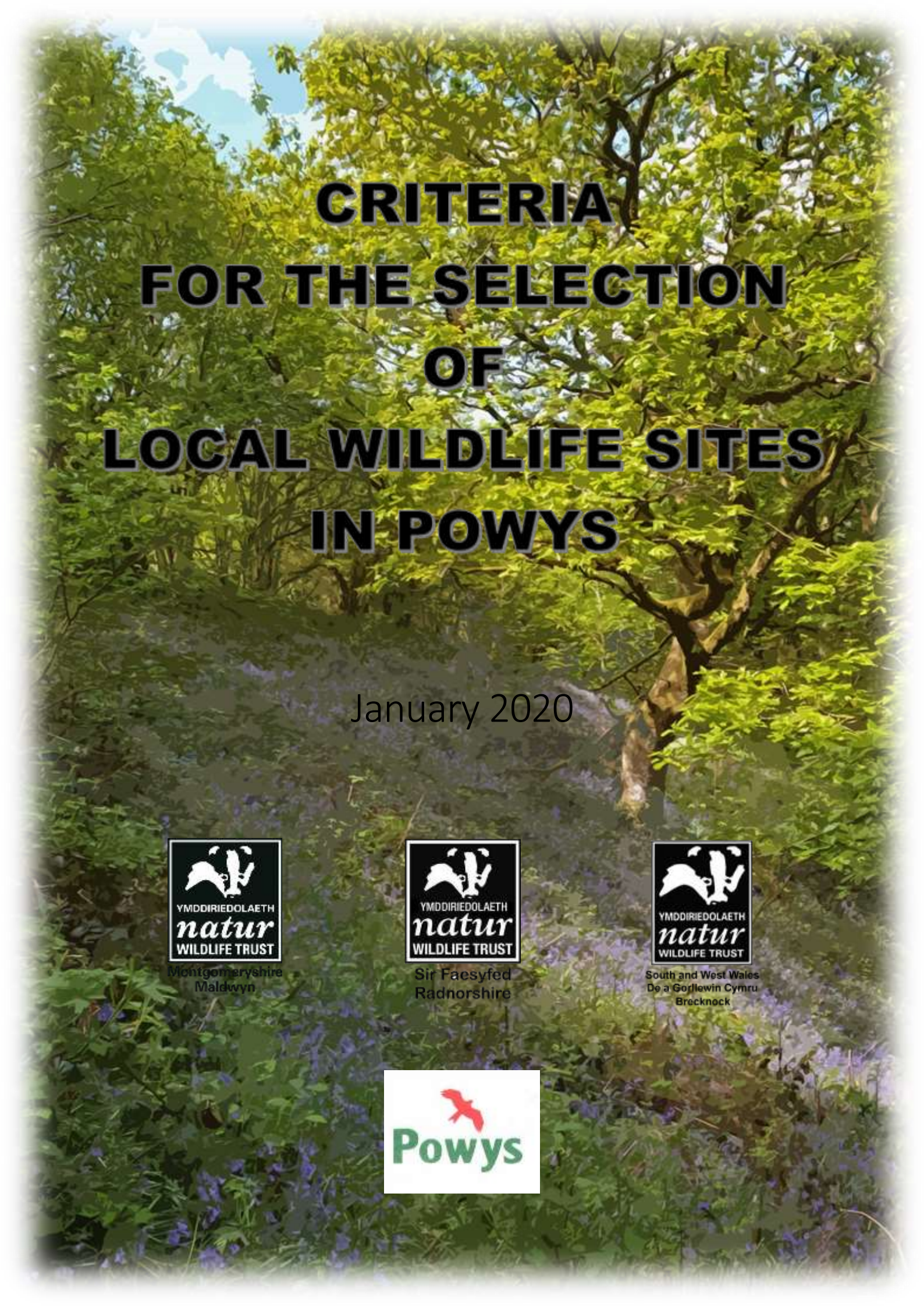

CRITERIA FOR THE SELECTION OF LOCAL WILDLIFE SITES IN POWYS

January 2020

YMDDIRIEDOLAETH natur WILDLIFE TRUST
Montgomeryshire
Maldwyn

YMDDIRIEDOLAETH natur WILDLIFE TRUST
Sir Faesyfed
Radnorshire

YMDDIRIEDOLAETH natur WILDLIFE TRUST
South and West Wales
De a Gorllewin Cymru
Brecknock

Powys

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Policy Framework

Environment (Wales) Act 2016

The Environment (Wales) Act aims to build greater resilience into our ecosystems. Biodiversity and well-functioning ecosystems provide natural solutions that build resilience, which in turn help society create jobs, support livelihoods and human well-being, adapt to the adverse impacts of climate change and contribute to sustainable development.

Section 6 of the Act introduced an enhanced biodiversity and resilience of ecosystems duty (the S6 duty) for public authorities in the exercise of functions in relation to Wales. The S6 duty requires that public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems.

Section 7 replaces the duty in Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales – Section 7 habitats and species. The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section and encourage others to take such steps.

Part 1 of the Act, including Sections 6 and 7, came into force on May 21, 2016.

Planning Policy Wales (PPW) 10

Planning Policy Wales Edition 10, December 2018, sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.

PPW 10 considers Local Wildlife Sites as follows:

Figure 11: Designated Sites Hierarchy

Tier	Name	Statutorily and Non Statutorily Protected Sites
International	Special Area of Conservation	Statutory
	Special Protection Area	Statutory
	Ramsar sites	Statutory
	UNESCO Biosphere Reserve	Non-Statutory
National	Site of Special Scientific Interest	Statutory
	National Nature Reserve	Statutory
Local	Sites of Importance for Nature Conservation	Non-Statutory
	Local Nature Reserve	Non-Statutory
	Local Wildlife Sites	Non-Statutory

Protection for Non-statutory Designations – "*6.4.20 Although non-statutory designations carry less weight than statutory designations, they can make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given adequate protection in development plans and the development management process. Before authorising development likely to damage a local wildlife designation, planning authorities should give notice of the proposed operation to the County Ecologist and third sector environmental organisations. Where a Green Infrastructure Assessment* has identified that certain features or characteristics of the site need to be conserved or enhanced, planning authorities should state in their development plans what features or characteristics require this extra protection and why, and explain how the policies will achieve this protection. Assessments should similarly consider the presence of protected and priority species including those on the Section 7 list and appropriate weight attached to their protection. Policies for non-statutory sites should make it clear that such designations do not preclude appropriate developments, where there are no adverse impacts on the features for which a site is designated.*"

*NOTE: The Green Infrastructure Assessment for Powys has not yet been written. PPW10 was produced too late to be incorporated into the 2018 Powys Local Development Plan (LDP). It is currently anticipated that this will be done as part of the planned review of the LDP in 2022.

Technical Advice Note (TAN) 5: Nature Conservation and Planning

TAN 5 of Planning Policy Wales, produced in 2009, is one of a series of Technical Advice Notes (TANs) which supplement Planning Policy Wales. Section 5.5 covers 'Local Sites':

"*5.5.1 Local sites have an important role to play in meeting biodiversity targets and contributing to the quality of life and well-being of the community. Paragraph 5.3.11 of PPW explains the policy in respect of such sites. Policies in UDPs and Local Development Plans provide for their protection. The nature conservation interests for which they have been designated are a material consideration in planning decisions.*

5.5.2 Locally designated sites should be subject to the application of rigorous criteria to ensure their designation is justified on biological or geological grounds. The process of designating and maintaining the sites should be transparent with records and assessments publicly available, unless information about particular species is sensitive in terms of theirprotection. Developers should be able to identify how their proposals may affect the interests for which the sites are designated (either positively or negatively) and where relevant, how the sites contribute to wider ecological networks or mosaics.

5.5.3 The conservation and enhancement of locally designated sites is an important contribution to the implementation of Biodiversity Action Plans and to the management of features of the landscape of major importance for wild flora and fauna (see paragraph 3.2.2 above). Developers should avoid harm to those interests where possible. Where harm is unavoidable it should be minimised by mitigation measures and offset as far as possible by compensation measures designed to ensure there is no reduction in the overall nature conservation value of the area or feature. Where locally designated sites may be affected, developers should consult the local planning authority and Wildlife Trust and/or Local Record Centre to agree the information that will be required to assess the implications of the development and mitigation and compensatory measures.

5.5.4 Where development proposals may affect national or local BAP habitats or species the same principles apply as to locally designated sites in paragraph 5.5.2 above (see further habitats and species of principal importance for biodiversity in Wales in section 6.5 below)."

Powys Local Development Plan (LDP), adopted April 2018

Local Wildlife Sites are a material consideration in the Local Authority Planning (LPA) system, covered under LDP Policy DM2 – The Natural Environment, which states:

"*Development proposals shall demonstrate how they protect, positively manage and enhance biodiversity and geodiversity interests including improving the resilience of biodiversity through the enhanced connectivity of habitats within, and beyond the site.*

Development proposals which would impact on the following natural environment assets will only be permitted where they do not unacceptably adversely affect:"

"*3. The locally important site designations, habitats and species including:*

- *A. Local Nature Reserves;*
- *B. Local Biodiversity Action Plan Habitats and Species; and*
- *C. Regionally Important Geodiversity Sites and Geological Conservation Review Sites.*

Development proposals likely to have an adverse impact upon these sites, habitats or species will only be permitted where it can be demonstrated that:

- *i. They conserve and where possible enhance the natural heritage importance of the site, habitat or species; or*
- *ii. The development could not reasonably be located elsewhere; and*
  - *a. The benefits of the development outweigh the natural heritage importance of the site, habitat or species; and*
  - b. *Mitigation and/or compensation measures are provided where adverse effects are unavoidable.*"

The Powys LDP Supplementary Planning Guidance for Biodiversity and Geodiversity, adopted October 2018, clarifies this further, as follows:

"*6.26 As well as sites referred to in Policy DM2, there are a number of other important locally designated sites, which applicants' proposals will need, to 'demonstrate how they protect, positively manage and enhance'.*

6.27 The most common of these local designations are ***Sites of Interest for Nature Conservation (SINC)****. These are assessed and selected using specific criteria, which recognise their wildlife value, agreed by members of the Powys Biodiversity Partnership (see Appendix B). These sites help meet local and national biodiversity objectives and contribute to the quality of life and well-being of the local community. SINC are not necessarily open to the public, with the majority having no public access at all. Should a site visit be necessary for surveying purposes then applicants must contact the landowner to seek permission to enter the site.*

6.28 When a SINC has been identified, subsequent negotiations with the landowner can result in a management agreement being drawn up and the site becoming a ***Local Wildlife Site (LWS)****. Where funding allows, these additional negotiations are usually carried out by the three Wildlife Trusts (WT) that operate in Powys (see Appendix B).*"

Acknowledgements

These criteria for the selection of Local Wildlife Sites in Powys have been developed over three years, as part of the 'Where the Wild Things Are' project. We thank all the surveyors who gathered data from existing and potential Local Wildlife Sites, providing real world data to inform this process. Many individuals have given a significant amount of their time to write, inform and finalise these criteria, namely Julian Jones and Darylle Hardy at Radnorshire Wildlife Trust, Stephanie Coates and Sarah Woodcock at The Wildlife Trust for South and West Wales, David Drewett (Natural Resources Wales) and Ray Woods. We'd also like to thank all the local experts who provided information and guidance, including Mike Haigh, Andrew King and Peter Jennings (birds), Phil Ward, Chris Ledbury, Clare Boyes, Janice Vincent, Anne Coker and Bob Dennison (invertebrates), Kate Thorne and Gillian Foulkes (plants). Jo Milborrow, Ben Mullen and Janet Imlach at the Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS) have also provided help and support during the process. Finally, we wish to thank the funder, Arwain, without whom the project would not have been possible.

Tammy Stretton, Montgomeryshire Wildlife Trust, December 2019

Background

Local Wildlife Sites are sites of substantive nature conservation value. They are the most important places for wildlife outside statutory designated sites and the linkages they provide in a local context, are of vital importance to the whole biodiversity resource within a given area.

The origins of biological Local Sites systems stretch back to the 1970s, when wildlife trusts in the UK wished to protect and encourage the management of the whole biodiversity resource within a given local government area. The idea behind this was to provide an inclusive system of sites to support and re-enforce the features of statutory designated sites.

For a Local Site system to succeed and be given due recognition, it is important that rigorous criteria be produced for the selection of a 'Local Wildlife Site'. The system can then demonstrate why a particular site has passed or has not met the criteria for being a 'Local Wildlife Site', making it a justifiable process.

In 1999, the wildlife trusts in Wales published biological guidelines and criteria for the selection of Local Wildlife Sites, based upon Hawkswell 1997. Three systems were developed, covering North Wales, Powys and the south and west of Wales. After 20 years, the need for a review of the Powys criteria has become increasingly urgent. The number of currently selected Local Wildlife Sites in Powys is relatively low and is not deemed to truly reflect the wildlife value of the area. At the same time, the pressures on our landscape continue to grow and there has been no let-up in the net loss of nature (Hayhow et al 2019). Potential Local Wildlife Sites are being lost before they are even known about, through changes in land management and development, leading not only to a loss of habitat and biodiversity, but also connectivity across the landscape. We are now becoming increasingly aware of the impact this is having, not only on nature, but also the human race. Local Wildlife Sites have a critical role to play in not only halting biodiversity loss, but also in mitigating climate change.

Introduction

A successful biological local site system requires rigorous criteria for sites to be identified. General guidelines for choosing and evaluating sites of nature conservation importance were first formulated by Ratcliffe, 1977. Collis & Tyldesley 1993 and Hawkswell 1997, built on these guidelines with respect to Wildlife Sites.

A good model for the selection of Local Wildlife Sites is considered to be the criteria used in selecting the national series of Sites of Special Scientific Interest (SSSI). The scientific basis of this system is broadly accepted, although this system was developed for the selection of a representative series of specimen sites of national significance and is not therefore suitable for direct application in the evaluation and selection of sites in the local (i.e. sub-national) context.

Between 2017 and 2019, Montgomeryshire Wildlife Trust, Radnorshire Wildlife Trust and The Wildlife Trust for South and West Wales, have been working together on the Arwain funded 'Where the Wild Things Are' project. A key outcome for this project is to complete a review of the criteria for the selection of the Local Wildlife Sites in Powys, making them easily workable and fully embedded in the Local Planning Authority system. The criteria have been developed from Wildlife Sites Guidance Wales (Wales Biodiversity Partnership 2008), using some elements of the 1999 Powys Local Wildlife Site system and in discussion with a wide range of organisations and local experts.

The Local Wildlife Sites criteria laid out in this document are considered to be appropriate for the selection of quality habitats and species, but should not be seen as being set in 'tablets of stone'. Nature is dynamic and policies and legislation change. It is anticipated that this will

be a living document which is regularly updated as and when changes are needed. Ultimately, decisions on which sites are selected/deselected should be taken by the Powys Local Wildlife Site Partnership, following consultation with local experts, where necessary.

This document is spilt into two broad sections, the habitat criteria (H1 – H13) and the species criteria (S1 – S10). Some sites may be significant entirely because a certain species is present, whilst others may be significant because they contain a threatened habitat type or a diverse range of habitats. Most sites will be selected on the basis of habitat; it is, after all, the habitat in which the species usually depends and most sites will be of interest on both grounds. However, some sites may be significant entirely because a certain species is present and may need to be managed in a particular way to benefit this species. These sites should then be selected using the species criteria.

Relationship with Nationally Designated Sites

Statutory sites and non-statutory local sites do not generally overlap in Wales. This limits the risk of confusion amongst landowners, users and potential developers etc., concerning the legal status and protection of the land concerned. However, there may be some instances where it is appropriate to select designated land as a Local Wildlife Site, especially where:

- a SSSI is notified on geological grounds and is subsequently selected as a Local Wildlife Site because of its biological (i.e. nature conservation) interest;
- the reasons for SSSI notification omit to mention key features which qualify for Local Wildlife Site status.

Geological Sites

Many potential Local Wildlife Sites in Wales are also of geological or geomorphological importance in addition to their nature conservation significance and there are other sites, which may have value and significance on geological grounds alone. Local Wildlife Sites should be designated entirely on ecological grounds, without reference to geology, except where this is a factor affecting or determining the ecological value; for example, Inland Rock and Scree habitats.

A national framework for the identification and recognition of non-statutory geological sites already exists in the form of the Regionally Important Geological and Geomorphological Sites (RIGS) programme. Whilst not strictly comparable with Local Wildlife Sites, being concerned primarily with the identification of educational or demonstration sites, this programme nevertheless offers a separate mechanism for the identification and protection of geological sites.

Site Boundaries

Selection of site boundaries can be difficult and contentious. There is a need to designate Local Wildlife Sites of sufficient size to allow reasonable long-term ecological viability and continuation or introduction of favourable management. Site boundaries should be drawn as far as possible to be meaningful in ecological terms. Where sites are selected on species guidelines, appropriate regard should be given to the habitat requirements of the species concerned.

Observable physical boundaries or topographic features should be used as boundaries wherever possible. Where only part of a management unit is of qualifying quality, the whole management unit can still be selected. Where areas (such as single fields) failing to meet the criteria occur within a definable complex of management units (such as a block of fields),

then the whole complex can still be selected as a Local Wildlife Site, providing the qualifying areas form a clear majority of this Local Wildlife Site.

Boundaries should not generally include "buffer zones". However areas of land which marginally fail to meet any of the criteria, but which lie adjacent to qualifying habitat and thus form part of an effective ecological unit, should be selected. Also there are exceptions when considering watercourses and other open water bodies where the aquatic habitat may be profoundly influenced by adverse management of the immediate bank side(s).

Ultimately, site boundaries should be agreed by the Powys Local Wildlife Site Partnership when sites are selected.

Site selection process

Survey methodology (new sites)

In general, any area of land or water which satisfies one or more of the criteria is eligible for designation as a Local Wildlife Site. Sites should generally be evaluated on the basis of reliable information that is as up to date as possible. Extensive information is needed about the flora and fauna of an individual site to enable its evaluation against the guidelines and to ensure proper management. Initially a vegetation survey is completed, which will also highlight the faunal interest likely to be important on the site. In addition, information relating to the history of the site and, if appropriate, its use by the local community may be collected. This will usually involve collating existing data and further survey work.

Every site vegetation survey completed should include information concerning:

- distribution of different habitats;
- presence and abundance of different plant species in each habitat (either through NVC survey or using Phase 1 methodology with DAFOR information);
- recording the presence of uncommon, notable or rare species, including detailed location information within the site;
- recording of structures and features, such as fences, roads & buildings along with features of particular value to fauna such as invertebrates, e.g. veteran trees, exposed riverine shingles & soft cliffs, bare ground and glades;
- casual records of fauna, collected during the vegetation survey;
- management regime (with any speculation being clearly indicated as such);
- potential threats;
- communications made with landowners, managers or neighbours;
- summary description of the whole site (including site name, name of surveyor, date of survey, grid reference, location, boundary, aspect, adjacent habitats).

Sites that are (or are potentially) important for particular species groups will need to be surveyed by a specialist. On occasions existing data may be available to enable evaluation for this feature. Asking local specialists or specialist recording groups to carry out these surveys may be necessary. Even where a site is thought to meet the criteria for one feature, wherever possible the data should still be collected for all potential areas of interest to ensure a comprehensive understanding of the site's value. Where there are significant gaps in the knowledge about a site, these deficiencies should be indicated.

Re-surveying and monitoring of Wildlife Sites

Regular re-survey and monitoring of Local Wildlife Sites is essential to ensure the system is effectively protecting the sites and to determine where management effort requires to be focussed. If the system is to remain useful, credible data must be kept up-to-date. In addition, re-survey and monitoring will help to display wider species and habitat trends over a number of sites. Ideally, 10% of the Local Wildlife Sites across Powys should be surveyed in any one calendar year, leading to a rolling programme of survey and monitoring of sites, augmented by specified surveys of some sites when required (e.g. for development control procedures).

Selecting sites

Once the required amount of data has been gathered for a site, the user can than assess that site against the criteria detailed in this document. Sites passing one or more criteria should then be put forward to the Powys Local Wildlife Sites Partnership for selection. The Partnership will decide whether this candidate should be selected, referring to local experts for advice, where necessary. Once ratified by the Partnership, a candidate is selected as a Site of Interest for Nature Conservation (SINC). Dialogue with the landowner(s) should then follow (although this may have occurred prior to selection). Once agreement has been reached with the landowner, the site will be selected as a Local Wildlife Site (LWS).

LWS are not selected without landowner permission. If landowner permission is refused, the site will remain a SINC. Where there are multiple owners, one or more may refuse permission. In this case, the Powys Local Wildlife Sites Partnership will need to decide on how to proceed. Parts of the site, where permission is granted could be selected and the boundary redrawn to reflect this; for example, if owner A owns the majority of the site or the area of most interest and gives permission, his land would be selected as a discrete LWS; owner B refuses permission, so his land would be excluded, or selected as a discrete SINC. It may be decided that splitting the site would not be beneficial and in this case the whole site would remain a SINC.

When a site is being assessed as a SINC/LWS, some sort of report is necessary. This typically comprises a site summary, including management & reason(s) for selection, a full species list and map(s). Appendix 1 contains an example of such a report. When a site is selected as a LWS, this report should be shared with all the landowners and updates provided following re-survey.

It must be noted that working with landowners is seen as an important part of the Local Wildlife Site system, but is also time consuming. This work is typically carried out by the wildlife trusts; as the Trusts are all small charities, funding is usually required for surveys and/or landowner engagement to take place.

Deselection

A site, or part thereof, will remain a SINC/LWS until data is collected that proves is no longer meets the criteria. A site cannot have its status removed for political reasons, or as a result of wilful and deliberate destruction or neglect. The presumption is against deselecting sites.

Sites to be considered for deselection will be subject to survey by a person endorsed by the Powys Local Wildlife Sites Partnership and with permission from the landowner. Where landowner permission is not forthcoming, the site will remain (or be changed to) a SINC. As with all surveys and re-surveys, the Powys Local Wildlife Sites Partnership will consider and evaluate the survey information against the selection criteria.

Deselection may be recommended where the site's nature conservation interest has deteriorated to such an extent that it no longer qualifies as a SINC/LWS and where it is not possible to restore it through appropriate management. The potential for restoration will be an important factor in the decision.

Data

The Local Wildlife Site system generates a range of data, including:

- Habitat surveys;
- Species records;
- Site records;
- Site ownership records;
- Records of contact with landowner/managers, management advice given and site condition assessments.

Each site should also have a written report, which includes a boundary map, plus information on habitats and species found on the site.

The wildlife trusts in Powys (**Montgomeryshire Wildlife Trust, Radnorshire Wildlife Trust** and **The Wildlife Trust of South and West Wales**) hold the site reports, original site surveys, site ownership records, records of contact with landowners/managers and records relating to development issues. These are held in paper and electronic formats and in accordance with the Data Protection Act 2018.

Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS) holds species records, habitat and site boundary information, as well as a summary of the interest of the site, in order to disseminate through the Data Enquiry service or to users through Service Level Agreements (SLA). All data is held in accordance with the Data Protection Act 2018. More information on BIS can be found on their website: https://www.bis.org.uk.

The main users of LWS data are:

- Site owners
- Local Planning Authority
- Statutory authorities
- Advisory organisations
- Consultancies and private companies

Most LWS data originates from survey work and monitoring conducted by the wildlife trusts, who are in turn, responsible for ensuring that BIS is provided with the most up to date information on LWS. Formal enquiries for information and species data should be directed to BIS, who can then direct the user to the relevant wildlife trust, should the level of data received be insufficient.

