, 27 and 28	SO 18016 72723 SO 18170 72725, SO 18135 72736	Along the banks of the Nant yr Wyn there are narrow bands and small areas of marginal vegetation. The vegetation within each stand varies in diversity but all include stands of meadowsweet and common valerian. Additional species include marsh marigold, sweet-grass species, brooklime, field horsetail and rush species.
Field 18	SO 18393 72473	Marginal vegetation alongside and within the drainage channel at the south corner of the field. Species include a sweet-grass species, brooklime, lesser spearwort, and a willowherb.

J2 Boundaries

Boundary types identified within the Pentwyn boundary:

- Intact species-poor hedgerow
- Defunct species-poor hedgerow
- Hedge and trees
- Fence

Intact species-poor hedgerow: The majority of field boundaries across Pentwyn are managed, intact (appear stockproof) species-poor hedgerows. Species richness was assessed based on the diversity of native woody species in the hedgerow, additional native shrubs, and ground flora of the hedgerow. The hedgerows were dominated with hawthorn, blackthorn, and hazel. There was a very limited frequency of elder and willow in managed hedgerows.

Defunct species-poor hedgerow: There are hedgerows with gaps of hawthorn, blackthorn, and hazel. The hedgerows are not stockproof with additional fencing forming a boundary.

Hedge and trees: Located across Pentwyn there are hedgerows with standard trees or unmanaged hedgerow species. Hedgerows with trees are associated with watercourses and drainage stream across Pentwyn, forming good habitat links with trees and woodland.

For further details on individual hedgerow condition and species lists see the PentwynHabitat_Line attribute table within the QGIS files.

G2 Running water

Additional coding for running water e.g. eutrophic, mesotrophic and oligotrophic, were not used as part of the phase I survey as not enough is known about water quality for the site and individual watercourses.

There are two watercourses that run through Pentwyn: the River Lugg that borders the north and east of the north area of Pentwyn, and the Nant yr Wyn which runs through fields along the north and east of the south area of Pentwyn.

The River Lugg is located in an undulating valley, with north- and east-facing slopes which decrease moving towards the B4356.

There are drainage channels and seasonal streams that run down into the River Lugg, all associated with a mosaic of semi-natural and natural habitats including marshy grassland and native scrub.

The Nant yr Wyn is located within gently sloping fields. The stream is edged by a mosaic of marginal vegetation, swamp, and marsh before turning south and becoming a stream alongside semi-improved grassland alongside a hedgerow of remnant wet woodland.

There are small drainage streams draining into the Nant yr Wyn associated with semi-improved marshy grassland and small areas of marginal vegetation.

4 Summary of habitats and areas of interest

Pentwyn - North area

The north area of Pentwyn is located over a sloping hill, descending to the River Lugg along its north and east boundary. The area is grassland intersected by dingles, with seasonally wet or flowing streams (red arrows of Figure 1). These features are surrounded by, and support, natural habitat features of native scrub and woodland. The undulating and sloping nature of the landscape has preserved a mosaic of habitats along the north and east boundary of Pentwyn with neutral, acid, and wet ground flora (red dashed line of Figure 1). The mosaic of wet and dry habitats has been reduced and restricted in extent by past agricultural improvement actions.

Management of the landscape to reduce drainage and implement appropriate grazing would allow the expansion, and linking of wet and semi-natural habitats, and increase the diversity of flora moving up the slopes of the hill, into more highly improved grassland.