HABITAT CRITERIA

The habitat criteria are structured according to the Section 7 list, grouped by the broad habitat categories, within which are the specific priority habitats. Some non-priority habitat categories are also included, where those are of local importance (locally rare, or especially distinctive/characteristic of the area) and these are grouped with the most relevant habitat types. When assessing a single habitat type, the user may simply refer to the relevant section. For sites with more than one habitat type, the user must decide on the appropriate approach:

1. For sites consisting largely of one habitat type, with small areas of other habitats within and adjacent, the site should be assessed using only the primary habitat type, but the other habitats included in the site boundary.
2. Where one habitat type is larger or more locally/nationally significant than the others, the site will be assessed using the main habitat type, but all habitats should be assessed under their relevant criteria. Where sites pass on multiple habitat criteria, this should be noted.
3. If the site is a mosaic of habitats with no obvious dominant/particularly special habitat, where habitats are sufficiently discrete, they can be assessed using the relevant selection criteria; where sites pass on multiple habitat criteria, this should be noted. If no single habitat passes, the site should be assessed under the 'Mosaic Habitats' criteria (H12).

For some habitats, there is a distinction between lowland and upland. Lowland habitats are here defined as areas which lie below the uppermost enclosure boundary ('the ffridd/coed cae boundary'). In practice, this often lies at an altitude of about 300m. Upland habitats are here taken to comprise those that lie above the uppermost enclosure boundary.

The habitat criteria generally deal with vegetation characteristics, concentrating on vascular plants. However appropriate regard is also given to the physical elements of habitats, particularly where these are insignificant for vascular plants but crucial for fauna or lower plants. Given the difficulty of survey and identification for invertebrates and lower plants it is crucial that key physical features for such groups are recognised by habitat guidelines. These features include the presence of varied sward height and bare ground in many vegetation types, the presence of significant quality of standing and fallen dead wood, the presence of veteran trees and the presence of soft cliffs and exposed riverine sediments, etc.

Many of the habitats refer to the National Vegetation Classification (NVC) (Rodwell 1991 et seq.). However, selection of appropriate Local Wildlife Sites can still be undertaken if the determination of NVC type has not been made, or where analysis of quadrats from representative samples of the vegetation community in question indicates that the vegetation is not readily referable to an NVC type. This can be achieved by application of key 'Ratcliffe Criteria', particularly species diversity. To this end, lists of indicator species have been compiled for certain habitats. Where considered appropriate, this has can be accompanied by a threshold number of species, which will need to be reached before a site can be selected as a Local Wildlife Site on the basis of its vegetation type and diversity.

Lists of indicator species are especially valuable in instances where an NVC type can contain examples of a wide range of quality, such as the MG6 semi-improved lowland meadow. A species-rich MG6 grassland containing a reasonably large number of indicators

of unimproved grassland will be worthy of selection, whilst a relatively species-poor MG6 grassland with few such indicators, would not. The species lists are comprised of native species or archaeophytes, which are characteristic of the vegetation type in question. In the case of the grassland, species that are regularly found in agriculturally improved grasslands are generally excluded from the species lists. Plant species rare enough to merit Local Wildlife Site designation on the basis of their presence alone can be found in the Species Criteria Vascular Plant section (S6).

The species lists and appropriate threshold values given in this document were drawn up with local experts, using information from Wildlife Sites Guidance Wales, the 1999 Powys LWS system and the county rare plant registers. This approach has been developed to ensure sites with appropriate quality, as recognised by balanced application of the Ratcliffe Criteria, are selected. However, anomalies may occur; e.g. sites on calcareous substrates may qualify against the Local Wildlife Site threshold for neutral grasslands, but not for calcareous grassland, or vice versa. However the key factor in such cases will be that the site is of sufficient quality to merit recognition of substantive nature conservation value through Local Wildlife Site designation.

Special Cases - Mosaic Habitats

Mosaic sites, comprising complex mixtures of semi-natural habitats, are acknowledged to be problematic when determining guidelines for Local Wildlife Site selection. Such sites may not contain any habitats that are intrinsically of very high interest, but may nevertheless be extremely important for the range of species they support. Further detail on the selection of mosaic habitats can be found in section H12 - Mosaic Habitats.

H1) BROADLEAVED, MIXED, AND YEW WOODLAND

Wales is one of the least wooded countries in Europe, with woodland covering only 15% of the land area, compared to the EU average of 38%. Only around 5% of woodlands in Wales have designated conservation status. All woodlands, including 20th century coniferous planted woodland, provide habitat for a wide range of flora and fauna but some woodland types are more significant than others from a biodiversity perspective. Semi-natural broadleaved woodlands comprise seven of the habitats of principal importance in Wales (listed on Section 7 of the Environment (Wales) Act 2016) and support 39% of Section 7 species (Woodlands for Wales 2018).

The Section 7 list of priority woodland habitats are as follows:

- Traditional orchards
- Wood pasture & parkland
- Upland oak woodland
- Lowland beech and yew woodland
- Upland mixed ash woodland
- Wet woodland
- Lowland mixed deciduous woodland

Definitions of all these habitat types is available on the JNCC website.

The Ancient Woodland Inventory for Wales was updated in 2011; more information on ancient woodland, including maps showing their location can be obtained from NRW.

Powys' woodland Local Wildlife Sites are split into three categories, as follows:

1. Traditional orchards
2. Wood pasture & parkland
3. Native woodlands

H1.1) TRADITIONAL ORCHARDS

Traditional Orchards represent a historic land use and have greatly declined in recent decades. Traditionally managed orchards support characteristic invertebrate faunas, including a number of rare specialist species. Characteristic plants include Mistletoe (*Viscum album*), a very local species in Wales. Many historic fruit varieties may persist in old orchards and are of potential value to fruit-growers.

The following sites should be considered for selection:

- ***all undesignated orchards ≥ 0.25ha which are, or were, traditionally managed and which still contain a good scatter of old fruit trees.***

Traditional orchards are defined, for priority habitat purposes, as groups of fruit and nut trees planted on vigorous rootstocks at low densities in permanent grassland; and managed in a low intensity way (Oram et al. 2013). Orchards managed intensively for fruit production by the input of chemicals such as pesticides and inorganic fertilisers, frequent mowing of the

orchard floor rather than grazing or cutting for hay and planting of short-lived, high-density, dwarf or bush fruit trees, would not qualify.

Further information on orchards, can be obtained from People's Trust for Endangered Species (PTES).

H1.2) WOOD PASTURE, PARKLAND & VETERAN TREES

Wood pasture and parkland are mosaic habitats valued for their trees, especially veteran and ancient trees and the plants and animals that they support. Parklands in this context include pasture-woodlands, the class of woodlands where deer and/or farm animals have historically been allowed to graze within a matrix of trees. These are taken to include both the traditional wood-pastures such as forests and chases and wooded commons, as well as winter-grazed woodlands (Harding & Rose 1986).

Old trees can have an extremely high value for wildlife and have become increasingly uncommon as they are removed due to concerns about safety. Standing and fallen dead trees support unique assemblages of a great diversity of flora and fauna, but are often 'tided up'. Ancient and veteran trees are the most valuable. It is important to note that a tree can have the physical characteristics of an ancient tree, but not be ancient in years, compared with others of the same species. The term 'veteran' describes all trees that have markedly ancient characteristics, irrespective of chronological age. The term 'ancient' is applied specifically to trees that are ancient in years. For more detail on how to define ancient and veteran trees, see Lonsdale, 2013.

Ancient & veteran trees are typically of large stature and often support significant decay features such as dead timber in the canopy, heart-rot, root-rot, rot-holes, external fungal growths, loose bark, sap-runs etc. It may also include the standing trunks or fallen hulks and limbs of dead trees and be both native and non-native species. The presence of characteristic assemblages of saproxylic invertebrates, epiphytic mosses and lichens, roosting bats and rare nesting birds, etc. (see Alexander 1999) should also be considered where appropriate. Groups of large willow (*Salix* spp.) pollards may also qualify, where they do not already fall into Local Wildlife Sites based on watercourses (see H9).

The following sites should be considered for selection:

- ***all undesignated parkland sites which are believed to have been derived from ancient woodland and which continue to support large mature trees;***
- ***all undesignated parkland sites, of whatever origin, containing ancient/veteran trees;***
- ***all ancient/veteran trees at least 1.5m girth* at 1.5m from base, or individuals that are estimated to be at least 200 years old which exhibit veteran tree characteristics such as rot hollows, bracket fungi or a large proportion of dead wood.***

* For some species, 1.5m is not considered a notable girth. Lonsdale, 2013 includes a chart (copied below) detailing the classification of eleven tree species. Where the LWS assessment is considering one of these species, this chart should be referred to, in which case the tree should be at least 'Locally notable' to qualify.

Fig 1.3: Chart of girth in relation to age and developmental classification of trees*

More information on wood pasture and parkland can be obtained from the UK Wood Pasture & Parkland Network.

Lonsdale, 2013 includes further information on ancient and veteran trees, including survey methodology.

H1.3) NATIVE WOODLANDS

Woodlands for Wales 2018 defines native woodland as woods mainly or entirely composed of locally native species (one that arrived in Wales without assistance of humans during post-glacial colonisation). The five remaining native woodland priority habitats have been combined into one category – 'native woodlands'. This reflects the fact that on the ground there is a dynamic continuum between woodland types. The setting of targets for individual types is deemed unrealistically precise, too complex and unduly prescriptive. However, this will not dilute the emphasis placed on nativeness and on achieving the right type of woodland for each individual site.

The SSSI selection guidelines (Latham et al, 2018) point out that the approach to the selection of woodland sites for designation inevitably differs from that for other habitats. Woods have a complex structure, which may be strongly influenced by past treatment and in which the differing layers may vary more-or-less independently from each other. It is therefore not sufficient to describe or classify woodlands solely in terms of their woody communities or even by broader floristic classification such as the NVC. Some parts of the woodland biota, e.g. rare plants, may be conserved in one small patch of woodland, whilst other aspects, such as the pattern of glades or the age structure of the trees, may require a very large area if they are to be sustained. For these reasons, the SSSI designation criteria focuses primarily on the broader elements of historical continuity and the overall naturalness

of the woodlands under consideration: ancient and long-established semi-natural woodlands form the main 'pool' from which the SSSI series is drawn, irrespective of the individual woodland types which may be present. This approach has also been followed by these criteria.

Notwithstanding this, the SSSI guidelines note that certain distinctive and important types of semi-natural woodland and associated communities, including wet woodland and yew woodland, are unlikely to be contained within ancient woodland sites, so more recent examples will need to be selected. It is also noted that in some areas of the country, most woodland was historically cleared from land highly valued for agriculture and only more recent woodland now exists. These may be the only substantial stands of native woodland and should also be considered for designation.

Priority upland woodland in habitats in Wales includes oak woods of NVC communities W10e, W11, W16b and W17 and ash woods of communities W8 and W9.

The following sites should be considered for selection:

- ***all undesignated ancient woodlands, as recorded in the Ancient Woodland Inventory, apart from those felled and replanted with non-native species, which have also entirely lost their ancient features such as characteristic ground flora;***
- ***all undesignated semi-natural woodlands, of whatever size, which support an assemblage* of ancient woodland indicator species (see Table 1 below): * 25 or more for mesotrophic & calcareous woodland, 5 or more for acid woodland;***
- ***all planted/re-planted/naturally regenerated wet woodland with semi-natural ground flora or other areas of interest such as ditches, pools and marshy areas.***

'Ancient woodland' are sites that have been continuously wooded since before 1600AD. Details of these sites can be found on the 2011 Ancient Woodland Inventory which indicates that there are around 95,000ha of ancient woodland in Wales.

'Semi-natural' woodlands contain a high proportion (i.e. ±70% or more) of native, locally-indigenous tree and shrub species, a combination regarded as having the highest nature conservation value (Kirby et al 1984).

Various species can be used to give an indication that a site has been continuously wooded for a considerable length of time. The most commonly used are known as 'ancient woodland indicator species' and these are the most accessible way of using species to determine the ancient status of a wood. Lists of ancient woodland indicators vary in different parts of the UK, yet the more of these species found in a wood, the more likely it is to be ancient. Vascular plant indicators are the most readily familiar and identifiable group containing such species, but indicator species occur in many other taxa, including mosses, lichens, beetles, moths, flies and snails, amongst others. A list of vascular plant indicator species for Powys is provided in Table 1 below. It should be noted that some indicator species might not necessarily be confined to woodland habitats; where they occur in woodlands, however, the woodland is usually of ancient origins. Examples include Pignut (*Conopodium majus*), which occurs in both woodlands and grasslands.

Wet woodlands are typically dominated by Alder (*Alnus glutinosa*), willows (*Salix* spp.) and/or Downy Birch (*Betula pubescens*). This category also includes sites where semi-natural wet woodland has been replanted with exotic species (e.g. cultivated poplar *Populus* spp.) or plantations of poplars on formerly open wet ground. Wet woodlands can be especially important for invertebrates.

Table 1 – Powys ancient woodland indicator species

Taxon	**Common name**
Acer campestre	Field Maple
Adoxa moschatellina	Moschatel
Allium ursinum	Ramsons
Anemone nemorosa	Wood Anemone
Bazzania trilobata	Greater Whipwort
Blechnum spicant	Hard-fern
Bromopsis benekenii	Lesser Hairy-brome
Bromopsis ramosa	Hairy Brome
Campanula latifolia	Giant Bellflower
Campanula trachelium	Nettle-leaved Bellflower
Cardamine impatiens	Narrow-leaved Bitter-cress
Carex elongata	Elonated Sedge
Carex laevigata	Smooth-stalked Sedge
Carex pendula	Pendulous Sedge
Carex remota	Remote Sedge
Carex strigosa	Thin-spiked Wood-sedge
Carex sylvatica	Wood-sedge
Cephalanthera longifolia	Narrow-leaved Helleborine
Ceratocapnos claviculata	Climbing Corydalis
Chrysosplenium alternifolium	Alternate-leaved Golden-saxifrage
Chrysosplenium oppositifolium	Opposite-leaved Golden-saxifrage
Circaea spp.	Enchanter's-nightshades
Conopodium majus	Pignut
Convallaria majalis	Lily of The Valley
Crepis paludosa	Marsh Hawk's-beard
Dicranum majus	Greater Fork-moss
Dioscorea communis	Black Bryony
Dipsacus pilosus	Small Teasel
Dryopteris aemula	Hay-scented Buckler-fern
Dryopteris affinis	Scaly Male Fern
Epipactis helleborine	Broad-leaved Helleborine
Equisetum sylvaticum	Wood Horsetail
Euonymus europaeus	Spindle
Euphorbia amygdaloides	Wood Spurge
Festuca altissima	Wood Fescue
Festuca gigantea	Giant Fescue
Frangula alnus	Alder Buckthorn
Galium odoratum	Woodruff
Geum rivale	Water Avens
Gymnocarpium dryopteris	Oak Fern
Holcus mollis	Creeping Soft-grass
Hordelymus europaeus	Wood Barley
Hyacinthoides non-scripta	Bluebell
Hymenophyllum wilsonii	Wilson's Filmy Fern
Hypericum androsaemum	Tutsan
Hypericum pulchrum	Slender St John's-wort
Ilex aquifolium	Holly

Lamium galeobdolon	Yellow Archangel
Lathraea squamaria	Toothwort
Lathyrus linifolius	Bitter Vetch
Leucobryum glaucum	Large White-moss
Listera ovata	Common Twayblade
Luzula forsteri	Southern Wood-rush
Luzula pilosa	Hairy Wood-rush
Luzula sylvatica	Great Wood-rush
Lysimachia nemorum	Yellow Pimpernel
Malus sylvestris	Crab Apple
Melampyrum pratense	Common Cow-wheat
Melica nutans	Mountain Melick
Melica uniflora	Wood Melick
Mercurialis perennis	Dog's Mercury
Milium effusum	Wood Millet
Moehringia trinervia	Three-nerved Sandwort
*Narcissus pseudonarcissus**	Daffodil*
Neottia nidus-avis	Bird's-nest Orchid
Orchis mascula	Early-purple Orchid
Oreopteris limbosperma	Lemon-scented Fern
Oxalis acetosella	Wood-sorrel
Paris quadrifolia	Herb Paris
Phegopteris connectilis	Beech Fern
Phyllitis scolopendrium	Hart's-tongue
Plagiothecium undulatum	Waved Silk-moss
Platanthera chlorantha	Greater Butterfly-orchid
Poa nemoralis	Wood Meadow-grass
Polygonatum multiflorum	Solomon's-seal
Polygonatum odoratum	Angular Solomon's-seal
Polypodium vulgare agg.	Polypody
Polystichum aculeatum	Hard Shield-fern
Polystichum setiferum	Soft Shield-fern
Populus tremula	Aspen
Primula vulgaris	Primrose
*Prunus avium**	Wild Cherry*
*Prunus padus**	Bird Cherry*
Quercus petraea	Sessile Oak
Ranunculus auricomus	Goldilocks Buttercup
Rhytidiadelphus loreus/triquetrus	Shaggy-mosses
Rosa arvensis	Field-rose
Sanicula europaea	Sanicle
Sedum telephium	Orpine
Solidago virgaurea	Goldenrod
Sorbus torminalis	Wild Service-tree
Stellaria holostea	Greater Stitchwort
Stellaria neglecta	Greater Chickweed
Stellaria nemorum	Wood Stitchwort
*Taxus baccata**	Yew*
Tilia cordata	Small-leaved Lime
Ulmus glabra	Wych Elm
Vaccinium myrtillus	Bilberry
Veronica montana	Wood Speedwell
Viburnum opulus	Guelder Rose
Vicia sylvatica	Wood Vetch
Viola reichenbachiana	Early Dog-violet

* WHERE IT IS BELIEVED TO BE OF NATIVE ORIGIN

H2) BOUNDARY & LINEAR FEATURES

Linear features, such as hedgerows, disused railway lines, green lanes, roadside verges and old drove roads, can be important in providing long corridors of semi-natural habitats, linking sites which might otherwise be isolated. In some cases these represent the last remnants of habitats once much more widespread in our countryside and occasionally they provide a last refuge for rare or threatened species.

Due to their small size, ownership and management complexity, most boundary and linear features would be included as part of Local Wildlife Sites selected under other criteria. However, sites supporting priority species would likely qualify under the relevant species criteria and sites meeting habitat criteria in their own right would be selected as such.

H2.1) HEDGEROWS

Section 7 of the Environment (Wales) Act lists 'Boundary and linear features' as a broad habitat category, within which 'Hedgerows' are identified as a habitat of principle importance for conservation in Wales. Section 7 hedgerows are defined on the JNCC website.

Hedgerow systems and their associated standard trees are often remnants of ancient field boundary layouts and may be of critical value both as linear habitats and as habitat corridors, supporting very large and diverse populations of flora and fauna. Hedges may provide important habitats for the Hazel Dormouse (*Muscardinus avellanarius*).

Hedgerows may often be included incidentally in Local Wildlife Sites which are designated for other reasons (e.g. grasslands) and where the hedges are of high conservation value this should be noted in the reasons for selection. However, good systems of hedges may also be a reason for selection in themselves.

The Hedgerow Regulations 1997 prohibit the removal of most countryside hedgerows without first submitting a hedgerow removal notice to the local planning authority. Local planning authorities are able to order the retention of 'important' hedgerows (but not others). The Regulations set out criteria to be used by the local planning authority in determining which hedgerows are important.

The Hedgerow Survey Handbook (Defra 2007) details a standard procedure for hedgerow survey in the UK. It also takes account of advances in our understanding of what a hedgerow looks like when it is in a good or 'favourable condition' for wildlife.

The following sites should be considered for selection:

- ***All hedgerows ≥ 100m in length which also meet at least five of the following criteria:***
    1) ***One or more locally important plant species (marked with * in Tables 2 & 3);***
    2) ***One or more nationally important species;***
    3) ***At least two distinct physical features: bank, wall, ditch or standard trees;***
    4) ***At least five of the woody & climbing axiophyte species listed in Table 2;***
    5) ***At least three of the woodland ground flora axiophyte species listed in Table 3;***

6) ***No gaps greater than 10% of the length;***
7) ***At least one connection to other hedges, woodland or scrub.***

'Nationally important' species include species with European and UK Legal Protection, Section 7 and Species of Conservation Concern - Global Red List, British Red Data Book, Nationally Rare & Scarce, and Welsh Red and Amber Birds.

'Axiophytes' are plant species which are indicative of good habitats.

Table 2 – Woody & climbing species found in hedgerows in Powys

Taxon	**Common name**
Acer campestre	Field Maple
Alnus glutinosa	Alder
Betula pendula	Silver Birch
Betula celtiberica/pubescens	Downy Birch
Bryonia dioica	White Bryony
Clematis vitalba	Traveller's Joy
Cornus sanguinea	Dogwood
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Daphne laureola	Spurge Laurel
Dioscorea communis	Black Bryony
Euonymus europaeus	Spindle
****Frangula alnus***	***Alder Buckthorn**
Fraxinus excelsior	Ash
Hedera helix	Ivy
Hedera hibernica	Ivy
Humulus lupulus	Hop
Ilex aquifolium	Holly
Lonicera periclymenum	Honeysuckle
Malus sylvestris	Crab Apple
Populus tremula	Aspen
****Populus nigra***	***Black Poplar**
Prunus avium	Wild Cherry
Prunus padus	Bird Cherry
Prunus spinosa	Blackthorn
Quercus petraea	Sessile Oak
Quercus robur	Pedunculate Oak
Rhamnus cathartica	Buckthorn
Ribes rubrum	Red Currant
Rosa spp.	Rose species
Rubus fruticosus agg.	Bramble
Salix spp.	Willow species
Sambucus nigra	Elder
Solanum dulcamara	Bittersweet
Sorbus aucuparia	Rowan
****Sorbus torminalis***	***Wild Service-tree**
Taxus baccata	Yew
****Tilia cordata***	***Small-leaved Lime**
****Tilia platyphyllos***	***Large-leaved Lime**
Ulex gallii	Western Gorse
Ulmus spp.	Elm species
Viburnum opulus	Guelder Rose

***** **RARE/SCARCE WOODY PLANT SPECIES FOUND IN HEDGEROWS IN POWYS**

Table 3 – Ground flora species found in hedgerows in Powys

Taxon	**Common name**
Adoxa moschatellina	Moschatel
Ajuga reptans	Bugle
Alliaria petiolata	Garlic Mustard
Allium ursinum	Ramsons
Anemone nemorosa	Wood Anemone
Arum maculatum	Lords-and-ladies
Athyrium filix-femina	Lady Fern
Blechnum spicant	Hard-fern
Brachypodium sylvaticum	False Brome
Bromopsis benekenii	***Lesser Hairy-brome**
Bromopsis ramosa	Hairy Brome
Campanula latifolia	***Giant Bellflower**
Campanula patula	***Spreading Bellflower**
Campanula trachelium	Nettle-leaved Bellflower
Cardamine impatiens	Narrow-leaved Bitter-cress
Carex pallescens	Pale Sedge
Carex spicata	Spiked Sedge
Carex strigosa	Thin-spiked Wood-sedge
Carex sylvatica	Wood-sedge
Circaea lutetiana	Enchanter's Nightshade
Cirsium heterophyllum	Melancholy Thistle
Colchicum autumnale	***Meadow Saffron**
Conopodium majus	Pignut
Cruciata laevipes	Crosswort
Dryopteris affinis	Scaly Male Fern
Dryopteris dilatata	Broad Buckler-fern
Dryopteris filix-mas	Male Fern
Epipactis helleborine	Broad-leaved Helleborine
Equisetum sylvaticum	Wood Horsetail
Equisetum telmateia	Great Horsetail
Euphorbia amygdaloides	***Wood Spurge**
Festuca gigantea	Giant Fescue
Fragaria vesca	Wild Strawberry
Galium odoratum	Woodruff
Geranium robertianum	Herb Robert
Geum rivale	Water Avens
Geum urbanum	Wood Avens
Glechoma hederacea	Ground Ivy
Helleborus viridis	Green Hellebore
Hieracium spp.	Hawkweed species
Hyacinthoides non-scripta	Bluebell
Hypericum pulchrum	Slender St John’s-wort
Jasione montana	Sheep’s Bit
Lamium galeobdolon	Yellow Archangel
Lathraea squamaria	***Toothwort**
Listera ovata	Common Twayblade
Luzula forsteri	Southerm Wood-rush
Luzula pilosa	Hairy Wood-rush
Luzula sylvatica	Great Wood-rush
Lysimachia nemorum	Yellow Pimpernel
Lysimachia nummularia	Creeping-jenny
Melampyrum pratense	Common Cow-wheat
Melica uniflora	Wood Melick
Mercurialis perennis	Dog’s Mercury

Milium effusum	Wood Millet
Moehringia trinervia	Three-nerved Sandwort
Mycelis muralis	Wall Lettuce
Orchis mascula	Early-purple Orchid
Oxalis acetosella	Wood-sorrel
Paris quadrifolia	***Herb Paris**
Phyllitis scolopendrium	Hart's-tongue
Poa nemoralis	Wood Meadow-grass
Polypodium vulgare agg.	Polypody
Polystichum aculeatum	Hard Shield-fern
Polystichum setiferum	Soft Shield-fern
Potentilla sterilis	Barren Strawberry
Primula vulgaris	Primrose
Ranunculus auricomus	Goldilocks Buttercup
Sanicula europaea	Sanicle
Saxifraga granulata	Meadow Saxifrage
Silene dioica	Red Campion
Solidago virgaurea	Goldenrod
Stellaria holostea	Greater Stitchwort
Stellaria neglecta	Greater Chickweed
Teucrium scorodonia	Wood Sage
Umbilicus rupestris	Navelwort
Veronica montana	Wood Speedwell
Viola odorata	Sweet Violet
Viola reichenbachiana	Early Dog-violet
Viola riviniana	Common Dog-violet

***** **RARE/SCARCE GROUND FLORA SPECIES FOUND IN HEDGEROWS IN POWYS**

H2.2) ROAD VERGES

Road verges are not listed as a priority habitat on Section 7 of the Environment (Wales) Act 2016, nor were they covered by the 1999 Powys Local Wildlife Sites system. However, rural road verges within Powys, like much of the UK, are invaluable wildlife habitat. The post-1940s promotion of intensive land management practices means road verges are often the last refuges of flora and fauna now lost from the wider countryside. Their linear nature provides a county-wide network of corridors helping wildlife to move through the landscape and maintain contact between individuals and otherwise isolated populations.

Road verge habitats continue to face a number of threats. Modern management methods have often resulted in a deterioration of habitat quality and the loss of biodiversity interest. Cuttings (known as 'arisings') are left to lie on verges, which act as a mulch suppressing the growth of desirable plant species. Nutrient enrichment from arisings, as well as agricultural run-off and atmospheric deposition, encourages growth of coarser, less desirable species which out-compete more desirable species for light, water, space and/or nutrients. Although road sweepings are no longer deposited on road verges, localised damage to sensitive sites can be caused through piling up of chipped wood material and road salt, as well as deposition of materials from ditch clearance work and inappropriate use of herbicides. Considerable lengths of biodiversity-rich verge can be significantly damaged or lost entirely by road widening schemes or installation of French drains.

Since 2001, Powys has operated a 'Road Verge Nature Reserve' (RVNR) system. An RVNR is a length of road verge that has been identified as having particular value to wildlife and is subsequently managed by Powys County Council (PCC) with the aim of conserving and enhancing those features of interest. More specifically, RVNR designation serves to:

- highlight its wildlife value within a local and/or national context, particularly as an important repository of species associated with declining semi-natural habitats;
- recognise its importance as a 'wildlife corridor' in linking otherwise isolated semi-natural habitats;
- secure the most appropriate management regime for conserving the site's biodiversity interest, wherever possible.

The RVNR designation affords the site no legal protection *per se* but serves to highlight the site's biodiversity importance to local authority staff and contractors. The selection of road verges as Local Wildlife Sites does not replace the RVNR system, but rather complements it. Indeed, this LWS selection criteria is based on the RVNR system. There is likely to be significant overlap between the two 'designations', but this is not considered a problem, as their purposes are different. Local Wildlife Site selection provides the opportunity to provide a greater level of protection for Powys' most important road verges.

The following sites should be considered for selection:

- ***all undesignated road verges supporting one or more nationally important species, recorded as present at least twice within the previous five years*;***
- ***all undesignated road verges supporting one or more locally important species, recorded as present at least twice within the previous five years*;***
- ***all undesignated road verges with at least 10 species typical for the habitat type#, per 10m length, for at least 50% of the total length surveyed;***
- ***all undesignated road verges of contiguous habitat adjacent to designated sites.***

*On road verges, this will primarily be vascular plants, bryophytes, lichens or fungi. Animal species are often highly mobile, meaning that road verges typically do not form vital habitat in their own right, but rather contribute to a wider ecological landscape and aid connectivity. However, there may be exceptions to this, in which case advice should be sought from a relevant local expert.

#When assessing road verges for species richness, the reference table(s) for the appropriate habitat should be used. For example, if the road verge is of a neutral grassland type, there should be at least 10 species from Table 4 present per 10m length, for at least 50% of the total length surveyed.

'Nationally important' species include species with European and UK Legal Protection, Section 7 and Species of Conservation Concern - Global Red List, British Red Data Book, Nationally Rare & Scarce.

'Locally important' species are those considered rare or scarce on a local level, or considered of concern due to declines in range or population locally. In the former case, they are likely to be found in 10 or fewer sites across each vice-county. In the case of vascular plants, they will be classified 'locally rare' or 'locally scarce within County Rare Plant Registers. The Local Environmental Record Centre for Powys (Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS)) is currently compiling an up to date list of Locally Important species for the area. Until this is complete, advice should be sought from relevant local experts.

Defining the boundaries of a road verge LWS will be similar as for all LWS, but should only include the width of the highway 'soft estate', i.e. the vegetated area lying between the edge of the tarmacadam road surface and the nearest boundary feature; the latter may be included in some cases, where relevant, for example a hedgerow, tree(s) or wall may form part of the habitat. A road verge forming continguous habitat immediately adjacent to a LWS, should be included in the site boundary for that LWS.

H3) NEUTRAL GRASSLAND

Semi-natural neutral grasslands, while being widespread across lowland Britain, are collectively very scarce and fragmented as they have been a particular focus for agricultural improvement. It is estimated that significantly less than 15,000 hectares remain in Great Britain (Jefferson et al 2014).

Of those neutral grasslands found in Powys, the following are identified by the SSSI Lowland Grassland Selection Guidelines (Jefferson et al., 2014) as having high botanical conservation value:

- MG1 c & e – *Arrhenatherum elatius* grassland
- MG4 – *Alopecurus pratensis – Sanguisorba officinalis* grassland
- MG5 – *Cynosurus cristatus – Centaurea nigra* grassland
- MG7c-related *Alopecurus pratensis – Poa trivialis – Cardamine pratensis* floodplain grassland
- MG8 – *Cynosurus cristatus – Caltha palustris* grassland and related vegetation

Other types, although of lower botanical interest, could be of value where rare plants/assemblages are found, or where they form a contiguous habitat with higher value grassland.

Section 7 of the Environment (Wales) Act lists 'Lowland Meadows' and 'Upland hay meadows' under the broad category of 'Neutral grassland'. Upland hay meadows refer almost entirely to NVC community MG3, *Anthoxanthum odoratum - Geranium sylvaticum* grassland, which, for the most part, are restricted to upland valleys in the north of England, with outliers in Scotland. Definitions of both these habitat types is available on the JNCC website.

H3.1) LOWLAND MEADOWS

This priority habitat, as defined by the JNCC, includes most forms of unimproved neutral grassland across the enclosed lowland landscapes of the UK. In Powys some of these enclosed landscapes may occur at higher altitudes, however for the purposes of this criteria all enclosed neutral grasslands are considered under H3.1. In terms of National Vegetation Classification (NVC) plant communities, they primarily embrace each type of MG4, MG5 and MG8. Both MG4 and MG8 are very scarce habitats in Wales; any examples in Powys will be significant.

Lowland meadows does not only apply to grasslands cut for hay, but also takes into account unimproved neutral pastures where livestock grazing is the main land use. On many farms in different parts of the UK, use of particular fields for grazing pasture and hay cropping changes over time, but the characteristic plant community may persist with subtle changes in floristic composition. In non-agricultural settings, such grasslands are less frequent but additional examples may be found in recreational sites, burial grounds, roadside verges and a variety of other localities.

Excluded from 'Lowland Meadows' are maritime grassland communities, confined to coastal habitats and MG3 grasslands, which are not found in Powys. *Molinia-Juncus* pastures are covered in Purple Moor Grass and Rush Pastures H7.3 - Purple Moorgrass and Rush Pastures.

The following sites should be considered for selection:

- ***all undesignated MG4 or MG8 grasslands;***
- ***all undesignated MG5 grasslands ≥ 0.5ha;***
- ***all species-rich (supporting 15 or more species from Table 4) neutral grasslands ≥ 0.5 ha;***
- ***all undesignated neutral grasslands that contain one or more of the uncommon species marked with * in Table 4;***
- ***all undesignated semi-improved neutral grasslands ≥ 0.5ha in good conservation management that are immediately adjacent and form contiguous habitat with neutral grassland of high botanical value, such as SSSIs, nature reserves or existing LWS.***

Table 4 – vascular plants found in unimproved lowland neutral grassland in Powys

Agrimonia eupatoria	Agrimony
Agrimonia procera	Fragrant Agrimony
Ajuga reptans	Bugle
Alchemilla spp. *(*NOT *mollis*)	Lady's mantles
Anemone nemorosa	Wood Anemone
Briza media	Quaking-grass
Bromus commutatus	Meadow Brome
***Bromus racemosus**	***Smooth Brome**
Caltha palustris	Marsh Marigold
Cardamine pratensis	Cuckoo Flower
Carex caryophyllea	Spring Sedge
***Carex disticha**	***Brown Sedge**
Carex flacca	Glaucous Sedge
Carex muricata	Prickly Sedge
Carex pallescens	Pale Sedge
Carex panicea	Carnation Sedge
Centaurea nigra	Common Knapweed
***Colchicum autumnale**	***Meadow Saffron**
Conopodium majus	Pignut
Dactylorhiza spp.	Spotted-orchids
Danthonia decumbens	Heath-grass
Euphrasia officinalis agg.	Eyebright
Festuca arundinacea	Tall Fescue
Festuca pratensis	Meadow Fescue
Filipendula ulmaria	Meadowsweet
Galium verum	Lady's Bedstraw
***Genista anglica**	***Petty Whin**
***Genista tinctoria**	***Dyer's Greenweed**
Geranium pratense	Meadow Crane's-bill
***Geranium sylvaticum**	***Wood Crane's-bill**
***Gymnadenia conopsea subsp. borealis**	***Heath Fragrant-orchid**
***Hordeum secalinum**	***Meadow Barley**
Hyacinthoides non-scripta	Bluebell
Hypericum hirsutum	Hairy St John's-wort
Hypericum maculatum	Imperforate St John's-wort
Hypochaeris radicata	Cat's-ear
Lathyrus pratensis	Meadow Vetchling
Leontodon autumnalis	Autumn Hawkbit
Leontodon hispidus	Rough Hawkbit

Leucanthemum vulgare	Ox-eye Daisy
Linum catharticum	Fairy Flax
Lotus corniculatus	Common Bird's-foot-trefoil
Lotus pedunculatus	Greater Bird's-foot-trefoil
Luzula campestris	Field Wood-rush
***Ononis repens**	***Common Restharrow**
***Ophioglossum vulgatum**	***Adder's-tongue**
***Orchis morio**	***Green-winged Orchid**
Persicaria bistorta	Common Bistort
Pilosella officinarum	Mouse-ear-hawkweed
Pimpinella saxifraga	Burnet-saxifrage
***Platanthera bifolia**	***Lesser Butterfly-orchid**
***Platanthera chlorantha**	***Greater Butterfly-orchid**
***Poa angustifolia**	***Narrow-leaved Meadow-grass**
Polygala vulgaris	Common Milkwort
Potentilla anglica	Trailing Tormentil
Potentilla erecta	Tormentil
Primula veris	Cowslip
Ranunculus bulbosus	Bulbous Buttercup
Rhinanthus minor	Yellow Rattle
***Sanguisorba officinalis**	***Great Burnet**
Saxifraga granulata	Meadow Saxifrage
Serratula tinctoria	Saw-wort
***Silaum silaus**	***Pepper-saxifrage**
Stachys officinalis	Betony
Stellaria graminea	Lesser Stitchwort
Succisa pratensis	Devil's-bit Scabious
Trifolium medium	Zigzag Clover
Trifolium pratense	Red Clover
Trisetum flavescens	Yellow Oat-grass
Vicia cracca	Tufted Vetch
***Vicia orobus**	***Wood Bitter-vetch**

***** **VASCULAR PLANT SPECIES OF UNIMPROVED NEUTRAL GRASSLANDS WITH A RESTRICTED DISTRIBUTION IN POWYS**

H4) CALCAREOUS GRASSLANDS

Calcareous grasslands are confined to basic soils, which are usually of low fertility and often free-draining. Key grass species include Upright Brome (*Bromopsis erecta*) and Sheep's Fescue (*Festuca ovina* agg.) together with characteristic herbs such as Wild Thyme (*Thymus polytrichus*), Common Rock-rose (*Helianthemum nummularium*), Fairy Flax (*Linum catharticum*) and Salad Burnet (*Sanguisorba minor*).

Section 7 of the Environment (Wales) Act lists 'Lowland calcareous grassland' and 'Upland calcareous grassland' under the broad category of 'Calcareous grassland'. Definitions of both these habitat types is available on the JNCC website.

It is considered that all relatively diverse calcareous grasslands should be considered for selection as Local Wildlife Sites; they are generally the most diverse grassland type in terms of wildflowers and grasses and are uncommon in Powys. Calcareous grasslands can also arise on post-industrial substrates, e.g. rail and road cuttings, quarries, ballast, flue ash or slag and spoil tips. The criteria should be applied equally to habitats regardless of their origins.

The following sites should be considered for selection:

- ***all undesignated unimproved lowland or upland calcareous grassland;***
- ***all undesignated semi-improved calcareous grasslands containing 8 or more species from Table 5 below.***

'Semi-improved' grasslands include those swards which have been degraded by agricultural management but which are still recognisably derived from calcareous grassland. Only those semi-improved sites that are 'species-rich' should be considered for selection as a Local Wildlife Site.

Table 5 – vascular plants found in calcareous grassland in Powys

Agrimonia eupatoria	Agrimony
Agrimonia procera	Fragrant Agrimony
Aira spp.	Hair-grasses
Allium vineale	Wild Onion
Anacamptis pyramidalis	Pyramidal Orchid
Antennaria dioica	Mountain Everlasting
Anthyllis vulneraria	Kidney Vetch
Aphanes agg.	Parsley-pierts
Arabis hirsuta	Hairy Rock-cress
Arenaria serpyllifolia	Thyme-leaved Sandwort
Blackstonia perfoliata	Yellow-wort
Brachypodium pinnatum	Heath False-brome
Briza media	Quaking-grass
Bromopsis erecta	Upright Brome
Campanula glomerata	Clustered Bellflower
Campanula rotundifolia	Harebell
Carduus nutans	Musk Thistle
Carex caryophyllea	Spring Sedge

Carex flacca	Glaucous Sedge
Carex montana	Soft-leaved Sedge
Carlina vulgaris	Carline Thistle
Catapodium rigidum	Fern-grass
Centaurea scabiosa	Greater Knapweed
Centaurium erythraea	Common Centaury
Cirsium acaule	Dwarf Thistle
Cirsium eriophorum	Woolly Thistle
Clinopodium ascendens	Common Calamint
Clinopodium vulgare	Wild Basil
Dactylorhiza fuchsia	Common Spotted-orchid
Dactylorhiza viridis	Frog Orchid
Danthonia decumbens	Heath-grass
Daucus carota	Wild Carrot
Dianthus deltoids	Maiden Pink
Echium vulgare	Viper's Bugloss
Erigeron acris	Blue Fleabane
Erodium cicutarium	Common Stork's-bill
Erophila spp.	Whitlowgrasses
Euphrasia officinalis agg.	Eyebright
Filipendula vulgaris	Dropwort
Galium mollugo	Hedge Bedstraw
Galium sterneri	Limestone Bedstraw
Galium verum	Lady's Bedstraw
Gentianella amarelle	Autumn Gentian
Geranium columbinum	Long-stalked Crane's-bill
Geranium sanguineum	Bloody Crane's-bill
Gymnadenia conopsea	Fragrant Orchid
Helianthemum nummularium	Common Rock-rose
Helictotrichon pratensis	Meadow Oat-grass
Helictotrichon pubescens	Downy Oat-grass
Hypericum hirsutum	Hairy St John's-wort
Hypericum montanum	Pale St John's-wort
Hypericum perforatum	Perforate St John's-wort
Inula conyzae	Ploughman's Spikenard
Knautia arvensis	Field Scabious
Koeleria macrantha	Crested Hair-grass
Lathyrus nissolia	Grass Vetchling
Leontodon hispidus	Rough Hawkbit
Leontodon saxatilis	Lesser Hawkbit
Linum catharticum	Fairy Flax
Listera ovata	Common Twayblade
Lotus corniculatus	Common Bird's-foot-trefoil
Lychnis viscaria	Sticky Catchfly
Medicago lupulina	Black Medick
Moenchia erecta	Upright Chickweed
Myosotis ramosissima	Early Forget-me-not
Ononis repens	Common Restharrow
Ononis spinose	Spiny Restharrow
Ophrys apifera	Bee Orchid
Orchis mascula	Early-purple Orchid
Orchis morio	Green-winged Orchid
Origanum vulgare	Wild Marjoram
Pastinaca sativa	Wild Parsnip
Picris hieracioides	Hawkweed Ox-tongue
Pilosella officianum	Mouse-ear Hawkweed
Pilosella peleteriana subsp. subpeleteriana	Shaggy Mouse-ear Hawkweed
Pimpinella saxifraga	Burnet-saxifrage

Plantago media	Hoary Plantain
Poa angustifolia	Narrow-leaved Meadow-grass
Polygala vulgaris	Common Milkwort
Potentilla tabernaemontani	Spring Cinquefoil
Primula veris	Cowslip
Ranunculus bulbosus	Bulbous Buttercup
Sagina nodosa	Knotted Pearlwort
Sanguisorba minor	Salad Burnet
Saxifraga tridactylites	Rue-leaved Saxifrage
Scabiosa columbaria	Small Scabious
Sedum forsterianum	Rock Stonecrop
Senecio erucifolius	Hoary Ragwort
Serratula tinctoria	Saw-wort
Sherardia arvensis	Field Madder
Spiranthes spiralis	Autumn Lady's-tresses
Stellaria pallida	Lesser Chickweed
Teesdalia nudicaulis	Shepherd's Cress
Thalictrum minus	Lesser Meadow-rue
Thymus polytrichus	Wild Thyme
Thymus pulegioides	Large Garden
Torilis nodosa	Knotted Hedge-parsley
Trifolium campestre	Hop Trefoil
Trifolium scabrum	Rough Clover
Trifolium striatum	Knotted Clover
Trisetum flavescens	Yellow Oat-grass
Veronica spicata	Spiked Speedwell
Viola hirta	Hairy Violet

H5) ACID GRASSLAND

Acid grasslands are comparatively scarce in the lowlands, being largely restricted to areas of nutrient-poor acidic soils. They are more characteristic of the uplands where they occur over extensive areas, although many of these have been subject to agricultural improvement or are in deteriorating condition due to neglect. Acid grasslands are characteristically rather poor in terms of plant species-diversity, but unimproved swards often support characteristic plants, as well as a range of other wildlife including scarce or rare species.

Section 7 of the Environment (Wales) Act lists 'Lowland dry acid grassland' under the broad category of 'Acid grassland'. The definition of both this habitat type is available on the JNCC website.

H5.1) LOWLAND DRY ACID GRASSLAND

Lowland dry acid grassland is defined as comprising grassland NVC communities U1-U3 and U4 below 300m, although in some cases these enclosures may extend up to 400m. Occurrences of this habitat on roadside verges are also covered by the definition.

Of those communities found in Powys, the 'Lowland Grasslands' SSSI selection criteria (Jefferson et al., 2014) identifies the following as having high botanical nature conservation value:

- U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland
- U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland
- U5 *Nardus stricta-Galium saxatile* grassland

U1 and U2 grasslands are comparatively widespread in Wales although chiefly of upland occurrence, the former often associated with upland crags and ledges. A variant of U1 is common on old colliery tips and along parts of old railways. Good examples of U4 grassland typically have high frequencies of species such as Common Bent (*Agrostis capillaris*), Sheep's Fescue (*Festuca ovina*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Tormentil (*Potentilla erecta*) and Heath Bedstraw (*Galium saxatile*) and low frequencies of mesotrophic species such as Yorkshire Fog (*Holcus lanatus*) and White Clover (*Trifolium repens*).

The following sites should be considered for selection:

- ***all undesignated lowland dry acid grasslands with 7 or more vascular plant species from Table 9 below.***

Table 6 – vascular plants found in lowland dry acid grassland in Powys

Achillea millefolium	Yarrow
Agrostis canina	Velvet Bent
Aira spp.	Hair-grasses
Alchemilla spp. (NOT *mollis*)	Lady's mantles
Anemone nemorosa	Wood Anemone
Aphanes agg.	Parsley-pierts
Arenaria serpyllifolia	Thyme-leaved Sandwort
Botrychium lunaria	Moonwort
Briza media	Quaking-grass

Calluna vulgaris	Heather
Campanula rotundifolia	Harebell
Carex montana	Soft-leaved Sedge
Carex nigra	Common Sedge
Carex panicea	Carnation Sedge
Carex pilulifera	Pill Sedge
Carex pulicaris	Flea Sedge
Carex viridula subsp. oedocarpa	Common Yellow Sedge
Carum verticillatum	Whorled Caraway
Cerastium semidecandrum	Little Mouse-ear
Cladonia spp.	Cladonia lichens
Conopodium majus	Pignut
Dactylorhiza maculata	Heath Spotted-orchid
Danthonia decumbens	Heath-grass
Deschampsia flexuosa	Wavy Hair-grass
Dianthus deltoides	Maiden Pink
Dicranum scoparium	Broom Fork-moss
Erica cinerea	Bell Heather
Erica tetralix	Cross-leaved Heath
Erodium cicutarium	Common Stork's-bill
Erophila agg.	Whitlowgrasses
Euphrasia	Eyebright species
Festuca ovina agg.	Sheep's Fescue
Filago minima	Small Cudweed
Galium saxatile	Heath Bedstraw
Galium verum	Lady's Bedstraw
Genista anglica	Petty Whin
Geranium molle	Dove's-foot Crane's-bill
Gymnadenia conopsea subsp. borealis	Heath Fragrant-orchid
Hieracium spp.	Hawkweed species
Hypericum humifusum	Trailing St John's-wort
Hypericum pulchrum	Slender St John's-wort
Hypochaeris radicata	Cat's-ear
Jasione montana	Sheep's Bit
Lathyrus linifolius	Bitter Vetch
Leontodon autumnalis	Autumn Hawkbit
Leontodon saxatilis	Lesser Hawkbit
Lotus corniculatus	Common Bird's-foot-trefoil
Luzula campestris	Field Wood-rush
Luzula multiflora	Heath Wood-rush
Moenchia erecta	Upright Chickweed
Myosotis discolour	Changing Forget-me-not
Myosotis ramosissima	Early Forget-me-not
Nardus stricta	Mat-grass
Ophioglossum vulgatum	Adder's-tongue
Ornithopus perpusillus	Bird's-foot
Pedicularis sylvatica	Lousewort
Pilosella officianum	Mouse-ear Hawkweed
Pilosella peleteriana subsp. subpeleteriana	Shaggy Mouse-ear Hawkweed
Pimpinella saxifraga	Burnet-saxifrage
Platanthera bifolia	Lesser Butterfly-orchid
Polygala serpyllifolia	Heath Milkwort
Potentilla anglica	Trailing Tormentil
Potentilla argentea	Hoary Cinquefoil
Potentilla erecta	Tormentil
Pseudorchis albida	Small-white Orchid
Rumex acetosella	Sheep's Sorrel
Sedum anglicum	English Stonecrop

Senecio sylvaticus	Heath Groundsel
Spergularia rubra	Sand Spurrey
Stachys officinalis	Betony
Succisa pratensis	Devil's-bit Scabious
Teesdalia nudicaulis	Shepherd's Cress
Thymus polytrichus	Wild Thyme
Trifolium dubium	Lesser Trefoil
Trifolium micranthum	Slender Trefoil
Trifolium striatum	Knotted Clover
Veronica officinalis	Heath Speedwell
Vicia orobus	Wood Bitter-vetch
Viola canina	Heath Dog-violet
Viola lutea	Mountain Pansy
Viola riviniana	Common Dog-violet
Vulpia bromoides	Squirrel-tail Fescue
Wahlenbergia hederacea	Ivy-leaved Bellflower

H5.2) UPLAND ACID GRASSLANDS

Upland is defined as land above the level of agricultural enclosure, which is generally above 250 – 300m in Wales. Upland acid grassland is characterised by vegetation dominated by grasses and herbs. It is found on a range of usually lime-deficient soils, which have been derived from acid rocks such as sandstones and acid igneous rocks and on superficial deposits such as sands and gravels. Acid grassland dominates large areas of upland Wales, particularly where there has been a history of heavy grazing which has reduced the cover of ericoid species, which would otherwise dominate this habitat, once the tree cover had been removed.