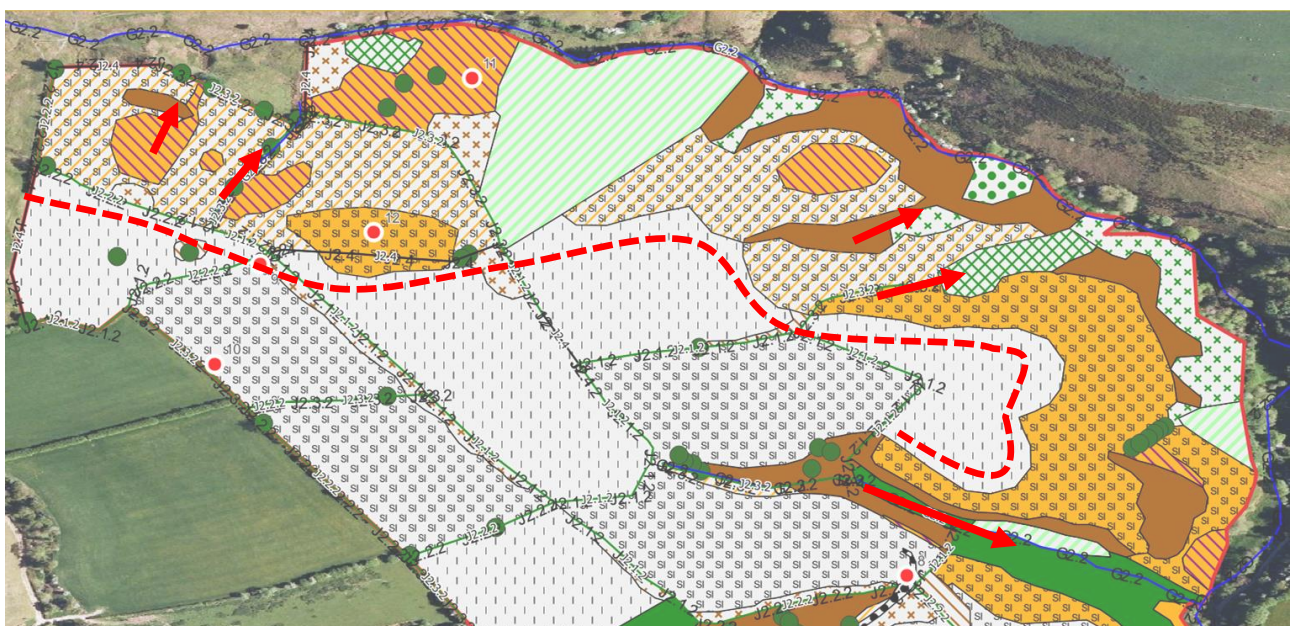


Figure 1: North area of Pentwyn, highlighting the band of habitat mosaic along the River Lugg. Red arrows indicate dingles flowing to River Lugg. Red dashed line indicates upper limit of semi-natural/natural habitat mosaic.

Fron-felen wood, on the west boundary is a south-facing semi-natural broad-leaved woodland against a bracken slope with areas of acid grassland. There is a natural band of south-facing slope which extends east-west to a wooded dingle with bracken, acid- and semi-improved grassland, indicated by the red dashed lines in Figure 2. The area has potential to develop as a wooded, scrub and semi-natural grassland mosaic, increasing connectivity between wider areas of woodland west and south of the site to the woodland dingle and River Lugg (see Appendix 2: Treescapes across Pentwyn).

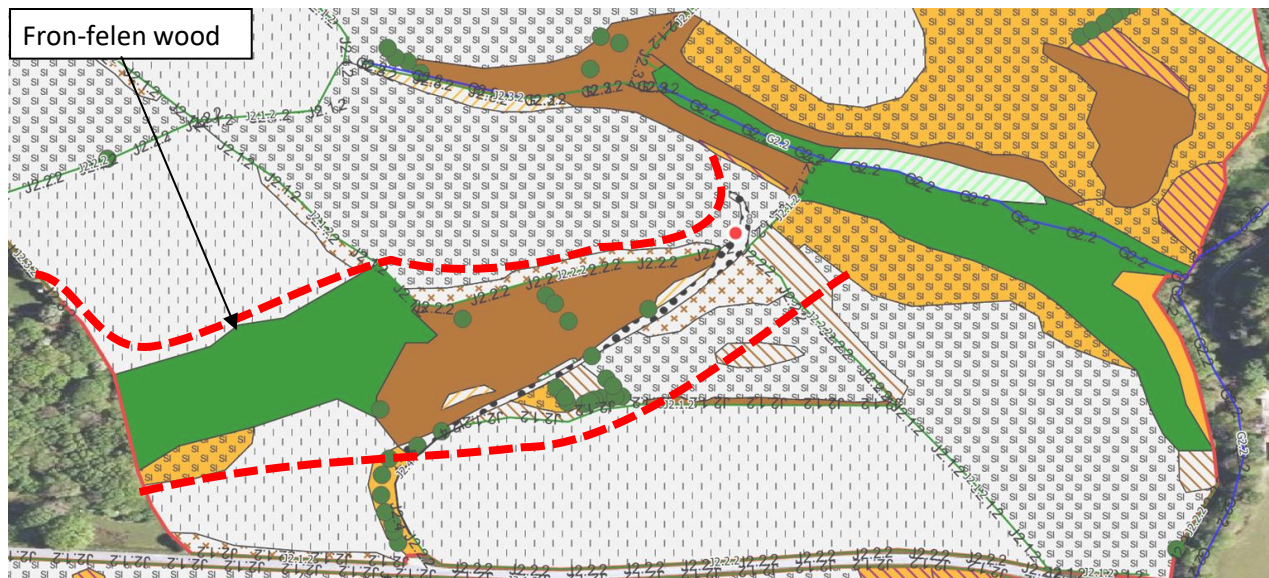


Figure 2: North area of Pentwyn, Fron-felen wood. Red dashed line indicating the area of woodland, bracken and scrub that extends as a band along a south-facing slope.