Often species-poor, with limited biodiversity interest, upland acid grassland does not feature as a priority habitat under Section 7 of the Environment (Wales) Act 2016. Upland acid grassland can nevertheless contribute to the overall conservation interest of upland habitats, where it is best considered as part of a mosaic site (see section H12). Being typically unploughed and un-fertilised land, these habitats can form the essential building blocks for nature's recovery and can also support a characteristic fauna, such as Curlew, Snipe, Wheatear and Skylark and short-grazed areas can be of great importance for grassland fungi. Some unimproved upland acid grassland communities, however, have a high botanical value and should be selected as detailed below.

Rhos pasture is also a common upland acid grassland community, but has its own selection criteria under 'Purple Moorgrass & Rush Pastures', section H7.3.

The following sites should be considered for selection:

- ***all undesignated upland acid grasslands containing one or more of the species listed in Table 7.***

Table 7 – plant species found in upland acid grassland with restricted distribution in Powys

Antennaria dioica	Mountain Everlasting
Botrychium lunaria	Moonwort

Carex bigelowii	Stiff Sedge
Diphasiastrum alpinum	Alpine Clubmoss
Festuca vivipara	Viviparous Sheep's-fescue
Galium boreale	Northern Bedstraw
Huperzia selago	Fir Clubmoss
Hylocomium splendens	Glittering Wood-moss
Listera cordata	Lesser Twayblade
Lycopodium clavatum	Stag's-horn Clubmoss
Platanthera bifolia	Lesser Butterfly-orchid
Pseudorchis albida	Small-white Orchid
Orthilia secunda	Serrated Wintergreen
Salix herbacea	Dwarf Willow
Saxifraga hypnoides	Mossy Saxifrage
Saxifraga oppositifolia	Purple Saxifrage
Selaginella selaginoides	Lesser Clubmoss

H6) DWARF SHRUB HEATH

Section 7 of the Environment (Wales) Act 2016 identifies 'Lowland heathland' and 'Upland heathland' under the broad category of 'Dwarf shrub heath'. Definitions of both these habitat types is available on the JNCC website. Broadly, heathland is characterised by the presence of dwarf shrubs at a cover of at least 25%. Blanket bog vegetation may also contain substantial amounts of dwarf shrubs, but is distinguished from heathland by its occurrence on deep peat (>0.5m).

The following heathland communities of high priority for nature conservation occur within Powys:

- H8 *Calluna vulgaris-Ulex gallii* heath
- H9 *Calluna vulgaris-Deschampsia flexuosa* heath
- H10 *Calluna vulgaris-Erica cinerea* heath
- H12 *Calluna vulgaris-Vaccinium myrtillus* heath
- H18 *Vaccinium myrtillus-Deschampsia flexuosa* heath
- H21 *Calluna vulgaris-Vaccinium myrtillus-Sphagnum capillifolium* heath
- M15 *Scirpus cespitosus-Erica tetralix* wet heath
- M16 *Erica tetralix* wet heath

H6.1) LOWLAND HEATHLAND

Lowland heathland is generally found below 250-300m on nutrient-poor soils. Once a relatively widespread lowland habitat in historic times, lowland heathland has decreased enormously due to various human impacts, including agricultural reclamation, afforestation and urban development. Some have scrubbed over or been converted to birch or Scots Pine woodland through natural succession, in the absence of grazing or other management. The decline in the UK is estimated to be of the order of 85% in the last 200 years.

In Powys, lowland heathland usually only remains on the lower slopes of hills where it forms part of an altitudinal zonation of vegetation types from valley bottom, to lowland heath, to upland heath. It is only the altitude that leads to the distinction between upland and lowland heath, although lowland heath supports a range of birds, reptiles and invertebrates not found on upland heath. Lowland heath may be classified as dry or wet, depending on soil moisture content. Although usually quite distinct, transitions between dry and wet heath are common.

The following sites should be considered for selection:

- ***all undesignated lowland wet or dry heathland;***
- ***all undesignated degraded lowland wet or dry heathland with ≥ 10% cover of dwarf heath species, comprising three or more of the following:***
    - ***Calluna vulgaris* (Heather)**
    - ***Empetrum nigrum* (Crowberry)**
    - ***Erica tetralix* (Cross-leaved Heath)**
    - ***Erica cinerea* (Bell Heather)**
    - ***Ulex gallii* (Western Gorse)**
    - ***Vaccinium myrtillus* (Bilberry)**
    - ***Vaccinium vitis-idaea* (Cowberry)**

H6.2) UPLAND HEATHLAND

Wet and dry upland heathland is generally found above 250-300m, above the upper edge of enclosed agricultural land and is widespread in Powys. Upland heath in 'favourable condition' is typically dominated by a range of dwarf shrubs such as Heather (*Calluna vulgaris*), Bilberry (*Vaccinium myrtillus*), Crowberry (*Empetrum nigrum*), Bell Heather (*Erica cinerea*) and Western Gorse (*Ulex gallii*). They are structurally diverse, containing stands of vegetation with heather at different stages of growth. Wet heath in 'favourable condition', should be dominated by mixtures of Cross-leaved Heath (*Erica tetralix*), Deergrass (*Trichophorum germanicum*), Heather and Purple Moor-grass (*Molinia caerulea*), over an understorey of mosses, often including carpets of *Sphagnum* species.

The following sites should be considered for selection:

- ***all undesignated dry or wet upland heathland ≥ 5ha;***
- ***all undesignated degraded upland wet or dry heathland ≥ 5ha with ≥ 10% cover of dwarf heath species, comprising three or more of the following:***
    - ***Calluna vulgaris* (Heather)**
    - ***Empetrum nigrum* (Crowberry)**
    - ***Erica tetralix* (Cross-leaved Heath)**
    - ***Erica cinerea* (Bell Heather)**
    - ***Ulex gallii* (Western Gorse)**
    - ***Vaccinium myrtillus* (Bilberry)**
    - ***Vaccinium vitis-idaea* (Cowberry)**

H7) FEN, MARSH AND SWAMP

Section 7 of the Environment (Wales) Act 2016 identifies the following priority habitats under the broad category of 'Fen, marsh and swamp':

- Upland flushes, fens and swamps
- Lowland fens
- Purple moorgrass and rush pastures
- Reedbeds

Definitions of these habitat types is available on the JNCC website.

H7.1) UPLAND FLUSHES, FENS AND SWAMPS

The varying ground topography and geology of upland areas leads to the appearance of wet ground as water from the surrounding land is channelled into one area. Lateral movements through peat sediments, changes in underlying geology and human disturbance such as drains and peat cuttings can also encourage the development of areas of shallow standing water. These all lead to the development of fens and wet flushes in the uplands.

While not as diverse as lowland counterparts, the fens and flushes/springs of the uplands are small but important components of the upland landscape. The standing water attracts water plants and a number of invertebrates species, included some that are typical of upland environments. As with most upland habitats, the fens and flushes will occur as a mosaic with blanket bogs, wet and dry heath/grass areas, bog pools, exposed rock. Fens and flushes often occur as part of the Ffridd zone.

The availability of water may make these favoured areas by grazing livestock. While poaching and over grazing can be problems, an appropriate level of grazing can create further diversity within the habitat. Where few other water sources are available, these natural seepages are critical for watering stock and so their presence can enable grazing of the surrounding habitats.

The most common types of 'flush' in Powys are M6 acidic flushes, which in most cases occur in close association with larger mire, wet heath and marshy grassland complexes. Basic or neutral flushes are much rarer, containing a number of specialised communities, including M10 base-rich flushes which can occur in both uplands and lowlands but which are invariably small in size. Most small sites will probably fall within larger areas of surrounding habitats which also qualify for selection, however the nature conservation importance of flushes, with the range of higher plant, bryophyte and invertebrate interest that is likely to be present, justifies all unmodified flushes being considered for Wildlife Site designation.

The following sites should be considered for selection:

- ***all undesignated, unmodified upland flushes, fens and swamps with 4 or more species from Table 8***

Table 8 – axiophyte species for upland flushes, fens and swamps in Powys

Anagallis tenella	Bog Pimpernel

Briza media	Quaking-grass
Caltha palustris var. radicans	Marsh Marigold (upland form)
Carex curta	White Sedge
Carex dioica	Dioecious Sedge
Carex flacca	Glaucous Sedge
Carex hostiana	Tawny Sedge
Carex lasiocarpa	Slender Sedge
Carex limosa	Bog-sedge
Carex magellanica	Tall Bog-sedge
Carex pulicaris	Flea Sedge
Drosera rotundifolia	Round-leaved Sundew
Eleocharis multicaulis	Many-stalked Spike-rush
Eleocharis quinqueflora	Few-flowered Spike-rush
Galium uliginosum	Fen Bedstraw
Hammarbya paludosa	Bog Orchid
Hypericum elodes	Marsh St John's-wort
Linum catharticum	Fairy Flax
Menyanthes trifoliata	Bogbean
Narthecium ossifragum	Bog Asphodel
Pedicularis sylvatica	Lousewort
Pilularia globulifera	Pillwort
Pinguicula vulgaris	Common Butterwort
Potentilla palustris	Marsh Cinquefoil
Ranunculus omiophyllus	Round-leaved Crowfoot
Rhynchospora alba	White Beak-sedge
Sagina nodosa	Knotted Pearlwort
Scutellaria minor	Lesser Skullcap
Selaginella selaginoides	Lesser Clubmoss
Succisa pratensis	Devil's-bit Scabious
Triglochin palustre	Marsh Arrowgrass
Utricularia minor	Lesser Bladderwort
Vaccinium oxycoccos	Cranberry
Valeriana dioica	Marsh Valerian

H7.2) LOWLAND FENS

Fens are predominantly fed by groundwater, rather than the rain-fed blanket and raised bogs. Fen vegetation is floristically varied and can resemble other habitats such as marshy grassland and wet heath. However, fen habitats are developed over peat deeper than 0.5 metres.

Fens occur throughout Wales, particularly at low altitudes and they fall into three main groups: 'basin fens'; 'valley fens' and 'flood-plain fens'. Basin fens occur in closed hollows, partly fed by ground water. Typically the vegetation consists of a floating mat of sedges and/or bryophytes. Valley fens are widely distributed in Wales, although in Powys the majority have been degraded through drainage – only fragments remain. Flood-plain fens are similar to valley fens, but are found on the stream flood-plains which are subject to flooding from the adjacent watercourse.

The following fen communities of high priority for nature conservation occur within Powys:

- M4 *Carex rostrata - Sphagnum recurvum* mire
- M5 *Carex rostrata – Sphagnum squarrosum* mire
- M6 *Carex echinata - Sphagnum recurvum/auriculatum* mire

- M9 *Carex rostrata – Calliergon cuspidatum* mire
- M10 *Carex dioica - Pinguicula vulgaris* mire
- M21 *Narthecium ossifragum - Sphagnum papillosum* valley mire
- M26 *Molinia caerulea – Crepis paludosa* mire
- M27 *Filipendula ulmaria - Angelica sylvestris* mire
- M28 *Iris pseudacorus - Filipendula ulmaria* mire
- M29 *Hypericum elodes - Potamogeton polygonifolius* soakway
- M30 Related vegetation of seasonally-inundated habitats
- M37 *Cratoneuron commutatum - Festuca rubra* spring
- S10 *Equisetum fluviatile* swamp
- S11 *Carex vesicaria* swamp
- S25 *Phragmites australis – Euphatorium cannabinum* tall-herb fen
- S27 *Carex rostrata – Potentilla palustris* tall-herb fen

The UK is thought to host a large proportion of the fen surviving in the EU. As in other parts of Europe fen vegetation has declined dramatically in the past century. Fen habitats support a diversity of plant and animal communities. Some can contain up to 550 species of higher plants, a third of our native plant species; up to and occasionally more than half the UK's species of dragonflies, several thousand other insect species, as well as being an important habitat for a range of aquatic beetles.

The following sites should be considered for selection:

- ***all undesignated lowland fen habitat, providing they are not grossly modified by agricultural or other man-made improvement.***

H7.3) PURPLE MOORGRASS AND RUSH PASTURES

Marshy grassland is widely distributed in Powys. Two main types are found: those dominated by tall rushes (*Juncus*) and those where tussocky grasses, i.e. Purple Moor-grass (*Molinia caerulea*), are most prominent. These mainly fall within NVC communities M22 to M25, often in combination with elements of M15 wet heathland and are often referred to as 'rhos pastures'.

In sites where the rushes dominate, other dominant species include Yorkshire Fog (*Holcus lanatus*), Common Marsh Bedstraw (*Galium palustre*), Greater Bird's-foot-trefoil (*Lotus pedunculatus*) and Purple Moor-grass.

Where Purple Moor-grass is dominant, other co-dominant species found include Tormentil (*Potentilla erecta*), Devil's-bit Scabious (*Succisa pratensis*), Meadow Thistle (*Cirsium dissectum*) and Carnation Sedge (*Carex panicea*). Communities of this type may also be mapped and classified as being 'wet bog', 'wet heath' or 'fen meadow' depending on their species composition. Some of the more species-rich stands of this type are of very high nature conservation value.

Purple moor grass and rush pastures are a priority for nature conservation because they are highly susceptible to agricultural modification and reclamation, throughout their range and it is thought that considerably more survives in the UK than the rest of Europe.

The following sites should be considered for selection:

- ***all undesignated M22 or M24 marshy grassland;***
- ***all undesignated marshy grassland supporting 12 or more vascular plant species from Table 9 below.***

Table 9 – indicator species for purple moorgrass & rush pasture in Powys

Achillea ptarmica	Sneezewort
Agrostis canina	Velvet Bent
Anagallis tenella	Bog Pimpernel
Angelica sylvestris	Wild Angelica
Briza media	Quaking-grass
Calamagrostis canescens	Purple Small-reed
Caltha palustris	Marsh Marigold
Cardamine pratensis	Cuckoo Flower
Carex disticha	Brown Sedge
Carex flacca	Glaucous Sedge
Carex hostiana	Tawny Sedge
Carex nigra	Common Sedge
Carex pallescens	Pale Sedge
Carex panicea	Carnation Sedge
Carex pulicaris	Flea Sedge
Carex rostrata	Bottle Sedge
Carex vesicaria	Bladder-sedge
Carex viridula subsp. brachyrrhyncha	Long-stalked Yellow Sedge
Carex viridula subsp. oedocarpa	Common Yellow Sedge
Carum verticillatum	Whorled Caraway
Cirsium dissectum	Meadow Thistle
Crepis paludosa	Marsh Hawk's-beard
Dactylorhiza spp.	Marsh orchids
Dactylorhiza spp.	Spotted-orchids
Danthonia decumbens	Heath-grass
Drosera rotundifolia	Round-leaved Sundew
Dryopteris carthusiana	Narrow Buckler-fern
Eleocharis spp.	Spike-rushes
Epilobium palustre	Marsh Willowherb
Epilobium parviflorum	Hoary Willowherb
Epipactis palustris	Marsh Helleborine
Equisetum palustre	Marsh Horsetail
Equisetum sylvaticum	Wood Horsetail
Erica tetralix	Cross-leaved Heath
Eriophorum angustifolium	Common Cottongrass
Eriophorum latifolium	Broad-leaved Cottongrass
Eupatorium cannabinum	Hemp-agrimony
Filipendula ulmaria	Meadowsweet
Galium palustre	Common Marsh Bedstraw
Galium uliginosum	Fen Bedstraw
Genista anglica	Petty Whin
Geum rivale	Water Avens
Hydrocotyle vulgaris	Marsh Pennywort
Hypericum tetrapterum	Square-stalked St John's-wort
Iris pseudacorus	Yellow Iris
Isolepis setacea	Bristle Club-rush
Juncus bulbosus	Bulbous Rush
Juncus conglomeratus	Compact Rush
Juncus inflexus	Hard Rush

Juncus subnodulosus	Blunt-flowered Rush
Lotus pedunculatus	Greater Bird's-foot-trefoil
Luzula multiflora	Heath Wood-rush
Lychnis flos-cuculi	Ragged-robin
Lycopus europaeus	Gypsywort
Lysimachia nummularia	Creeping-jenny
Lysimachia vulgaris	Yellow Loosestrife
Lythrum salicaria	Purple Loosestrife
Mentha aquatica	Water Mint
Menyanthes trifoliata	Bogbean
Montia fontana	Blinks
Myosotis laxa	Tufted Forget-me-not
Myosotis scorpioides	Water Forget-me-not
Myosotis secunda	Creeping Forget-me-not
Myrica gale	Bog Myrtle
Narthecium ossifragum	Bog Asphodel
Oenanthe fistulosa	Tubular Water-dropwort
Pedicularis palustris	Marsh Lousewort
Pedicularis sylvatica	Lousewort
Persicaria bistorta	Common Bistort
Pinguicula vulgaris	Common Butterwort
Potentilla erecta	Tormentil
Potentilla palustris	Marsh Cinquefoil
Pulicaria dysenterica	Common Fleabane
Ranunculus flammula	Lesser Spearwort
Sagina nodosa	Knotted Pearlwort
Sanguisorba officinalis	Great Burnet
Salix repens	Creeping Willow
Scirpus sylvaticus	Wood Club-rush
Scutellaria galericulata	Skullcap
Scutellaria minor	Lesser Skullcap
Senecio aquaticus	Marsh Ragwort
Serratula tinctoria	Saw-wort
Stachys palustris	Marsh Woundwort
Stellaria alsine	Bog Stitchwort
Stellaria palustris	Marsh Stitchwort
Succisa pratensis	Devil’s-bit Scabious
Thalictrum flavum	Common Meadow-rue
Thelypteris palustris	Marsh Fern
Triglochin palustre	Marsh Arrowgrass
Trollius europaeus	Globe-flower
Vaccinium oxycoccos	Cranberry
Valeriana dioica	Marsh Valerian
Valeriana officinalis	Common Valerian
Veronica beccabunga	Brooklime
Veronica scutellata	Marsh Speedwell
Viola palustris	Marsh Violet
Wahlenbergia hederacea	Ivy-leaved Bellflower

H7.4) REEDBED AND LOWLAND SWAMP

Reedbeds are wetlands dominated by stands of the Common Reed (*Phragmites australis*), wherein the water table is at or above ground level for most of the year. They tend to incorporate areas of open water and ditches and small areas of wet grassland and carr woodland may be associated with them. There are about 5,000ha of reedbeds in the UK, but

of the 900 or so sites contributing to this total, only about 50 are greater than 20ha. Reedbeds are amongst the most important habitats for birds in the UK; a number of rare invertebrates also rely on it.

Swamps are found around the edges of open water and tend to be species-poor, dominated by one or a few emergent species. Although the commonest NVC swamp community is S4 *Phragmites australis* swamp and reedbeds, the following can also be found in Powys:

- S3 *Carex paniculata* sedge-swamp
- S5 *Glyceria maxima* swamp
- S6 *Carex riparia* swamp
- S7 *Carex acutiformis* swamp
- S9 *Carex rostrata* swamp
- S12 *Typha latifolia* swamp
- S13 *Typha angustifolia* swamp
- S14 *Sparganium erectum* swamp
- S19 *Eleocharis palustris* swamp
- S22 *Glyceria fluitans* water-margin vegetation
- S23 Other water-margin vegetation

The following sites should be considered for selection:

- ***all undesignated S3, S4, S6, S7, S9, S12, S13, S14 or S19 reedbed and other tall swamp (of natural origin).***

H8) BOG

Section 7 of the Environment (Wales) Act 2016 identifies the following priority habitats under the broad category of 'Bogs':

- Lowland raised bog
- Blanket bog

Definitions of these habitat types is available on the JNCC website.

'Bog' is a generic term covering mire vegetation occurring on peat ≥0.5m deep, where the water level is at or just below the surface and is maintained principally by rainfall rather than by groundwater sources. This definition includes bog pools, soakaways, basin mires and 'schwingmor'. The main vegetation component is usually bog moss (*Sphagnum* spp.), with members of the sedge family and sometimes with ericoid (heath family) species.

H8.1) LOWLAND RAISED BOG

Raised bogs in this category are restricted to level ground in the lowlands, along valley floors and estuarine floodplains. They are widely distributed, but very scarce in Wales and as such, the majority of sites are already designated as SSSIs or National Nature Reserves (NNRs).

Lowland raised bog is made up of a shallow dome of peat, which has developed through succession from open water to swamp and fen. Very few examples of lowland raised bog occur in Powys. The main NVC community types found are:

- M2 *Sphagnum cuspidatum/recurvum* bog pool community
- M4 *Carex rostrata - Sphagnum recurvum* mire
- M5 *Carex rostrata – Sphagnum squarrosum* mire
- M18 *Erica tetralix – Sphagnum papillosum* rised and blanket mire
- M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire
- M20 *Eriophorum vaginatum* blanket and raised mire
- M25 *Molinia caerulea-Potentilla erecta* mire
- M29 *Hypericum elodes - Potamogeton polygonifolius* soakway

All bog habitats are selected using the same criteria which can be found at the end of this section, below Blanket Bog (H8.2).

H8.2) BLANKET BOG

Blanket bog is a globally restricted peatland habitat confined to cool, wet, typically oceanic climates. Peat depth is variable, with an average of 0.5-3 m being fairly typical but depths in excess of 5m are not unusual.

Blanket bog vegetation may contain substantial amounts of dwarf shrubs, but is distinguished from heathland by its occurrence on deep peat (>0.5 m) and usually contains frequent occurrence of Hare's-tail Cottongrass (*Eriophorum vaginatum*) and characteristic mosses. Many of the typical blanket mire species, such as Heather (*Calluna vulgaris*), Cross-leaved Heath (*Erica tetralix*), Deergrass (*Trichophorum germanicum*), cottongrass (*Eriophorum*) species and several of the bog moss (*Sphagnum*) species, occur throughout much of the range of the habitat, although their relative proportions vary across the country.

The principal NVC communities covered by this habitat are M1, M2, M3, M15, M17, M18, M19, M20 and M25, together with their intermediates. Other communities, such as flush, fen and swamp types, also form an integral part of the blanket bog landscape. The main blanket bog communities found in Powys are:

- M1 *Sphagnum auriculatum* bog pool community
- M2 *Sphagnum cuspidatum/recurvum* bog pool community
- M3 *Eriophorum angustifolium* bog pool community
- M4 *Carex rostrata - Sphagnum recurvum* mire
- M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire
- M18 *Erica tetralix – Sphagnum papillosum* rised and blanket mire
- M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire
- M20 *Eriophorum vaginatum* blanket and raised mire

The following sites should be considered for selection:

- ***all undesignated, undegraded bog habitats;***
- ***all undesignated degraded bog habitats supporting one or more vascular plant species of restricted distribution in Powys (marked *bold in Table 10 below);***
- ***all undesignated degraded bog habitats supporting 5 or more species from Table 10.***

Table 10 – species characteristic of bog habitats in Powys

***Andromeda polifolia**	***Bog Rosemary**
Calluna vulgaris	Heather
Carex curta	White Sedge
***Carex diandra**	***Lesser Tussock-sedge**
Carex echinata	Star Sedge
***Carex lasiocarpa**	***Slender Sedge**
Carex limosa	Bog Sedge
***Carex magellanica**	***Tall Bog-sedge**
Carex rostrata	Bottle Sedge
Dactylorhiza maculata	Heath Spotted-orchid
***Drosera intermedia**	***Oblong-leaved Sundew**
Drosera rotundifolia	Round-leaved Sundew
Dryopteris carthusiana	Narrow Buckler-fern
Eleocharis multicaulis	Many-stalked Spike-rush
Empetrum nigrum	Crowberry
Equisetum fluviatile	Water Horsetail
Eriophorum angustifolium	Common Cottongrass
***Eriophorum latifolium**	***Broad-leaved Cottongrass**
Eriophorum vaginatum	Hare's-tail Cottongrass
***Hammarbya paludosa**	***Bog Orchid**
Juncus bulbosus	Bulbous Rush
Menyanthes trifoliata	Bogbean
***Myrica gale**	***Bog Myrtle**
Narthecium ossifragum	Bog Asphodel
***Osmunda regalis**	***Royal Fern**
Pinguicula vulgaris	Common Butterwort
Potamogeton polygonifolius	Bog Pondweed
Potentilla palustris	Marsh Cinquefoil
***Rhynchospora alba**	***White Beak-sedge**

Rubus chamaemorus	***Cloudberry**
Sphagnum magellanicum	***Magellanic Bog-moss**
Sphagnum spp.	Other bog-mosses
Succisa pratensis	Devil's-bit Scabious
Trichophorum germanicum	Deergrass
Utricularia minor	Lesser Bladderwort
Vaccinium myrtillus	Bilberry
Vaccinium oxycoccos	Cranberry
Vaccinium vitis-idaea	Cowberry
Viola palustris	Marsh Violet

***** **VASCULAR PLANT SPECIES OF BOG HABITATS WITH A RESTRICTED DISTRIBUTION IN POWYS**

H9) RIVERS AND STREAMS

Section 7 of the Environment (Wales) Act 2016 identifies the 'Rivers' priority habitat type, under the broad category of 'Rivers and Streams'. The definition of this habitat type is available on the JNCC website.

H9.1) RIVERS

This habitat includes a very wide range of types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in 'natural' systems). These range from torrential mountain streams to meandering lowland rivers. Numerous factors influence the ecological characteristics of a watercourse; for example, geology, topography, substrate, gradient, flow rate, altitude, channel profile, climate, catchment features (soil, land use, vegetation, etc.) - human activities add to this complexity. In addition most river systems change greatly in character as they flow from source to sea or lake.

Rivers are difficult to conserve, but are important wildlife corridors, migratory routes and key breeding areas for birds, such as Common Sandpiper, Grey Wagtail, White-throated Dipper, Goosander, Little Ringed Plover, Common Kingfisher and Sand Martin. The rivers of Powys are also important for a number of fish species, such as Atlantic Salmon, trout, lamprey and shad species, as well as Freshwater White-clawed Crayfish, and European Water Vole, both of which are now very scarce.

It is recognised that all watercourses are likely to have been modified and/or polluted to some extent, at some point, but the intention of selection should be to conserve systems where the majority is unmodified and/or unpolluted.

Natural, dynamic flowing watercourses contain distinctive features, such as riffles and pools, meanders, eroding soft cliffs and exposed riverine sediments (gravel bars, etc.). There is often little or no vascular plant interest to such features, but they are good indicators of the physical naturalness of watercourses and the overall quality. Equally importantly, their features are of critical importance for the support of distinctive invertebrate communities. These communities could be selected through individual species criteria or assemblages, but blanket designation of natural watercourse features is the best way of furthering the conservation of these often overlooked habitat features and their dependant species.

Watercourses selected as Local Wildlife Sites should include 'buffer zones' of adjacent habitat, up to 7m wide, from either bank top, although this may be narrower locally where the land alongside is developed or otherwise degraded by human activities. Adjacent semi-natural habitat directly associated with and adjacent to qualifying watercourses should also be included, even if the associated habitats do not merit selection as a Local Wildlife Site in their own right. This may include flood meadows, woodland, marsh and pollarded willows, for example. Reens (ditches) should also be considered, as it is a habitat that is often rich in rare or uncommon flora and fauna. Watercourses can form an important hydrological link to other habitats, such as alder/willow carr or wet grassland and may be included as part of those habitats or as part of a mosaic.

The following sites should be considered for selection:

- ***all undesignated rivers or streams supporting one or more of the species listed in Table 11, provided the species has been recorded there within at least 10 years of the assessment date and is found within the river channel or adjacent regularly flooded areas;***
- ***all undesignated rivers or streams with a predominantly natural bank and bed profile, free of canalisation and revetment and no persistent gross pollution, supporting an average of 5 or more species of submerged, floating and emergent plant species in 50m;***
- ***all undesignated rivers or streams with exposed river sediments known to support diverse or rare invertebrate fauna.***

Table 11 – restricted species found in the rivers and streams of Powys

Vascular plants	
Allium schoenoprasum	Chives
Butomus umbellatus	Flowering Rush
Callitriche obtusangula	Blunt-fruited Water-starwort
Callitriche platycarpa	Various-leaved Water-starwort
Carex elata	Tufted-sedge
Limosella aquatica	Mudwort
Luronium natans	Floating Water-plantain
Lysimachia vulgaris	Yellow Loosestrife
Myosoton aquaticum	Water Chickweed
Myriophyllum verticillatum	Whorled Water-milfoil
Nuphar lutea	Yellow Water-lily
Oenanthe aquatica	Fine-leaved Water-dropwort
Potamogeton crispus	Curled Pondweed
Potamogeton perfoliatus	Perfoliate Pondweed
Ranunculus fluitans	River Water-crowfoot
Ranunculus penicillatus subsp. penicillatus	Stream Water-crowfoot
Ranunculus trichophyllus	Thread-leaved Water-crowfoot
Scrophularia auriculata	Water Figwort
Thalictrum flavum	Common Meadow-rue
Veronica catenata	Pink Water-speedwell
Lichen	
Collema dichotomum	River Jelly Lichen
Invertebrates	
Austropotamobius pallipes	Freshwater White-clawed Crayfish
Coccinella quinquepunctata	5-spot Ladybird
Gomphus vulgatissimus	Common Club-tail
Platycnemis pennipes	White-legged Damselfly
Fish	
Alosa alosa	Allis Shad
Alosa fallax	Twaite Shad
Anguilla anguilla	European Eel
Lampetra fluviatilis	River Lamprey
Lampetra planeri	Brook Lamprey
Petromyzon marinus	Sea Lamprey
Salmo salar	Atlantic Salmon
Mammals	
Arvicola amphibious	European Water Vole

H10) STANDING OPEN WATERS AND CANALS

Section 7 of the Environment (Wales) Act 2016 identifies the following priority habitats under the broad category of 'Standing open waters and canals':

- Oligotrophic and dystrophic lakes
- Ponds
- Mesotrophic lakes
- Eutrophic standing waters
- Aquifer-fed naturally fluctuating water bodies (not found in Powys)

Definitions of these habitat types is available on the JNCC website.

Powys has a wide range of standing water types. The peat-dominated upland landscapes where the catchments drain calcium-poor rocks are predominantly acidic and poor in nutrients. Generally the water is peat coloured, has very little turbidity and the diversity of aquatic plants is low. In contrast, standing waters in the south of Brecknock are rich in nutrients and highly productive; they often possess a diverse range of aquatic vascular plants.

Consideration should be given to the inclusion of an appropriate area of terrestrial habitat around any selected ponds and lakes, which should be sufficient to protect the waterbody from incidental pollution or disturbance. This 'buffer zone' should typically be a minimum of 10m wide from the water's edge.

H10.1) OLIGOTROPHIC AND DYSTROPHIC LAKES

Oligotrophic and dystrophic lakes are water bodies mainly more than 2ha in size which are characterised by their low nutrient levels and low productivity. Their catchments usually occur on hard, acid rocks, most often in the uplands. This habitat type encompasses a wide range of size and depth and includes the largest and deepest water bodies in the UK. Good examples may support some of the least disturbed aquatic assemblages in the UK.

Characterised by clear, well oxygenated water, oligotrophic lakes typically have low alkalinity with significant areas of hard substrate, such as gravel and cobbles. This is a widespread habitat type in Wales, most common in the upland areas of Snowdonia and the Cambrian Mountains, but relatively scarce elsewhere.

Dystrophic lakes have water that is stained brown due to the presence of high concentrations of dissolved organic carbon from peat. They occur exclusively on or close to deep peat, usually blanket bog and are often fishless and may also lack submerged plants. This is a scarce habitat type in Wales.

The following sites should be considered for selection:

- ***all undesignated oligotrophic/dystrophic lakes which have largely unmodified, semi-natural beds and banks, good water quality and/or which support characteristic aquatic, emergent or bankside plant communities.***

H10.2) PONDS

Ponds, for the purpose of the UK BAP priority habitat classification, are defined as permanent and seasonal standing water bodies up to 2ha in extent, which meet one or more of a specific set of criteria. Full details of these can be found on the JNCC website. Of those likely to exist in Powys, these criteria can be summarised as follows:

- Ponds supporting species of high conservation importance
- Ponds supporting exceptional populations or numbers of key species
- Ponds of high ecological quality (i.e. having a PSYM score ≥75% - see Howard, 2002)
- Individual ponds or groups of ponds with a limited geographic distribution, recognised as important because of their age, rarity of type or landscape context

Ponds in Radnorshire and Brecknock are considered nationally important for their wetland plant and macroinvertebrate species and assemblages. Upland ponds and pools are abundant within this area, where they are often collectively referred to as 'mawn pools', particularly in Radnorshire. The area also has many records for Great Crested Newt and Pillwort. For this reason, the area was identified as an Important Area for Ponds (IAP) as part of a preliminary assessment of Wales (Nicolet et al., 2007). The Important Areas for Ponds (IAP) concept was proposed and developed by Freshwater Habitats Trust to raise awareness of geographic regions that support ponds of national or international biodiversity importance. The project was successfully piloted in Wales prior to ponds being added to the UK list of BAP Priority Habitats in 2007. The aim of IAPs is to identify networks of the most important ponds and their biodiversity. These areas can then be used to help focus strategies for pond monitoring, protection and appropriate management and creation.

Ponds may often qualify for selection as Local Wildlife Sites using the species criteria, particularly when Great Crested Newt (S3) are present or due to exceptional invertebrate assemblages (S5). The National Pond Survey (Pond Action, 1998) and PSYM pond surveys are the recognised methodologies for professional assessment of ponds. These should be considered the preferred method for assessing pond quality, however, in both cases, they require considerable expertise and time to carry out the survey and results need to be sent to Freshwater Habitats Trust for analysis.

First developed by Pond Conservation in 2009, 'The Big Pond Dip invertebrate survey' (Pond Conservation, 2010) is a simple biological quality assessment method. It was designed for use by the wider public and assesses the overall 'naturalness' of ponds, but was also shown to be a good indicator of species richness. It was developed from the methods used by the National Pond Survey and PSYM and although specifically developed for garden ponds, the methods can be applied to any pond or lake up to 5 hectares in area. A high score on the Big Pond Dip indicates that a pond supports animals typical of high quality waterbodies. This method would therefore seem appropriate for a rapid assessment of pond quality and sites scoring highly should be considered for Local Wildlife Site selection or used to target more detailed expert survey.

Networks of small ponds may not qualify individually, but could be deemed as higher value than isolated larger ponds, as they create important connectivity for pond species. When considering site boundaries for Local Wildlife Site ponds, sufficient terrestrial habitat should be included, relevant to the interest of the site and to reduce the chance of water pollution from adjacent land use.

The following sites should be considered for selection:

- ***all undesignated 'High Quality Ponds' identified by and within the Radnorshire and Brecknock IAP;***
- ***all undesignated ponds which score 'High' or 'Very High' when assessed using methodology set out in the National Pond Survey (Pond Action, 1998);***
- ***all undesignated ponds which have a PSYM score ≥75% (Howard, 2002);***
- ***all undesignated ponds scoring ≥52 using the Big Pond Dip survey methodology (ponds scoring at least 35 should be further surveyed using National Pond Survey/PSYM)).***

More information on the National Pond Survey, PSYM and Big Pond Dip can be found on Freshwater Habitats Trust website: https://freshwaterhabitats.org.uk

H10.3) MESOTROPHIC LAKES

Mesotrophic lakes are an increasingly rare habitat type in the UK; they have a narrow range of nutrients, easily altered artificially. Their clear, well-oxygenated waters are more productive and usually warmer than oligotrophic lakes and they occur at lower altitudes and more sheltered locations. They often contain a mixture of hard and soft substrates, providing a range of niches; marginal swamp, fen and wet woodland tend to occur along their margins. Consequently, mesotrophic lakes can support a very wide range of biodiversity, typically the highest plant diversity of all the lake types and relative to other lake types, they contain a higher proportion of nationally scarce and rare aquatic plants.

This habitat type has a scattered distribution throughout Wales, without any particular concentrations. In Powys, mesotrophic lakes are a particular feature of the mid-eastern section, from south-eastern Montgomeryshire, through mid and eastern Radnorshire, to north-east Brecknockshire.

The following sites should be considered for selection:

- ***all undesignated mesotrophic lakes which have largely unmodified, semi-natural beds and banks, good water quality and/or which support good aquatic, emergent or bankside plant communities.***

H10.4) EUTROPHIC STANDING WATERS

Eutrophic standing waters are highly productive because plant nutrients are plentiful, either naturally or as a result of artificial enrichment. These water bodies are characterised by having dense, long-term populations of algae in mid-summer, often making the water green. Their beds are covered by dark anaerobic mud, rich in organic matter. The definition of this habitat includes both natural and man-made still waters such as lakes, reservoirs, oxbow lakes and gravel pits, but excludes small pools, field ponds and brackish waters. Some lakes will have been enriched as a result of human activity and so have been forced along the trophic continuum from a mesotrophic to a eutrophic state.

Healthy eutrophic lakes have high biodiversity, with abundant aquatic, emergent and bankside plants, supporting a great diversity of invertebrates, such as snails, dragonflies and

water beetles. This abundance of food can also support internationally important bird populations.

Eutrophic waters are most typical of hard water areas of the lowlands of southern and eastern Britain, but they are also fairly widespread in Wales, with clusters in Anglesey and Powys. The Tywi and Severn Valleys contain a number of important oxbow lakes.

The following sites should be considered for selection:

- ***all undesignated eutrophic lakes and ponds which have largely unmodified, semi-natural beds and banks, good water quality and which support good aquatic, emergent or bankside plant communities.***

H11) INLAND ROCK

Section 7 of the Environment (Wales) Act 2016 identifies the following priority habitats under the broad category of 'Inland rock':

- Inland rock outcrop and scree habitats
- Calaminarian grasslands
- Open mosaic habitats on previously developed land
- Limestone pavement

Definitions of these habitat types is available on the JNCC website.

H11.1) INLAND ROCK OUTCROP AND SCREE HABITATS

Rock exposures are a particular feature of the uplands, but also occur locally in lowland situations. The type of bed-rock has a crucial influence upon the type of vegetation encountered at a site and many are host to a number of different plant communities. Non-vascular plants may be dominant in some sites, as may certain fern species. Many nationally rare and scarce species can occur, including notable bryophytes and lichens.

Rock and scree communities are intrinsically rare as a habitat type. The following rock and scree NVC communities are found in Powys:

- **U16** *Luzula sylvatica-Vaccinium myrtillus* tall herb community (Section 7);
- **U17** *Luzula sylvatica-Geum rivale* tall herb community (Section 7);
- **U21** *Cryptogramma crispa-Deschampsia flexuosa* community (Section 7);
- **OV38** *Arrhenatherum elatius-Gymnocarpium robertianum* community (Section 7);
- **OV39** *Asplenium trichomanes-A. ruta-muraria* community (Section 7);
- **OV40** *Asplenium viride-Cystopteris fragilis* community (Section 7)

U16 & U17 are characteristic of old red sandstone crags and cliff ledges. These communities are likely to occur on relatively ungrazed, upland hillsides.

OV38 is one of the characteristic communities of limestone crags, scree and outcrops. It favours calcareous substrates and is generally composed of fern and grass-dominated open vegetation, on areas of limestone crags and scree, but also pavement.

OV39 & OV40 occur in rock gully and crevice habitats. Both of these communities are composed of open vegetation, often fragmented. Ferns and bryophytes are characteristically dominant.

These vegetation types are rather poorly characterised in the NVC and do not reflect the full spectrum of floristic variation within rock crevices. Bryophyte / lichen dominated communities of rock surfaces are not covered by the NVC.

In many cases rock & scree habitats are likely to fall within mosaics of other surrounding habitats which also qualify for selection. The presence of species of interest may allow selection under the Species criteria, particularly with reference to Bryophytes (S7) and Lichens (S8) of conservation concern and bats (S1.2).

The following sites should be considered for selection:

- ***all undesignated areas / exposures of Section 7 rock & scree habitat (identified above);***
- ***all undesignated areas of rock & scree habitat ≥ 0.5 ha;***
- ***all undesignated areas of rock & scree habitat supporting 5 or more species from Table 12 below.***

Table 12 – vascular plants found in rock & scree habitats in Powys

Allium vineale	Wild Onion
Antennaria dioica	Mountain Everlasting
Arenaria serpyllifolia	Thyme-leaved Sandwort
Asplenium septentrionale	Forked Spleenwort
Asplenium viride	Green Spleenwort
Cardamine impatiens	Narrow-leaved Bitter-cress
Catapodium rigidum	Fern-grass
Cerastium diffusum	Sea Mouse-ear
Ceratocapnos claviculata	Climbing Corydalis
Ceterach officinarum	Rustyback (natural situations only)
Circaea alpina	Alpine Enchanter's-nightshade
Clinopodium ascendens	Common Calamint
Convallaria majalis	Lily of The Valley
Cryptogramma crispa	Parsley Fern
Cystopteris fragilis	Brittle Bladder-fern
Diphasiastrum alpinum	Alpine Clubmoss
Dryopteris aemula	Hay-scented Buckler-fern
Dryopteris expansa	Northern Buckler-fern
Dryopteris oreades	Mountain Male Fern
Galium boreale	Northern Bedstraw
Genista pilosa	Hairy Greenweed
Geranium lucidum	Shining Crane's-bill
Geranium sanguineum	Bloody Crane's-bill
Geranium sylvaticum	Wood Crane's-bill
Geum rivale	Water Avens
Gymnocarpium dryopteris	Oak Fern
Gymnocarpium robertianum	Limestone Fern
Helianthemum nummularium	Common Rock-rose
Huperzia selago	Fir Clubmoss
Luzula sylvatica	Great Wood-rush
Lycopodium clavatum	Stag's-horn Clubmoss
Meconopsis cambric	Welsh Poppy
Melica nutans	Mountain Melick
Minuartia verna	Spring Sandwort
Orthilia secunda	Serrated Wintergreen
Phegopteris connectilis	Beech Fern
Polygonatum odoratum	Angular Solomon's-seal
Polypodium cambricum	Southern Polypody
Polypodium interjectum	Intermediate Polypody
Rubus saxatilis	Stone Bramble
Saxifraga hypnoides	Mossy Saxifrage
Saxifraga oppositifolia	Purple Saxifrage
Saxifraga stellaris	Starry Saxifrage
Sedum forsterianum	Rock Stonecrop
Sedum rosea	Roseroot
Sedum telephium	Orpine

Sorbus porrigentiformis	Grey-leaved Whitebeam
Sorbus rupicola	Rock Whitebeam
Sorbus torminalis	Wild Service-tree
Taxus baccata	Yew
Teucrium scorodonia	Wood Sage
Thalictrum minus	Lesser Meadow-rue
Tilia platyphyllos	Large-leaved Lime
Trollius europaeus	Globe-flower

H11.2) CALAMINARIAN GRASSLANDS

Calaminarian grasslands include a range of semi-natural and anthropogenic sparsely vegetated habitats on substrates, characterised by high levels of heavy metals such as lead, chromium and copper, or other unusual minerals. These are open-structured plant communities, often composed of specialist ruderal/metallophyte species of lichens, bryophytes and vascular plants. Outside the UK it is very rare.

These metal-rich habitats are found scattered across Powys in natural rock outcrops, screes and river gravels, as well as mine workings and even as a result of run-off from building materials or stonework such as copper window grills, lightning conductors, galvanised wire fencing, electricity pylons and corrugated iron sheeting. Artificial mineral workings & spoil are the most common source and mine spoil has also been used to surface paths, forest tracks, railway lines and even graves as its toxicity keeps weeds at bay. The Fan lead mines near Llanidloes in Montgomeryshire provided material for the Cambrian Railway and the Central Wales Railway. More than 40 years after the latter's closure, the metal-rich ballast is still remarkably weed-free, providing excellent habitat for metallophytes on Radnorshire Wildlife Trust's Gilfach Nature Reserve, near Rhayader.

Calaminarian grassland types are not fully covered by the NVC. The OV37 *Festuca ovina-Minuartia verna* community, with its three sub-communities, is the only one described and is not thought to be present in Powys. However, there are metallophyte habitats in the area, which can be distinguished from other grassland types by the open sward and presence of metallophyte species.

The following sites should be considered for selection:

- ***all undesignated calaminarian grassland sites supporting a good assemblage of indicator species****

* requires assessment by a lower plants specialist.

H11.3) OPEN MOSAIC HABITATS ON PREVIOUSLY DEVELOPED LAND

A diverse range of post-industrial sites are found throughout Powys, with areas of colliery spoil, slag and old quarries and a range of derelict land and demolition sites occurring in and around towns and cities. Other post-industrial sites (in the broadest sense) include disused railway lines, cuttings, rubbish dumps and embankments.