Pentwyn - South area

The south area of Pentwyn is located over a sloping hill, descending to the Nant yr Wyn along its north and east boundary. The improved grassland grades to semi-improved neutral/degraded marshy grassland and a mosaic of marshy grassland and swamp habitats against the watercourse. Sloping and wet ground has preserved a mosaic of habitats along the north and east boundary of Pentwyn (red dashed line of Figure 3). The mosaic of wet habitats has been reduced and restricted in extent by past agricultural improvement actions.

Decreasing drainage, slowing flow, into all watercourse features in the south area offers high potential to increase the extent of existing wet habitat mosaics and move marshy grassland species into areas of semi-improved and improved grassland.

The Nant yr Wyn extends along the west boundary of the south area, within a narrow channel that is bordered by woodland (outside ownership) and areas of marshy grassland and bracken (Field 23). The existing habitats and landscape provide potential for increased connectivity along the watercourse through development of alder and willow scrub, marshy grassland, and neutral grassland.

Developing the wooded and scrub areas along the Nant yr Wyn running south-north along the west boundary would increase the connectivity between Fron-hir wood and Fron-felen wood, Figure 3.



Figure 3: South area of Pentwyn, Nant yr Gyn along the west and north of the area. Red dashed line indicates current upper extent of semi-natural habitats. Solid red arrow indicates area offering potential to connect neighbouring woodlands through developing a habitat mosaic along the watercourse.

Habitats of interest

The habitat survey has identified broad areas of bracken and scrub cover with semi- and unimproved grassland ground flora. It would be beneficial to carry out further investigation of these areas to better understand the nature of the grassland communities to inform management of the areas. There is potential that reducing bracken cover could allow expansion of unimproved ground flora and additional management actions could aid the movement of unimproved communities to move 'up-slope' into grassland that has been subjected to a higher impact from agricultural improvements.

There are areas of the River Lugg that were inaccessible for this survey, particularly where there are steeper slopes leading down to the river corridor. Further investigation of the habitats in proximity of the river would be beneficial to provide further detail on the habitat mosaics the river corridor supports along with species of interest. Further information on the river-side habitats could also feed into aims of 'slow the flow' with possible, appropriate use of measures such as leaky dams to increase the extent of wet habitat features.

Wet and marshy habitat features are significantly impacted by 'hard' agricultural improvement actions such as drainage, use to implement long-term change to ground conditions. Actions to remove artificial drains within fields and aid water retention in the more natural drainage features of Pentwyn would likely have significant impacts to aid retention and expansion of existing wet habitats.

Semi-improved and improved grasslands are a significant feature across Pentwyn although there is variation in species composition across the site, landscape features and within fields, which indicate acid and neutral habitats. The improved grasslands of Pentwyn will require active management to decrease the nutrient levels in the soil and increase floral diversity.

Recommended actions for semi-improved and improved grassland habitats are:

- Dismantling of artificial drainage to aid new species community establishment.
- Creation of leaky dams within natural depressions or ditches to increase ground wetness.
- Successional hay/silage cuts, without adding fertiliser, to remove nutrients over several years.
- Grazing that allows a longer sward that is beneficial to wildlife.
- Timing of grazing and cutting to allow existing herbs to set seed and increase in frequency and existing distributions. There is potential for existing herb communities to expand.
- Spreading of green hay and/or yellow rattle seed to actively increase neutral and acid grassland species.

5 **References**

D. Drewett, DE Parry, H. Drewett (2021). *Field by field botanical assessment of RWT Pentwyn Farm, Autumn 2021*.

JNCC (2010 edition). Handbook for phase I habitat survey. Peterborough: JNCC.

6 Appendix I: Photographs



Plate 1: Oaks Coppice, mature oak with bluebell ground flora. Plate 2: Looking across Nant yr Wyn to Fronfelen Wood (top-left corner).



Plate 3: Earth bank with acid grassland and bracken (Field 15). Plate 4: Bracken and acid grassland bank (Field 15).



Plate 5: Semi-natural grassland over bank (Field 1). Plate 6: Semi-natural grassland, degraded marshy grassland (Field 24).



Plate 7: Marshy grassland, swamp, and marginal vegetation along the Nant yr Wyn (Field 27, looking east).



Plate 8: Marshy grassland (rush), semi-improved neutral grassland, and larch plantation (Field 4, looking east).



Plate 9: Marshy grassland, bracken (over acid grassland) and willow scrub (Field 6, looking east).

7 Appendix 2: Treescapes across Pentwyn