The varied, often mixed soil types and the frequent occurrence of varied topography and extremes of drainage all promote high floral and faunal diversity, as well as unusual assemblages of plant species, on post-industrial sites. Past and/or ongoing ground disturbance and substrate instability, or infertility often leads to patchy or extensive areas of largely bare ground, which can be a positive feature for annual and specialist colonisers and fauna, such as Grayling (*Hipparchia semele*) and Green Tiger Beetle (*Cicindela campestris*). Extensive areas of largely bare ground can be important for breeding birds such as Northern Lapwing (*Vanellus vanellus*) and Little Ringed Plover (*Charadrius dubius*), whilst sites with varied vegetation structure and bare ground, herbaceous vegetation and scrub, in close proximity, are often valuable for reptiles and scarce or rare invertebrates.

Many post-industrial sites will qualify as Local Wildlife Sites as a result of vegetation developing which has a similar floristic composition to semi-natural habitats of value. Grasslands, heaths, wetland and scrub vegetation of Local Wildlife Site quality are all frequent on post-industrial land. Sites with a high diversity of native and archaeophyte species could be selected as Local Wildlife Sites, even if a significant habitat mosaic is absent and the habitat present does not merit selection as a 'secondary' example of any of the semi-natural habitats for which there are other habitat criteria. Furthermore, many post-industrial land sites have a range of habitats present, such that the site is suitable for selection as a Local Wildlife Site on the basis of its mosaic of habitats (H12), even if none of the habitat elements are of Local Wildlife Site quality in their own right.

The following sites should be considered for selection:

- ***all undesignated areas of previously developed land ≥ 0.25ha, which has re-vegetated, supporting a mosaic of bare ground and 20 or more non-woody species from Tables 4, 5, 6, 7 & 12.***

H11.3) LIMESTONE PAVEMENT

Limestone pavements are of both geological and biological importance and the UK holds a significant proportion of the limestone pavement resource within Europe. In Wales, these were formed on Carboniferous limestone, laid down 350 million years ago and eroded during the last Ice Age, to form the level and gently sloping platforms seen today. Limestone pavements are divided into blocks (called 'clints') and are bounded by vertical fissures known as 'grikes').

Limestone pavements have a distinctive flora - woodland and wood-edge species are well-represented in the sheltered grikes, whilst the clints support plants of rocky habitats or are often unvegetated. On the limestone pavements of Brecknock where grazing has ceased, the woodland flora dominates and dense stands of Hazel (*Corylus avellana*) develop. Where grazing continues, communities with a closer affinity to grassland remain. Over 80 herb species have been recorded on the limestone pavements of Brecknock (Burek and Deacon, 1997).

Areas of pavement may be associated with exposed limestone faces which are not considered to be pavement, or scree and boulder fields of eroded material. The area immediately around limestone pavement is often calcareous grassland and small outcrops of pavement may form a mosaic, with different calcareous communities of both grassland and scrub. Local Wildlife sites should seek to include these other areas of Section 7 habitat within the site boundaries.

The following sites should be considered for selection:

- ***all undesignated limestone pavement.***

H12) MOSAIC HABITATS

Mosaic sites, comprising of complex mixtures of semi-natural habitats, are acknowledged to be problematic when determining criteria for Local Wildlife Site selection, especially where none of the habitats involved are capable of qualifying individually for selection ('non-qualifying mosaics'). Such sites may not contain any habitats that are intrinsically of very high interest, but may nevertheless be extremely important for the range of species they support collectively. Fauna may depend on a number of the habitat elements present for differing purposes, not being solely reliant on any one habitat element.

Parks, gardens burial grounds and golf courses can support mosaics of comparatively undisturbed habitats, including semi-natural grasslands, large trees, small woodlands and scrub, lakes and ponds, etc. Many wetlands may also qualify as mosaic sites, their importance lying in the continuity and interdependence of the habitats represented, rather than on the individual significance of key habitats or species.

It is unrealistic to design a firm criterion for the selection of mosaic sites because of the potential variety of habitats and features that could be involved. The difficulties implicit with mosaic sites mean that expert judgement is likely to be required in individual cases.

Nevertheless, the following mosaic sites should be considered for selection:

- ***any coherent site which has represented at least three distinct habitat types, where at least one is approaching Local Wildlife Site selection status in its own right, providing that improved, species-poor or degraded elements of low or negligible conservation interest do not form a significant proportion (>25%) of the total site area.***

The present state of survey information for uplands is significantly less detailed than for the lowlands. As a general rule it is desirable to aggregate individually qualifying habitats together into single sites where the habitats are adjacent and/or intimately associated. Where smaller sites, or extensively degraded sites, are considered as mosaic sites, care should be taken to ensure that a defensible and reasoned justification is given. Otherwise there may be a risk that the required test of 'substantive nature conservation interest' will not be met and the site could successfully be challenged.

H12.1) SCRUB & FFRIDD

Scrub communities do not feature as a specified Section 7 priority habitat, but 'scrub & ffridd' (also known as 'Coedcae') is a Local Biodiversity Action Plan habitat – currently under review and known as Powys Nature Recovery Action Plan (Powys NRAP). The draft Scrub & Ffridd Habitat Action Plan (HAP) describes this habitat as a mosaic of semi-natural communities usually located between improved agricultural land in valley bottoms and the plateaus of the hilltops. The mosaic can be a mixture of woody vegetation such as birch, ash, gorse, broom, rowan, oak, rose and willow growing in and around areas of scattered bracken, bramble, heath and semi-natural grasslands.

This varied structure, with dense patches of closed vegetation and more open grassland swards, provides for many niches which can support notable lower plant communities and

priority butterfly, reptile and bird species, including Pearl-bordered Fritillary (*Boloria euphrosyne*), Adder (*Vipera berus)*, Common Lizard (*Zootoca vivipara*), European Nightjar (*Caprimulgus europaeus*), Common Cuckoo (*Cuculus canorus*) and Merlin (*Falco columbarius*). The varied habitat structure allows wildlife to adapt to disturbances such as changes to extent, edge effects and age of habitat patches. It is possible therefore, to manage scrub and ffridd to maintain and enhance the conditions for these noted associated species, as long as there are linkages for them to disperse into adjacent habitat patches.

The boundaries of Ffridd are very difficult to define and it will often grade gently into more clearly defined upland mosaics above and lowland pastures and woodland below. Given this difficulty, the habitat value and its importance for connectivity, Scrub & Ffridd Local Wildlife Sites should seek to include adjacent habitat where a clear boundary such as a fence line can be used to set a definite boundary.

It is important to note that, aside from this priority habitat type, mixed scrub habitats, with good structural diversity, for example, varied age ranges & canopy heights, the presence of small rides & clearings, good gradations in edge habitats, varied ground flora etc., can support high biodiversity, as well as priority species, such as the Hazel Dormouse (*Muscardinus avellanarius*). Scrub habitats are extremely variable in form and composition and even some of the common communities may be exceptionally rich in species. In addition, scrub communities may also form important connections, linking habitats between other features of interest, forming a peripheral part of another habitat of interest, or under the Species Guidelines, where they support species of significance.

The following sites should be considered for selection:

- ***all undesignated scrub or ffridd sites, comprising a mosaic of at least 3 habitat communities and one or more of the following criteria:***
    - ***30 or more typical plant species (listed in Table 13) present***
    - ***8 or more butterfly/bird species from Table 14 present***

Note that some of the species listed in Table 14, for example, the Pearl-bordered Fritillary (*Boloria euphrosyne*), would qualify as a Species Local Wildlife Site in their own right. Refer to Species criteria section for more information.

Table 13 – typical plants of scrub and ffridd in Powys

Acer campestre	Field Maple
Achillea millefolium	Yarrow
Adoxa moschatellina	Moschatel
Agrimonia eupatoria	Agrimony
Agrimonia procera	Fragrant Agrimony
Aira spp.	hair-grasses
Alchemilla spp.	Lady's mantles
Alliaria petiolata	Garlic Mustard
Anacamptis pyramidalis	Pyramidal Orchid
Anemone nemorosa	Wood Anemone
Anthriscus sylvestris	Cow Parsley
Anthyllis vulneraria	Kidney Vetch
Aphanes agg.	Parsley-pierts
Arum maculatum	Lords-and-ladies

Betula spp.	Birches
Blackstonia perfoliata	Yellow-wort
Brachypodium pinnatum	Heath False-brome
Brachypodium sylvaticum	False Brome
Briza media	Quaking Grass
Bryonia dioica	White Bryony
Botrychium lunaria	Moonwort
Bromopsis erecta	Upright Brome
Calluna vulgaris	Heather
Campanula rotundifolia	Harebell
Carduus nutans	Musk Thistle
Carex binervis	Green-ribbed Sedge
Carex caryophyllea	Spring-sedge
Carex flacca	Glaucous Sedge
Carex muricata	Prickly Sedge
Carex pallescens	Pale Sedge
Carex pilulifera	Pill Sedge
Carex spicata	Spiked Sedge
Centaurea nigra	Common Knapweed
Centaurea scabiosa	Greater Knapweed
Centaurium erythraea	Common Centaury
Ceratocapnos claviculata	Climbing Corydalis
Circaea lutetiana	Enchanter's Nightshade
Cirsium acaule	Dwarf Thistle
Cirsium eriophorum	Woolly Thistle
Clematis vitalba	Traveller’s Joy
Clinopodium ascendens	Common Calamint
Clinopodium vulgare	Wild Basil
Conopodium majus	Pignut
Cornus sanguinea	Dogwood
Corylus avellana	Hazel
Crataegus monogyna	Hawthorn
Cruciata laevipes	Crosswort
Cynoglossum officinale	Hound’s-tongue
Dactylorhiza spp.	Spotted-orchids
Danthonia decumbens	Heath-grass
Deschampsia flexuosa	Wavy Hair-grass
Digitalis purpurea	Foxglove
Dioscorea communis	Black Bryony
Dryopteris affinis	Scaly Male Fern
Dryopteris filix-mas	Male Fern
Epipactis helleborine	Broad-leaved Helleborine
Erica cinerea	Bell Heather
Erica tetralix	Cross-leaved Heath
Eriophorum angustifolium	Common Cottongrass
Erodium cicutarium	Common Stork’s-bill
Euonymus europaeus	Spindle
Euphrasia officinalis agg.	Eyebrights
Filipendula ulmaria	Meadowsweet
Fragaria vesca	Wild Strawberry
Galium mollugo	Hedge Bedstraw
Galium saxatile	Heath Bedstraw
Galium verum	Lady’s Bedstraw
Geranium molle	Dove’s-foot Crane’s-bill
Geranium pratense	Meadow Crane’s-bill
Geranium robertianum	Herb Robert
Geum rivale	Water Avens
Geum urbanum	Wood Avens

Glechoma hederacea	Ground Ivy
Helianthemum nummularium	Common Rock-rose
Helictotrichon pubescens	Downy Oat-grass
Holcus mollis	Creeping Soft-grass
Hyacinthoides non-scripta	Bluebell
Hypericum hirsutum	Hairy St John's-wort
Hypericum humifusum	Trailing St John's-wort
Hypericum maculatum	Imperforate St John's-wort
Hypericum montanum	Pale St John's-wort
Hypericum perforatum	Perforate St John's-wort
Hypericum pulchrum	Slender St John's-wort
Hypochaeris radicata	Cat's-ear
Ilex aquifolium	Holly
Inula conyzae	Ploughman's Spikenard
Jasione montana	Sheep's Bit
Knautia arvensis	Field Scabious
Koeleria macrantha	Crested Hair-grass
Lathyrus linifolius	Bitter Vetch
Lathyrus pratensis	Meadow Vetchling
Lathyrus sylvestris	Narrow-leaved Everlasting-pea
Leontodon autumnalis	Autumn Hawkbit
Leontodon saxatilis	Lesser Hawkbit
Linaria vulgaris	Common Toadflax
Linum catharticum	Fairy Flax
Listera ovata	Common Twayblade
Lonicera periclymenum	Honeysuckle
Lotus corniculatus	Common Bird's-foot-trefoil
Luzula campestris	Field Wood-rush
Luzula multiflora	Heath Wood-rush
Malus sylvestris	Crab Apple
Malva moschata	Musk-mallow
Medicago lupulina	Black Meddick
Mercurialis perennis	Dog's Mercury
Moenchia erecta	Upright Chickweed
Moehringia trinervia	Three-nerved Sandwort
Myosotis ramosissima	Early Forget-me-not
Ophioglossum vulgatum	Adder's-tongue
Orchis mascula	Early-purple Orchid
Oreopteris limbosperma	Lemon-scented Fern
Origanum vulgare	Wild Marjoram
Ornithopus perpusillus	Bird's-foot
Oxalis acetosella	Wood-sorrel
Pastinaca sativa	Wild Parsnip
Pedicularis sylvatica	Lousewort
Phyllitis scolopendrium	Hart's-tongue
Pilosella officinarum	Mouse-ear-hawkweed
Pimpinella saxifraga	Burnet-saxifrage
Plantago media	Hoary Plantain
Polygala serpyllifolia	Heath Milkwort
Polygala vulgaris	Common Milkwort
Potentilla anglica	Trailing Tormentil
Potentilla erecta	Tormentil
Potentilla sterilis	Barren Strawberry
Primula veris	Cowslip
Primula vulgaris	Primrose
Prunus spinosa	Blackthorn
Quercus petraea	Sessile Oak
Rhamnus cathartica	Buckthorn

Rhinanthus minor	Yellow Rattle
Rosa spp.	Wild roses
Rumex acetosella	Sheep's Sorrel
Sambucus nigra	Elder
Sanguisorba minor	Salad Burnet
Sanguisorba officinalis	Great Burnet
Saxifraga granulata	Meadow Saxifrage
Scabiosa columbaria	Small Scabious
Serratula tinctoria	Saw-wort
Silene dioica	Red Campion
Sorbus spp.	Whitebeams
Stachys officinalis	Betony
Stachys sylvatica	Hedge Woundwort
Stellaria graminea	Lesser Stitchwort
Stellaria holostea	Greater Stitchwort
Taxus baccata	Yew
Teucrium scorodonia	Wood Sage
Thymus polytrichus	Wild Thyme
Torilis japonica	Upright Hedge-parsley
Torilis nodosa	Knotted Hedge-parsley
Trifolium campestre	Hop Trefoil
Trisetum flavescens	Yellow Oat-grass
Ulex gallii	Western Gorse
Ulmus glabra	Wych Elm
Vaccinium myrtillus	Bilberry
Veronica chamaedrys	Germander Speedwell
Veronica officinalis	Heath Speedwell
Vicia sepium	Bush Vetch
Viola canina	Heath Dog-violet
Viola hirta	Hairy Violet
Viola lutea	Mountain Pansy
Viola riviniana	Common Dog-violet
Viscum album	Mistletoe

Table 14 – typical butterfly and bird species of scrub and ffridd in Powys

Birds	
Alauda arvensis	Sky Lark
Anthus pratensis	Meadow Pipit
Anthus trivialis	Tree Pipit
Carduelis cannabina	Common Linnet
Cuculus canorus	Common Cuckoo
Emberiza citronella	Yellowhammer
Falco tinnunculus	Common Kestrel
Oenanthe oenanthe	Northern Wheatear
Pyrrhula pyrrhula	Common Bullfinch
Saxicola rubetra	Whinchat
Saxicola torquata	Stonechat
Sylvia borin	Garden Warbler
Sylvia communis	Common Whitethroat
Sylvia curruca	Lesser Whitethroat
Turdus philomelos	Song Thrush
Turdus torquatus	Ring Ouzel
Butterflies	
Argynnis aglaja	Dark Green Fritillary
Argynnis paphia	Silver-washed Fritillary
Boloria euphrosyne	Pearl-bordered Fritillary
Boloria selene	Small Pearl-bordered Fritillary

Callophrys rubi	Green Hairstreak
Coenonympha pamphilus	Small Heath
Gonepteryx rhamni	Brimstone
Hipparchia semele	Grayling
Ochlodes sylvanus	Large Skipper
Pyronia tithonus	Gatekeeper
Neozephyrus quercus	Purple Hairstreak
Thymelicus sylvestris	Small Skipper

H13) NEWLY CREATED HABITATS

With an increasing awareness of the widespread habitat loss and fragmentation which has occurred across the UK since the Second World War, many private landowners and businesses, as well as public bodies, are seeking to create/re-create species-rich habitats on their own land. As the express purpose of these areas is nature conservation, they can often become high value habitats within a relatively short period of time.

In some cases, when local provenance seed is not used, these habitats may comprise species not found in the local area and, as a consequence, contain locally rare/scarce species. Although artificially created, these habitats nevertheless have a high ecological value and should not be ignored by the Local Wildlife Site system. After all, even unimproved habitats of ancient provenance, are influenced by the actions of man.

When considering newly created habitats for selection as Local Wildlife Sites, the relevant habitat criteria should be used.

The following sites should be considered for selection:

- ***all undesignated artificially created habitats passing habitat criteria relevant to the habitat type and shown to have retained their nature conservation interest for a period of 10 years or more.***

SPECIES CRITERIA

Local Wildlife Sites are usually selected on the basis of habitat; it is, after all, the habitat in which the species usually depends and most sites will be of interest on both grounds. However, some sites may be significant entirely because a certain species is present and may need to be managed in a particular way to benefit this species.

Sites may be selected because they support individual species, which are rare or threatened, or communities of species, which are interesting or characteristic. Individual species of interest may be:

- rare or threatened throughout their range in Britain, in which case all populations are likely to be of significance;
- rare or threatened in the regional and/or local context, but comparatively common elsewhere in Britain, in which case all populations are likely to be of particular significance;
- rare or threatened elsewhere in Britain, but comparatively common regionally or locally, in which case some major populations are likely to be of significance.

Good assemblages or communities of species which are particularly characteristic of the region, or of a particular habitat type or feature, may also be considered for inclusion even though many of the species involved may be comparatively widespread and common (e.g. ancient woodland beetles, arable weed assemblages).

Unless otherwise stated it is assumed that the sites selected support established, resident populations of the species mentioned and that these are 'critically dependant' on the site – i.e. they would not be present in the location or its general vicinity in the absence of either the site or certain key features within it.

Sites which are known to support populations of species which are:

- listed in the EC Habitats Directive, Annexes II and IV;
- listed in Section 7 of the Environment (Wales) Act 2016;
- listed having a significant conservation designation in the UK listing with the JNCC, http://www.jncc.gov.uk/page-3409;
- listed on Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended);

should automatically be considered for selection as Local Wildlife Sites, although it should be clear that the species concerned are either established residents or are in some way dependant on the site for their survival in the locality. This may present difficulties when dealing with mobile species which may depend on a variety of different habitats at various times in their life cycle or at different times of year.

Sites should also be considered where these support species which are listed as 'Species of Conservation Concern', or for species which are rare, uncommon or threatened in the local context, especially where large or well-established populations are present. Assessing the comparative rarity of locally significant species and setting appropriate guidelines for selection is significantly more difficult in the absence of well-organised biological recording at the regional or local level and for many of the more difficult to identify taxa. Local experts have been consulted whilst drawing up these criteria, but there are likely to remain significant gaps in the data sets. Therefore, the precautionary approach should be applied

positively when selecting species-based Local Wildlife Sites, i.e. preferring to select sites which can be deleted at a later date when better species information becomes available.

The records for species and their status are regularly updated, so it is important that any changes which may affect the Local Wildlife Sites criteria are monitored. This document should be updated accordingly when changes are made, but if in doubt, reference should be made to the most recent priority species lists and/or consult with local experts. Local Wildlife Sites should normally be identified only on the basis of reliable field records. It should also be clear however, that the monitoring of sites for the presence of a particular species can take place only as often as resources allow.

S1) MAMMALS

Being a largely landlocked County, this criteria purely considers terrestrial mammals and bats. Across Powys, 50 mammal species have been recorded, 14 of which are bats.

Some terrestrial mammals and all bats are protected under the Wildlife and Countryside Act 1981 (as amended) and Conservation of Habitats and Species Regulations (2017) (as amended). Certain species are also listed on Section 7 of the Environment (Wales) Act 2016. Legal protection is given to Badger (*Meles meles*) and their setts on welfare grounds under The Protection of Badgers Act 1992, however, the presence of breeding badgers is not considered a valid reason for site selection.

S1.2) Terrestrial mammals

Powys is an important area for a number of terrestrial mammal species. However, the distribution of once common mammals can be very patchy. European Water Vole (*Arvicola amphibius*) which has suffered severe declines across the UK is now very scarce in Powys, with the majority of extant sites found in upland areas. Similarily, the Eurasian Red Squirrel (*Sciurus vulgaris*) is now confined to Brecknock, part of a population centred on the Tywi Forest. The Hazel Dormouse (*Muscardinus avellanarius*) is widespread across suitable habitat in Montgomeryshire, but in Radnorshire and Brecknock, they are largely restricted to the east of the County. Harvest Mouse (*Micromys minutus*) appear to be now absent from Powys, although they are easy to overlook.

The West European Hedgehog (*Erinaceus europaeus*) is currently still widespread, but with continued declines across the UK, they are now listed on Section 7 of the Environment (Wales) Act 2016. Similarily, Brown Hare (*Lepus europaeus*) have suffered historic declines, but remain widespread.

This part of Wales remained a stronghold for European Otter (*Lutra lutra*) and Polecat (*Mustela putorius*) when they declined across large areas of the UK. These species have now made remarkable recoveries elsewhere and remain widespread in Powys. Pine Marten (*Martes martes*) are now also making a comeback, following a reinforcement by Vincent Wildlife Trust. All these species are very mobile and have large home ranges, meaning that numbers remain relatively low.

Many of our mammals are nocturnal/crepuscular and secretive in their habits, making them difficult to study. As a consequence there is insufficient data for many species to make rigorous assessments on population and/or range. There is an urgent requirement for more research to assess population densities in key habitats and to assess the percentage of potentially suitable habitat, where a given species actually occurs: at present, uncertainty levels are unacceptably high (Mathews et al, 2018).

The following should be considered for selection:

- ***all sites supporting recent confirmed breeding populations of any of the following:***
    - ***European Water Vole (Arvicola amphibius)*#***
    - ***West European Hedgehog (Erinaceus europaeus)****
    - ***Brown Hare (Lepus europaeus)****

- ***European Otter (Lutra lutra)*#***
- ***Pine Marten (Martes martes)*#***
- ***Harvest Mouse (Micromys minutus)****
- ***Hazel Dormouse (Muscardinus avellanarius)*#***
- ***Polecat (Mustela putorius)****
- ***Eurasian Red Squirrel (Sciurus vulgaris)*#***

* Species listed on Section 7 of the Environment (Wales) Act 2016.
# Species listsed on Schedule 5 of the Wildlife & Countryside Act 1981, as amended.

The presence of breeding populations must be determined through survey, within the previous five years, in order to qualify. Defining site boundaries will be challenging as these species range over wide areas, utilise a variety of different habitats or their ecological needs are not clearly defined. As stated in the introduction, the majority of sites will be selected on the basis of the habitat criteria, but there may be situations where the terrestrial mammal criteria would be more robust. Site boundaries should include areas which are critical for nesting, foraging, laying up, territorial or other significant use.

S1.2) Bats

Almost a quarter of the UK's mammal species are bats. Of the 18 species which have been recorded in the UK, 14 have been found in Powys, including populations of Lesser Horseshoe Bat of European significance. There are no records of Alcathoe Bat, Mouse-eared Bat or Grey Bat in Powys, however it is possible that they are present but under-recorded. Improvements in bat survey technology and the use of eDNA has lead to an increased understanding of the distribution of bats. Some, like the Nathusius' Pipistrelle, may be expanding their range and moving in to new areas, whilst others, like Bechstein's Bat have very specific habitat requirements and are hard to detect.

Bats are highly mobile and require a diverse landscape to satisfy their requirements, which varies between species, gender and time of year. In addition, many roosts are found in places which would not qualify as Local Wildlife Sites under habitat criteria, but are nevertheless vital for the survival of the species.

All bats and their roosts are protected under the Wildlife and Countryside Act (1981) (as amended) and Conservation of Habitats and Species Regulations (2017) (as amended). Certain species are also listed on Section 7 of the Environment (Wales) Act 2016; these are shown in Table 14 below.

The following should be considered for selection:

- ***all undesignated sites supporting significant bat roosts, including vital flight and commuting routes and priority feeding areas.***

'Roosts' are any structure used by the bats at some time, including maternity, pre/post-maternity, hibernation, mating and male roosts. Roosts can be found in a diverse range of natural and man-made structures, from trees and caves, to mines, icehouses and bridges.

Significance levels are given in Table 15 below and vary for each species and roost type. Of particular importance are sites of multi-species occupancy and feeding sites targeted by several species. Signficance levels vary with time and year and species.

Table 15 – significance levels for bats in Powys

Species		**Maternity roost**	**Other roost types e.g. hibernation**
Western Barbastelle*	*Barbastella barbastellus**	Any	Any
Brandt's Bat	*Myotis brandtii*	10	5
Brown Long-eared Bat*	*Plecotus auritus**	25	5
Common Pipistrelle*	*Pipistrellus pipistrellus**	50	5
Daubenton's Bat	*Myotis daubentonii*	Any	Any
Greater Horseshoe Bat*	*Rhinolophus ferrumequinum**	Any	Any
Lesser Horseshoe Bat*	*Rhinolophus hipposideros**	Any	Any
Lesser Noctule	*Nyctalus leisleri*	Any	Any
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Any	Any
Natterer's Bat	*Myotis nattereri*	Any	Any
Noctule Bat*	*Nyctalus noctula**	10	5
Serotine	*Eptesicus serotinus*	Any	Any
Soprano Pipistrelle*	*Pipistrellus pygmaeus**	120	5
Whiskered Bat	*Myotis mystacinus*	10	5

* SPECIES LISTED ON SECTION 7 OF THE ENVIRONMENT (WALES) ACT 2016.

S2) BIRDS

244 species of bird have been recorded in Powys. Birds are highly mobile and in many cases, sites are of value at specific times of the year; for breeding or wintering, or simply as important stopping points during migration.

North Powys and Ceredigion once supported the last remnant Red Kite (*Milvus milvus*) population, which has now made a spectacular recovery, thanks to conservation efforts. Another bird of prey, the Osprey (*Pandion haliaetus*) is recolonising the area following its extinction locally. On moorland, Hen Harrier (*Circus cyaneus*) are still found in small numbers, along with other species typical of this habitat, such as Red Grouse (*Lagopus lagopus*) and Sky Lark (*Alauda arvensis*). Black Grouse cling on in isolated parts of the north. In the broadleaved woodlands, declining summer migrants like Wood Warbler (*Phylloscopus sibilatrix*), Pied Flycatcher (*Ficedula hypoleuca*) and Common Redstart (*Phoenicurus phoenicurus*) breed, whilst many streams support resident White-throated Dipper (*Cinclus cinclus*) and Grey Wagtail (*Motacilla cinerea*). The Dyfi Estuary is the traditional wintering area for Greenland White-fronted Goose (*Anser albifrons flavirostris*), where they are still present, despite global declines. Many other wetland birds can be found in suitable habitat around the County at different times of the year; some, like the Great Bittern (*Botaurus stellaris*) are becoming more frequently encountered.

Tables 15 & 16 below set out an assessment of those bird species, which are considered to be of conservation significance within Powys. Selection is based on each species' status within the region using: Birds of Conservation Concern 'Red' or 'Amber' listing; the Section 7 List, or listed on schedules of the Wildlife & Countryside Act 1981 (& amendments). The precise details of numbers and any additional species, have been developed with the county bird recorders. A 'species diversity' element is also included in these guidelines.

The following should be considered for selection:

- ***all undesignated sites supporting breeding populations, of any size, of species marked with an A in Table 16;***
- ***all undesignated sites regularly supporting wintering or passage refuelling populations, of any size, of species marked with an A in Table 17;***
- ***all undesignated sites supporting the number of breeding pairs or units as shown for those species marked with a B in Table 16;***
- ***all undesignated sites regularly supporting the number of wintering/passage birds as shown for those species marked with a B in Table 17;***
- ***all undesignated sites where 100 or more bird species have been recorded in the previous five years.***

Table 16 – breeding birds of conservation significance in Powys

SPECIES	COMMON NAME	W&C A Sch. 1	Sec. 7	BoCC	Local Status
Anas clypeata	Shoveler	-	-	Amber	A
Anas crecca	Eurasian Teal	-	-	Amber	A
Anas querquedula	Garganey	✓	-	Amber	A

Anas strepera	Gadwall	-	-	Amber	A
Asio flammeus	Short-eared Owl	-	-	Amber	A
Asio otus	Long-eared Owl	-	-	Green	A
Calidris alpine	Dunlin	-	-	Amber	A
Caprimulgus europaeus	European Nightjar	-	✓	Amber	A
Cettia cetti	Cetti's Warbler	✓	-	Green	A
Charadrius dubius	Little Ringed Plover	✓	-	Green	A
Charadrius hiaticula	Ringed Plover	-	✓	Red	A
Circus cyaneus	Hen Harrier	✓	✓	Red	A
Coccothraustes coccothraustes	Hawfinch	-	✓	Red	A
Dendrocopos minor	Lesser Spotted Woodpecker	-	✓	Red	A
Egretta garzetta	Little Egret	-	-	Green	A
Falco columbarius	Merlin	✓	-	Red	A
Falco peregrinus	Peregrine Falcon	✓	-	Green	A
Falco subbuteo	Eurasian Hobby	✓	-	Green	A
Falco tinnunculus	Common Kestrel	-	✓	Amber	A
Gallinago gallinago	Common Snipe	-	-	Amber	A
Larus marinus	Great Black-backed Gull	-	-	Amber	A
Motacilla flava	Yellow Wagtail	-	✓	Red	A
Numenius arquata	Eurasian Curlew	-	✓	Red	A
Pandion haliaetus	Osprey	✓	-	Amber	A
Passer montanus	Eurasian Tree Sparrow	-	✓	Red	A
Perdix perdix	Grey Partridge	-	✓	Red	A
Pernis apivorus	European Honey-buzzard	✓	-	Amber	A
Phylloscopus sibilatrix	Wood Warbler	-	✓	Red	A
Pluvialis apricaria	European Golden Plover	-	✓	Green	A
Poecile montanus	Willow Tit	-	✓	Red	A
Rallus aquaticus	Water Rail	-	-	Green	A
Regulus ignicapilla	Firecrest	✓	-	Green	A
Scolopax rusticola	Eurasian Woodcock	-	-	Red	A
Streptopelia turtur	European Turtle Dove	-	✓	Red	A
Sylvia curruca	Lesser Whitethroat	-	-	Green	A
Tadorna tadorna	Common Shelduck	-	-	Amber	A
Tetrao tetrix	Black Grouse	-	✓	Red	A
Tringa tetanus	Common Redshank	-	-	Amber	A
Turdus torquatus	Ring Ouzel	-	✓	Red	A
Tyto alba	Barn Owl	✓	-	Green	A
Vanellus vanellus	Northern Lapwing	-	✓	Red	A
Accipiter gentilis	Northern Goshawk	✓	-	Green	B: ≥2 pairs
Actitis hypoleucos	Common Sandpiper	-	-	Amber	B: ≥2 pairs
Alauda arvensis	Sky Lark	-	✓	Red	B: ≥2 pairs low, ≥10 pairs hill
Alcedo atthis	Common Kingfisher	✓	-	Amber	B: ≥2 pairs
Anas platyrhynchos	Mallard	-	-	Amber	B: ≥10 pairs
Anthus pratensis	Meadow Pipit	-	-	Amber	B: ≥10 pairs
Anthus trivialis	Tree Pipit	-	✓	Red	B: ≥3 pairs
Apus apus	Common Swift	-	-	Amber	B: ≥5 pairs
Athene noctua	Little Owl	-	-	-	B: ≥2 pairs
Carduelis cannabina	Common Linnet	-	✓	Red	B: ≥3 pairs
Carduelis cabaret	Lesser Redpoll	-	✓	Red	B: ≥3 pairs
Carduelis chloris	European Greenfinch	-	-	Green	B: ≥5 pairs
Chroicocephalus ridibundus	Black-headed Gull	-	✓	Amber	B: ≥20 pairs
Cinclus cinclus	White-throated Dipper	-	-	Amber	B: ≥3 pairs
Columba oenas	Stock Dove	-	-	Amber	B: ≥5 pairs
Cuculus canorus	Common Cuckoo	-	✓	Red	B: ≥3 pairs
Cygnus olor	Mute Swan	-	-	Amber	B: ≥2 pairs

Delichon urbicum	House Martin	-	-	Amber	B: ≥5 pairs
Emberiza citronella	Yellowhammer	-	✓	Red	B: ≥3 pairs
Emberiza schoeniclus	Reed Bunting	-	✓	Amber	B: ≥5 pairs
Ficedula hypoleuca	Pied Flycatcher	-	✓	Red	B: ≥5 pairs
Haematopus ostralegus	Eurasian Oystercatcher	-	-	Amber	B: ≥2 pairs
Lagopus lagopus	Red Grouse	-	✓	Amber	B: ≥5 pairs
Larus argentatus	Herring Gull	-	-	Red	B: ≥5 pairs
Larus fuscus	Lesser Black-backed Gull	-	-	Amber	B: ≥5 pairs
Larus melanocephalus	Mediterranean Gull	✓	-	Amber	B: ≥2 pairs
Locustella naevia	Grasshopper Warbler	-	✓	Red	B: ≥2 pairs
Loxia curvirostra	Common Crossbill	✓	-	Green	B: ≥5 pairs
Milvus milvus	Red Kite	✓	-	Green	B: ≥2 pairs
Motacilla cinerea	Grey Wagtail	-	-	Red	B: ≥2 pairs
Muscicapa striata	Spotted Flycatcher	-	✓	Red	B: ≥2 pairs
Oenanthe oenanthe	Northern Wheatear	-	-	Green	B: ≥2 pairs
Passer domesticus	House Sparrow	-	✓	Red	B: ≥20 pairs
Phoenicurus phoenicurus	Common Redstart	-	-	Amber	B: ≥4 pairs
Picus viridis	Green Woodpecker	-	-	Green	B: ≥2 pairs
Poecile palustris	Marsh Tit	-	✓	Red	B: ≥2 pairs
Prunella modularis	Hedge Accentor	-	✓	Amber	B: ≥10 pairs
Pyrrhula pyrrhula	Common Bullfinch	-	✓	Amber	B: ≥3 pairs
Riparia riparia	Sand Martin	-	-	Green	B: ≥50 onh
Saxicola rubetra	Whinchat	-	-	Red	B: ≥2 pairs
Saxicola torquata	Stonechat	-	-	Green	B: ≥2 pairs
Sterna hirundo	Common Tern	-	-	Amber	B: ≥2 pairs
Strix aluco	Tawny Owl	-	-	Amber	B: ≥5 pairs
Sturnus vulgaris	Common Starling	-	✓	Red	B: ≥4 pairs
Sylvia borin	Garden Warbler	-	-	Green	B: ≥3 pairs
Turdus philomelos	Song Thrush	-	✓	Red	B: ≥3 pairs
Turdus viscivorus	Mistle Thrush	-	-	Red	B: ≥2 pairs

W&CA SCH. 1: BIRDS LISTED ON SCHEDULE 1 OF THE WILDLIFE AND COUNTRYSIDE ACT 1981;
SEC. 7: BIRDS LISTED AS PRIORITY SPECIES ON SECTION 7 OF THE ENVIRONMENT (WALES) ACT 2016;
BOCC: BIRDS OF CONSERVATION CONCERN 4 (2015).

ONH: OCCUPIED NESTING HOLES
LOW: LOWLAND/ENCLOSED
HILL: UPLAND HILL/COMMON

Table 17 – wintering & passage birds of conservation significance in Powys

SPECIES	COMMON NAME	W&CA Sch. 1	Sec. 7	BoCC	Local Status
Acrocephalus paludicola	Aquatic Warbler	-	✓	Red	A
Anser albifrons	Greater White-fronted Goose	-	✓	Red	A
Asio flammeus	Short-eared Owl	-	-	Amber	A
Asio otus	Long-eared Owl	-	-	Green	A
Botaurus stellaris	Great Bittern	✓	✓	Amber	A
Cettia cetti	Cetti's Warbler	✓	-	Green	A
Circus aeruginosus	Eurasian Marsh Harrier	✓	-	Amber	A
Circus cyaneus	Hen Harrier	✓	✓	Red	A
Cygnus columbianus subsp. bewickii	Bewick's Swan	✓	✓	Amber	A
Dendrocopos minor	Lesser Spotted Woodpecker	-	✓	Red	A
Egretta garzetta	Little Egret	-	-	Green	A
Falco columbarius	Merlin	✓	-	Red	A

Gavia stellate	Red-throated Diver	✓	-	Green	A
Passer montanus	Eurasian Tree Sparrow	-	✓	Red	A
Perdix perdix	Grey Partridge	-	✓	Red	A
Poecile montanus	Willow Tit	-	✓	Red	A
Rallus aquaticus	Water Rail	-	-	Green	A
Recurvirostra avosetta	Pied Avocet	✓	-	Amber	A
Tyto alba	Barn Owl	✓	-	Green	A
Alauda arvensis	Sky Lark	-	✓	Red	B: ≥20
Alcedo atthis	Common Kingfisher	✓	-	Amber	B: ≥2
Anas acuta	Northern Pintail	-	-	Amber	B: ≥5
Anas clypeata	Shoveler	-	-	Amber	B: ≥10
Anas crecca	Eurasian Teal	-	-	Amber	B: ≥30
Anas penelope	Eurasian Wigeon	-	-	Amber	B: ≥25
Anas platyrhynchos	Mallard	-	-	Amber	B: ≥100
Anas querquedula	Garganey	✓	-	Amber	B: ≥5
Anas strepera	Gadwall	-	-	Amber	B: ≥10
Anthus pratensis	Meadow Pipit	-	-	Amber	B: ≥500
Arenaria interpres	Ruddy Turnstone	-	-	Amber	B: ≥10
Aythya farina	Common Pochard	-	-	Red	B: ≥5
Aythya marila	Greater Scaup	✓	-	Red	B: ≥2
Branta bernicla subsp. bernicla	Dark-bellied Brent Goose	-	✓	Amber	B: ≥5
Bucephala clangula	Common Goldeneye	-	-	Amber	B: ≥5
Calidris alpine	Dunlin	-	-	Amber	B: ≥50
Calidris canutus	Red Knot	-	-	Amber	B: ≥10
Carduelis cabaret	Lesser Redpoll	-	✓	Red	B: ≥50
Carduelis cannabina	Common Linnet	-	✓	Red	B: ≥50
Carduelis chloris	European Greenfinch	-	-	Green	B: ≥30
Carduelis flavirostris	Twite	-	✓	Red	B: ≥2
Charadrius hiaticula	Ringed Plover	-	✓	Red	B: ≥10
Coccothraustes coccothraustes	Hawfinch	-	✓	Red	B: ≥5
Columba oenas	Stock Dove	-	-	Amber	B: ≥50
Cygnus cygnus	Whooper Swan	✓	-	Amber	B: ≥2
Cygnus olor	Mute Swan	-	-	Amber	B: ≥20
Emberiza citronella	Yellowhammer	-	✓	Red	B: ≥15
Emberiza schoeniclus	Reed Bunting	-	✓	Amber	B: ≥20
Falco peregrinus	Peregrine Falcon	✓	-	Green	B: ≥2
Falco tinnunculus	Common Kestrel	-	✓	Amber	B: ≥2
Gallinago gallinago	Common Snipe	-	-	Amber	B: ≥10
Haematopus ostralegus	Eurasian Oystercatcher	-	-	Amber	B: ≥25
Larus marinus	Great Black-backed Gull	-	-	Amber	B: ≥3
Limosa lapponica	Bar-tailed Godwit	-	✓	Amber	B: ≥5
Limosa limosa	Black-tailed Godwit	✓	-	Red	B: ≥10
Melanitta nigra	Common Scoter	✓	✓	Red	B: ≥5
Motacilla flava	Yellow Wagtail	-	✓	Red	B: ≥5
Numenius arquata	Eurasian Curlew	-	✓	Red	B: ≥10
Numenius phaeopus	Whimbrel	✓	-	Red	B: ≥5
Passer domesticus	House Sparrow	-	✓	Red	B: ≥100
Phalacrocorax carbo	Great Cormorant	-	-	Green	B: ≥25 (R)
Picus viridis	Green Woodpecker	-	-	Green	B: ≥2
Pluvialis apricaria	European Golden Plover	-	✓	Green	B: ≥25
Pluvialis squatarola	Grey Plover	-	-	Amber	B: ≥5
Poecile palustris	Marsh Tit	-	✓	Red	B: ≥2
Pyrrhula pyrrhula	Common Bullfinch	-	✓	Amber	B: ≥20
Regulus ignicapilla	Firecrest	✓	-	Green	B: ≥2
Saxicola torquata	Stonechat	-	-	Green	B: ≥10
Scolopax rusticola	Eurasian Woodcock	-	-	Red	B: ≥5
Sterna hirundo	Common Tern	-	-	Amber	B: ≥10

Sterna paradisaea	Arctic Tern	-	-	Red	B: ≥5
Sterna sandvicensis	Sandwich Tern	-	-	Amber	B: ≥5
Sturnus vulgaris	Common Starling	-	✓	Red	B: ≥10,000 (R)
Tadorna tadorna	Common Shelduck	-	-	Amber	B: ≥5
Tringa tetanus	Common Redshank	-	-	Amber	B: ≥10
Turdus iliacus	Redwing	✓	-	Red	B: ≥500
Turdus philomelos	Song Thrush	-	✓	Red	B: ≥20
Turdus pilaris	Fieldfare	✓	-	Red	BL ≥250
Turdus torquatus	Ring Ouzel	-	✓	Red	B: ≥5
Turdus viscivorus	Mistle Thrush	-	-	Red	B: ≥20
Tyto alba	Barn Owl	✓	-	Green	B: ≥4
Vanellus vanellus	Northern Lapwing	-	✓	Red	B: ≥40

W&CA SCH. 1: BIRDS LISTED ON SCHEDULE 1 OF THE WILDLIFE AND COUNTRYSIDE ACT 1981;
SEC. 7: BIRDS LISTED AS PRIORITY SPECIES ON SECTION 7 OF THE ENVIRONMENT (WALES) ACT 2016;
BOCC: BIRDS OF CONSERVATION CONCERN 4 (2015).

(R): ROOSTS

S3) HERPETOFAUNA (REPTILES & AMPHIBIANS)

There are 12 species of non-marine reptiles and amphibians (collectively termed herpetofauna) generally accepted to be native to Britain, 9 of which occur in Powys. The British herpetofauna occurs across a wide range of habitats and exhibits a variety of reproductive modes, behaviours and survival strategies. Despite often being grouped together for the purpose of academic study and conservation, amphibians and reptiles have very distinct differences in biology. The key features common to both amphibians and reptiles are: ectothermy (the dependence on external sources of heat to allow activity, because of an inability to raise body temperatures via internal means), small size, lack of truly social behaviour and relatively modest dispersal abilities.

There is growing concern that even our widespread amphibian and reptile species are in national decline. All native amphibian and reptile species are protected by the Wildlife & Countryside Act 1981 (as amended), but the level of protection varies; Smooth Newt, Palmate Newt, Common Frog and Common Toad are all protected against sale only, whilst the others are protected against injury & killing, as well as sale. The Great Crested Newt (as well as 3 others not found in Powys) is also protected under the Conservation of Habitats and Species Regulations (2017) (as amended). Eight herpetofauna species are listed on Section 7 of the Environment (Wales) Act 2016.

S3.1) REPTILES

Of the six native reptile species in the UK, four are known to live in Powys; two lizards - Common Lizard (*Zootoca vivipara*) and Slow-worm (*Anguis fragilis*) – and two snakes – Grass Snake (*Natrix helvetica*) and Adder (*Vipera berus*). Grass Snake are particularly abundant round the Montgomery Canal in Montgomeryshire, but uncommon elsewhere. Both Common Lizard and Slow-worm can be locally abundant in suitable habitat. Adder are now rare in Powys; the majority of recent Adder sightings are a case of mistaken identity, usually turning out to be Grass Snake.

All four reptile species found in Powys are listed on Section 7 of the Environment (Wales) Act 2016, meaning they should be a priority for conservation action.

The following should be considered for selection:

- ***all undesignated sites with confirmed presence of Adder within the previous 5 years;***
- ***all undesignated sites supporting three or more reptile species;***
- ***all undesignated sites supporting good populations of any reptile species.***

Unfortunately there is no easy method available to establish the size of reptile populations. Variation in detectability of individuals, populations and species over time and between sites remains a challenge to standardization of survey protocols. More guidance on survey techniques for reptiles can be found in Sewell et al, 2013. Provided that an appropriate level of survey (covering geographical area & sufficient intensity of effort) has been undertaken by competent surveyors, the recording of several (i.e. two or more) individuals of a species on half or more of the survey occasions should be taken to indicate the presence of a ‘good’ population. Recording of several individuals on every survey occasion (or nearly every occasion) may be indicative of an exceptional population.

The occurrence of any reptile species, in any number, on a site should be considered a supporting reason for selection of a site which also qualifies under other guidelines (i.e. on habitat grounds or for species other than reptiles).

S3.2) AMPHIBIANS

Five of the seven UK native amphibian species have been recorded in Powys; Common Frog (*Rana temporaria*), Common Toad (*Bufo bufo*) and three species of newt. Palmate Newt (*Lissotriton helveticus*), Common Frog and Common Toad are widespread across the County, whilst Great Crested Newt (*Triturus cristatus*) and Smooth Newt (*Lissotriton vulgaris*) have a more eastern bias. There is also a population of the non-native Midwife Toad (*Alytes obstetricans*) around Llandrindod Wells, which is thought to be a deliberate introduction and is spreading.

The Great Crested Newt has declined markedly across much of its western European range and is now recognized as threatened in many European countries. British populations are considered to be internationally important, as some are among the largest within Europe. For this reason, Great Crested Newts and their 'breeding sites' or 'resting places' are protected under the Wildlife and Countryside Act (1981) (as amended) and Conservation of Habitats and Species Regulations (2017) (as amended). They are also listed on Section 7 of the Environment (Wales) Act 2016. Common Toad is also a Section 7 species.

The following should be considered for selection:

- ***sites supporting four or more species of amphibian;***
- ***sites supporting good populations of three or more species of amphibian;***
- ***sites supporting exceptional populations of any single species of amphibian;***
- ***sites supporting 10 or more Great Crested Newts, counted by torchlight survey.***

For the purpose of these guidelines, 'good' and 'exceptional' populations would comprise:

Species	Survey method	Good	Exceptional
Palmate Newt	Torchlight count of adults at night*	50	100
Smooth Newt	Torchlight count of adults at night*	50	100
Great Crested Newt	Torchlight count of adults at night*	10	100
Common Frog	Head count of adults	100	500
Common Toad	Head count of adults	100	500

*IT SHOULD BE NOTED THAT COUNTS MADE IN THIS MANNER ARE NORMALLY ASSUMED TO REPRESENT NO MORE THAN A SMALL PERCENTAGE OF THE ACTUAL ADULT POPULATION. THE USUAL RULE OF THUMB IS 10% (I.E. A COUNT OF 100 ADULTS INDICATES A POPULATION OF 1000 INDIVIDUALS).

Any terrestrial habitat known to be used for migration, foraging and wintering should be included; in the absence of direct knowledge of terrestrial habitat use, an area of at least 0.5ha (i.e. 5000 sq m) of terrestrial habitat surrounding the pond, or accessible from it, should be included. Groups of ponds may be selected as single sites where these all lie reasonably close to each other and there is a good probability that there is migration of

amphibians between the ponds, together with an appropriate surrounding area of terrestrial habitat. Indeed, the grouping of breeding ponds as a 'pond cluster' is recommended for Great Crested Newts in order to create well-connected, functional habitat for the species.

Torchlight surveys should be carried out at night in warm conditions during the peak breeding period (April to mid-June). Important migration routes and terrestrial habitats should ideally be established by means of actual sampling (e.g. using pitfall traps), wherever possible.

The occurrence of Great Crested Newt, in whatever numbers, should be considered a supporting reason for selection of a site which also qualifies under other guidelines (i.e. on habitat grounds or for species other than Great Crested Newt).

S4) FISH

About 38 native fish species occur in Britain, including estuarine and inshore species, two of which (Burbot and Houting) are probably now extinct. 35 species of fish have been recorded in Powys, of which 29 are native. Knowledge of distribution and population sizes is imprecise and confused due to the difficulty and patchiness of sampling and the activities of anglers who have translocated species and artificially reinforced populations in many waters.

Of the naturally occurring species, the following are of direct conservation concern in Wales (drawn from Wildlife Sites Guidance Wales 2008, which was based on Grice 1994; Maitland & Campbell 1992):

Table 18 – Freshwater fish of conservation significance in Powys

International/National UK Significant						
Species		**Type**	**IUCN Red List Status**	**Sec. 7**	**WCA/EC**	**Bern**
***Allis Shad**	***Alosa alosa***	**Ea**	**LC**	**Y**	**WCA, ECII, ECV**	**Y**
***Twaite Shad**	***Alosa fallax***	**Ea**	**LC**	**Y**	**WCA, ECII, ECV**	**Y**
***European Eel**	***Anguilla anguilla***	**Ea**	**CR**	**Y**	**WCA**	**N**
Bullhead	*Cottus gobio*	S	LC	N	ECII	N
River Lamprey	*Lampetra fluviatilis*	Ea	LC	Y	ECII, ECV	Y
Brook Lamprey	*Lampetra planeri*	E	LC	N	ECII	Y
***Sea Lamprey**	***Petromyzon marinus***	**Ea**	**LC**	**Y**	**ECII**	**Y**
Atlantic Salmon	*Salmo salar*	Ea	LC	Y	ECII, ECV	Y
***Grayling**	***Thymallus thymallus***	**S**	**LC**	**N**	**ECV**	**Y**
Regionally Significant						
***Bleak**	***Alburnus alburnus***	**S**	**LC**	**N**	**N**	**N**
Brown/Sea Trout	*Salmo trutta*	S/Ea	LC	Y	N	N

TYPE: E = EURYHALINE (LIVES IN BOTH SALT & FRESHWATER); S = STENOHALINE (FRESHWATER ONLY); a = ANADROMOUS (MATURES IN SEA, MIGRATES INTO FRESHWATER TO SPAWN)

IUCN RED LIST STATUS: LC = LEAST CONCERN; CR = CRITICALLY ENDANGERED

SEC. 7: LISTED ON SECTION 7 OF THE ENVIRONMENT (WALES) ACT 2016

WCA/EC: WCA = PROTECTED UNDER THE WILDLIFE & COUNTYSIDE ACT 1981 (AS AMENDED); ECII = LISTED ON ANNEX 2 OF EUROPEAN HABITATS DIRECTIVE (1992), I.E. CORE AREAS OF THEIR HABITAT ARE DESIGNATED AS SITES OF COMMUNITY IMPORTANCE (SCIS) AND INCLUDED IN THE NATURA 2000 NETWORK. THESE SITES MUST BE MANAGED IN ACCORDANCE WITH THE ECOLOGICAL NEEDS OF THE SPECIES; ECV = LISTED ON ANNEX 5 OF EUROPEAN HABITATS

DIRECTIVE (1992), I.E. MEMBER STATES MUST ENSURE THAT THEIR EXPLOITATION AND TAKING IN THE WILD IS COMPATIBLE WITH MAINTAINING THEM IN A FAVOURABLE CONSERVATION STATUS.

The following should be considered for selection:

- ***all undesignated waterbodies supporting recently (within previous 5 years) confirmed resident and/or spawning and/or juvenile populations of one or more species marked by * bold in Table 18;***
- ***all undesignated watercourses regularly used as major migratory routes by one or more anadromous species listed in Table 18;***
- ***all undesignated waterbodies supporting at least five of the species listed in Table 18, all recorded within the previous five years.***

Other rare or regionally uncommon species may also occur, but will most probably be the result of introductions. These will require individual consideration by an appropriate specialist.

S5) INVERTEBRATES

Invertebrates are generally inconspicuous but they dominate biodiversity; in Welsh terrestrial and freshwater environments there are thought to be more than 20,000 different species of macro-invertebrates. Invertebrates occupy all possible habitats from crevices in inter-tidal rocks to scree on the summits of our mountain tops, from birds' nests to saturated moss at the edge of waterfalls. This extraordinary diversity is possible because of the specialised niches that many species inhabit as a result of their adaptations to specific environmental conditions. They are also crucially important to the health of ecosystems.

Some taxa such as Lepidoptera (butterflies and moths), Odonata (dragonflies and damselflies) and to a lesser degree, Orthoptera (grasshoppers and allied insects) are relatively well known and knowledge of their distribution is generally good. Many taxa however are poorly known and knowledge of their distribution limited by the small number of recorders with the relevant identification expertise. All species have a life cycle which comprises several distinct phases i.e. egg/larvae/pupae/adult or egg/nymph/adult, meaning that a combination of conditions and habitats are usually required by each species for each of these stages; often microhabitats such as dead wood or small areas of bare ground may be important in sustaining a species.

There are eight non-marine invertebrates included on Annex II of the EC Habitats & Species Directive that occur in Wales, represented here on 22 Special Areas of Conservation. Twelve species are given Full Protection under Schedule 5 of the Wildlife & Countryside Act and Section 7 of the Environment (Wales) Act lists 215 invertebrate species.

The following should be considered for selection:

- ***all undesignated sites which support populations of one or more species, which is listed in the UK Red Data Book, or listed on Section 7 of the Environment (Wales) Act 2016, with the specific requirement for site protection action;***
- ***all undesignated sites which support one or more bee species listed on the Wales Threatened Bee Report (Olds et al.,+ 2019);***
- ***all undesignated sites which support an important assemblage or population(s) of 'Nationally Scarce' species (to be determined in consultation with appropriate experts);***
- ***all undesignated sites which support a species, recorded from 10 or fewer 10km grid squares in Wales (where the distribution is well known);***
- ***all undesignated sites which support a species that breeds in 4 or fewer sites within a Vice County;***
- ***all undesignated sites which support a significant population or assemblage of Local Priority Species listed in the Powys Nature Recovery Action Plan;***
- ***all undesignated sites supporting an assemblage of invertebrate species considered to be of significance (to be determined in consultation with appropriate experts); for example, 9 or more Odonata species, 7 or more Orthoptera species.***

To determine significance and especially in the case of less well-known taxa, it is essential that appropriate specialists and Vice-County recorders are consulted as part of the selection process.

The term ‘supports’ refers to any verified record of a species of wild occurrence in a possible breeding habitat. In general it should therefore be assumed that a record of a species from a site fulfils the ‘supports’ criteria unless there is evidence to the contrary; e.g. the species is an obvious migrant or in totally unsuitable breeding or foraging habitat.

The term ‘Nationally Scarce’ refers to species believed to occur in 16 to 100 10km squares in the UK National Grid. The separation of these species into ‘Notable A’ and ‘Notable B’, a distinction used in some of the published National Reviews, is not recognised in these criteria.

The status of UK aculeate Hymenoptera, with new red data book classifications is currently under review. In the interim, the Wales Threatened Bee Report (Olds et al., 2019) provides a reasonable starting point. This report identified 64 bee species recorded from Wales that are of conservation concern. The authors identified 26 threatened bees in Wales and 38 species of conservation concern. Some species listed in the report were not known by the authors to be present in Powys, but have since been recorded here, so it is possible that more of these species are present.

Selection should be based where possible on recent data; i.e. within the last five years. However where this data is not available and especially in the case of some species which are difficult to record, older records (and habitat suitability) should also be considered.

Determination of site boundaries should reflect the habitat and structural diversity needed to sustain a species.

S6) VASCULAR PLANTS

Powys has a very diverse flora as a result of the diversity of habitats and altitudes, as well as the County's central location in Britain. Despite this, declines seen elsewhere have also been experienced here. Of the 1,467 native and archaeophyte (naturalised in Britain before the 16th Century) vascular plants recorded in Wales, 38 are extinct (2.6%) and 256 (17.4%) are threatened with extinction, being either Critically Endangered (3.4%), Endangered (4.4%) or Vulnerable (9.7%); a further 28 (1.9%) are Near Threatened (Dinas, 2008).

The Vascular Plant Red Data Book for Wales lists 308 species, of which 54 are under threat. There are 41 species listed as nationally rare or scarce. There are 77 species of vascular plants and one Hieracium sp. group listed on Section 7 of the Environment (Wales) Act 2016.

The following should be considered for selection:

- ***all undesignated sites with one or more vascular plant species listed as Nationally Scarce (NS), Nationally Rare (NR), Vulnerable (VU), Endangered (EN) or Critically Endangered (CR) in the Vascular Plant Red Data Book, and/or listed on Section 7 of the Environment (Wales) Act 2016, and/or listed as 'rare' or 'scarce' on the county rare plant registers;***
- ***all undesignated sites with 5 or more vascular plant species, or a significant population (to be determined in consultation with appropriate experts) of one or more vascular plant species, listed on the county rare plants registers as 'uncommon' or 'threatened'.***

When considering Local Wildlife Site selection on the basis of rare vascular plants, it is important to understand the ecology and habitat requirements of the species. In some cases, site selection may not be appropriate; for example, some species, such as arable weeds, can be very ephemeral in nature and may disappear completely the year after selection.

The status of some plant species will change over time, so the above criteria should refer to the most up to date Red Data Books; these are currently Dines, 2008 for Wales and Cheffing et al., 2005 for GB. The Botanical Society of British & Ireland (BSBI) maintains a list of conservation statuses for all UK plants: bsbi.org, as well as links to the county rare plant registers.

S7) BRYOPHYTES (MOSSES, LIVERWORTS & HORNWORTS)

"*In both number of species and their individual abundance, this 'Atlantic' element of the bryophyte flora is more strongly represented in the British Isles than any other part of Europe.*" (Ratcliffe, 1968). Given that most mosses and liverworts thrive in moist conditions, it is hardly suprising that a large proportion of the British species occur in Wales - 811 (73%) of the 1,110 British species.

In Powys, as elsewhere in Wales, bryophytes can be found in all habitats. Sphagnum mosses form the major component of peat bogs, holding as much as twenty-times their own weight in water. In a few upland wetlands the rare Bog Pawwort (*Barbilophozia kunzeana*) can be found. The ground layer of Atlantic oak and ash woodlands are carpeted with a great diversity of mosses. On sunny rock outcrops in the upper/middle River Usk, the rare Welsh Thread-moss (*Bryum gemmiparum*) grows. Rigid Apple-moss (*Bartramia stricta*) has its only UK site on droughted volcanic rocks in Radnorshire.

Already, 26 mosses and liverworts (3%) are believed to have been lost from Wales in the last 150 years and another 173 have shown such significant declines and/or have such restricted ranges, that they are threatened with extinction. 34% of the Welsh bryophyte flora requires action to safeguard it for the future or to understand its true status (Bosanquet & Dines, 2011). The Bryophyte Red Data Book for Wales lists 158 species under threat. 52 species and 1 assemblage are listed on Section 7 of the Environment (Wales) Act 2016.

The following should be considered for selection:

- ***all undesignated sites supporting one or more bryophyte species which are listed as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) on the UK or Welsh Red Data Book/List, and/or listed on Section 7 of the Environment (Wales) Act 2016.***

Some areas within Wales are better recorded for bryophytes than others and where queries occur, the appropriate county recorder/specialist should be contacted.

The status of bryophtytes species will change over time, so the above criteria should refer to the most up to date Red Data Books; this is currently Bosanquet & Dines, 2011 for Wales.

S8) LICHENS

Lichens are remarkable organisms and consist of a symbiotic association between two or more organisms, namely fungi and one or more photosynthetic partners (green alga and/or cyanobacteria). Easy to overlook and difficult to study, lichens typically grow slowly and some are excellent environmental indicators, often sensitive to changes in air quality. Powys has a great diversity of lichens, including a number of rare species, such as the River Jelly Lichen (*Collema dichotomum*), which is found amongst other sites, in the River Irfon, at its largest known Welsh population. Trees and woodland form an important habitat for lichens; the woodlands at Gregynog in Montgomeryshire form one of the most important sites for old growth dependant epiphytic lichens in Britain and Western Europe. Many isolated ancient pasture woodland trees have no statutory protection and yet support internationally important lichen species such as *Caloplaca herbidella* and *Lecanora sublivescens*.

Despite being just 11% of mainland Britain, Wales supports 68% of the total British lichen flora. Sadly, of the 1,290 species studied, 22 are considered extinct, whilst a further 204 are threatened with extinction; there is insufficient information for another 152 for a threat category to be assigned to them (Woods 2010). There are 67 species of lichens listed on Section 7 of the Environment (Wales) Act 2016. Two lichen-dominated communities are also listed on Section 7; the Lobarion and ones dominated by heavy-metal tolerant lichens: the metallophytes. Appendix 1 in Woods (2010) typifies them.

The following should be considered for selection:

- ***all undesignated sites supporting one or more lichen species which is listed as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) on the UK or Welsh Lichen Red Data Books/Lists and/or listed on Section 7 of the Environment (Wales) Act 2016;***
- ***all undesignated sites supporting one or more lichen species recorded from 3 or fewer sites within a Watsonian Vice County (where the distribution is well known);***
- ***all undesignated sites supporting well-developed examples of the Lobarion, metallophyte, or other uncommon lichen communities.***

The status of lichen species will change over time, so the above criteria should refer to the most up to date Red Data Books; this is currently Woods, 2010 for Wales.

S9) FUNGI

There is an enormous diversity of fungi, ranging from the several thousand "larger" fungi (e.g. toadstools, bracket fungi, earth stars, stinkhorns, fairy clubs, puffballs, earthtongues, etc), to the even more numerous moulds, rusts and yeasts, amounting to at least 10,000 species within the UK. Unfortunately, the status of even the higher fungus species are relatively poorly known, largely due to the bewildering species diversity, the difficulty of making identifications and the irregular and ephemeral appearance of the fruiting bodies that make identification possible. However, it is known that not only do fungi play crucial roles in ecosystems, they are often excellent indicators of ecological quality, whilst many species appear to be highly localised in their distribution, or suffering significant declines.

Our knowledge of Wales' fungi is improving steadily over time, but it is undoubtedly still poor, as is the norm for virtually all of the UK. However; this poor state of knowledge is no reason for ignoring fungi as important considerations for the selection of Local Wildlife Sites in Powys, given the need for action for all our biodiversity, coupled with the ecological importance and sensitivity of fungi.

The need to include specific Local Wildlife Site selection criteria for fungi is exemplified by the unimproved grassland fungi communities. These fungi, including waxcaps, fairy clubs and earthtongues are very sensitive to grassland improvement and can appear in grassland which has seemingly little botanical interest, only showing their true value in autumn. This has led to them being over-looked and yet, a number of sites are amongst the very best in Europe for grassland fungi; despite its small size, Wales supports over half the number of waxcap fungi in Britain.

A further group of fungi which are likely to be of very significant conservation importance are species restricted to other ancient habitats such as wetlands and woodlands. The species associated with veteran trees, especially where they occur on a site that is likely to have had a long historical continuity of large diameter decaying timber available are also likely to contain rare species and/or important assemblages.

The Red Data List of Threatened British Fungi (Evans et al, 2006) assessed over 800 fungi taxa, assigning nearly 400 threat categories. There are 27 species listed on Section 7 of the Environment (Wales) Act 2016. Red Data assessments have also been carried out for both rust fungi (Woods et al., 2015) and smut fungi and their allies (Woods et al., 2018) in Wales. Over 300 species have been assessed and more than 70 have been assigned a threat status.

The following should be considered for selection:

- ***all undesignated sites supporting one or more fungus species which is listed as Critically Endangered, Endangered, or Vulnerable on the UK or Welsh Red Data Books/Lists and/or listed on Section 7 of the Environment (Wales) Act 2016.***
- ***all undesignated sites supporting one or more fungus species recorded from 3 or fewer sites within a Watsonian Vice County (where the distribution is well known).***
- ***all undesignated 'waxcap' grassland sites reaching a score of 12-29, using the system outlined in Box 1 below.***

Box 1 - Assessing the quality of a waxcap grassland (taken from Harries & Lamacraft, 2013)

Look for the different coloured mushroom-like fungi and for each colour-group add together the relevant points:

▪ Red (e.g. *Hygrocybe coccinea, punicea, splendidissima*)	5 points
▪ Pink (e.g. *H. calyptriformis*)	5 points
▪ Orange (e.g. *H. reidii, quieta, laeta*)	2 points
▪ Buff/brown (e.g. *H. pratensis*)	2 points
▪ Yellow (e.g. *H. chlorophana, glutinipes*)	2 points
▪ Orange/yellow turning black (e.g. *H. conica*)	1 point
▪ Green (e.g. *H. psittacina*)	1 point
▪ White (e.g. *H. virginia*)	1 point

Are there other grassland fungi? Add the points for the following groups:

▪ Violet coral (*Clavariazollingeri*)	5 points
▪ Yellow/white coral	1 point
▪ Beige/brown coral	2 points
▪ Earthtongue (any)	2 points

What is your final score?
0-4: low grassland fungi interest likely
5-11: moderate interest, worthy of further investigation
12-29: sites deemed good for grassland fungi

It is important to note that this type of assessment is based upon fruiting alone which can vary significantly year to year, depending upon the weather conditions. Therefore a full evaluation can only be made following visits to sites over multiple years.

The criteria do not attempt designation of Local Wildlife Sites on the basis of overall larger fungi diversity. Fungus recording has not been extensive or systematic enough in Wales for this to be usefully applied to the selection of Local Wildlife Sites. It is hoped that particularly diverse sites for fungi will be picked up by other Local Wildlife Site criteria, either relating to fungi, other taxa, or general vegetation characteristics. However, advice from local fungi experts should be sought where this is not the case.

The status of fungi species will change over time, so the above criteria should refer to the most up to date Red Data Books; this is currently Evans et al., 2006 for Great Britain and Woods et al., 2015 and Woods et al., 2018, in Wales.

S10) CHAROPHYTES (STONEWORTS)

The Charophytes (Stoneworts) are among the largest and most complex of the green algae. The main axes (stems) have whorls of short lateral branchlets at intervals so the plants bear a superficial resemblance to *Equisetum* or *Ceratophyllum*. They are submerged species (although some are able to survive on wet mud, drying out for short periods) anchored to the substrate by rhizoids (hair-like filaments).

Stoneworts are good indicators of water quality as they are sensitive to pollution, including nutrient enrichment. Many are of conservation importance; 30 species have been recorded in the UK and 17 of these occur in Wales. Of the latter, 4 are Red Data Book species, 6 are Nationally Scarce and 9 are considered rare in Wales. There are five species listed on Section 7 of the Environment (Wales) Act 2016, but only one of these is recorded in Powys: Slender Stonewort (*Nitella gracilis*). The only other *Nitella* species currently known from Powys are both nationally scarce - Smooth Stonewort (*Nitella flexilis*) and Pointed Stonewort (*Nitella mucronata*). All the known Powys records for these three species are within currently protected sites or Local Wildlife Sites; i.e. the Montgomery Canal SSSI & SAC, Cwm Gwynllyn SSSI and Llyn Ebyr LWS, however, these criteria have been written in case any new sites are found.

The following should be considered for selection:

- ***all undesignated sites supporting one or more stonewort species listed as Critically Endangered, Endangered, or Vulnerable on the UK or Welsh Red Data Book/List and/or listed on Section 7 of the Environment (Wales) Act 2016;***
- ***all undesignated sites supporting one or more stonewort species recorded from 3 or fewer sites within a Watsonian Vice County (where the distribution is well known).***

The status of stonewort species will likely change over time, so the above criteria should refer to the most up to date Red Data Book(s); this is currently Stewart & Church, 1993.

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APPENDIX 1

Example Local Wildlife Site report

Radnorshire Wildlife Trust

Wildlife Sites Inventory 2019

CORS PORFFOR

File code: WS200

Site Details

Grid ref: SN923456
Nearest town or village: Llangammarch Wells
Vice-county: Radnorshire

Reason for selection: H8: Bogs
Habitat: Raised bog - M17 & M18, with M25 & M14.
Area: 30.5 hectares
Altitude: 300 metres

First listed: 2006
Last Survey: 22/08/2017
Site Status: Local Wildlife Site

Site Description:

Cors Porffor is an upland raised peat bog dominated by various *Sphagnum* species, widespread Ling (*Callina vulgaris*) & Cross-leaved Heath (*Erica tetralix*), with patches of Common Cottongrass (*Eriophorum angustifolium*) & Hare's-tail Cottongrass (*E. vaginatum*) and frequent bog pools supporting Round-leaved Sundew (*Drosera rotundifolia*) & Bog Asphodel (*Narthecium ossifragum*). Along the old forestry rides and in the areas where some of the larger trees were recently felled, the habitat is more consistent with wet modified bog with sparse ericoids and more frequent Purple Moor-grass (*Molinia caerulea*) and Deer-grass (*Trichophorum germanicum*).

Of particular note are the good populations of Bog Rosemary (*Andromeda polifolia*), which is frequent across the central bog, as well as occasional White Beak-sedge (*Rhynchospora alba*). There are scattered small Sitka Spruce (*Picea sitchensis*) trees across the bog, invading from the remains of the conifer plantation, which still surrounds the site.

Management:

The site was drained and planted with Sitka Spruce in 1984, but this plantation largely failed. The current landowners are sympathetic and have previously carried out bog restoration work, with the help of the Trust. A large area of conifers was removed, leaving the larger trees round the boundary to retain the micro-climate. Peat dams were created in October 2006. Occasional light grazing from neighbouring sheep gaining access to the site via deteriorating fences was once observed and is still likely.

WILDLIFE SITE ASSESSMENT/VERDICT

Cors Porffor passes the 2019 Powys Local Wildlife Site criteria for the following reason(s):

- undesignated degraded bog habitats supporting one or more vascular plant species of restricted distribution in Powys:
    - Bog Rosemary (*Andromeda polifolia*);
    - White Beak-sedge (*Rhynchospora alba*).

In addition to the above, Cors Porffor is a Section 7 priority habitat supporting four Section 7 species: Common Lizard (*Zootoca vivipara*), Sky Lark (*Alauda arvensis*), Song Thrush (*Turdus philomelos*) & Brown Hare (*Lepus europaeus*)).

Cors Porffor appears much as it was during the last survey in 2006 and is an important local site. The bog restoration work has been partially successful, but some of the peat dams have failed. The site would likely benefit from further 're-wetting'. It would also be beneficial to remove more conifers, particularly those growing on the central bog area.

Local Wildlife Sites assessment by: Tammy Stretton, Montgomeryshire Wildife Trust

Date: 04/08/2019

Assessed & ratified by Powys Local Wildlife Sites Partnership on: 12/10/2019

Date landowner permission granted: 11/11/2019

Due for re-survey: on or before 1st August 2019

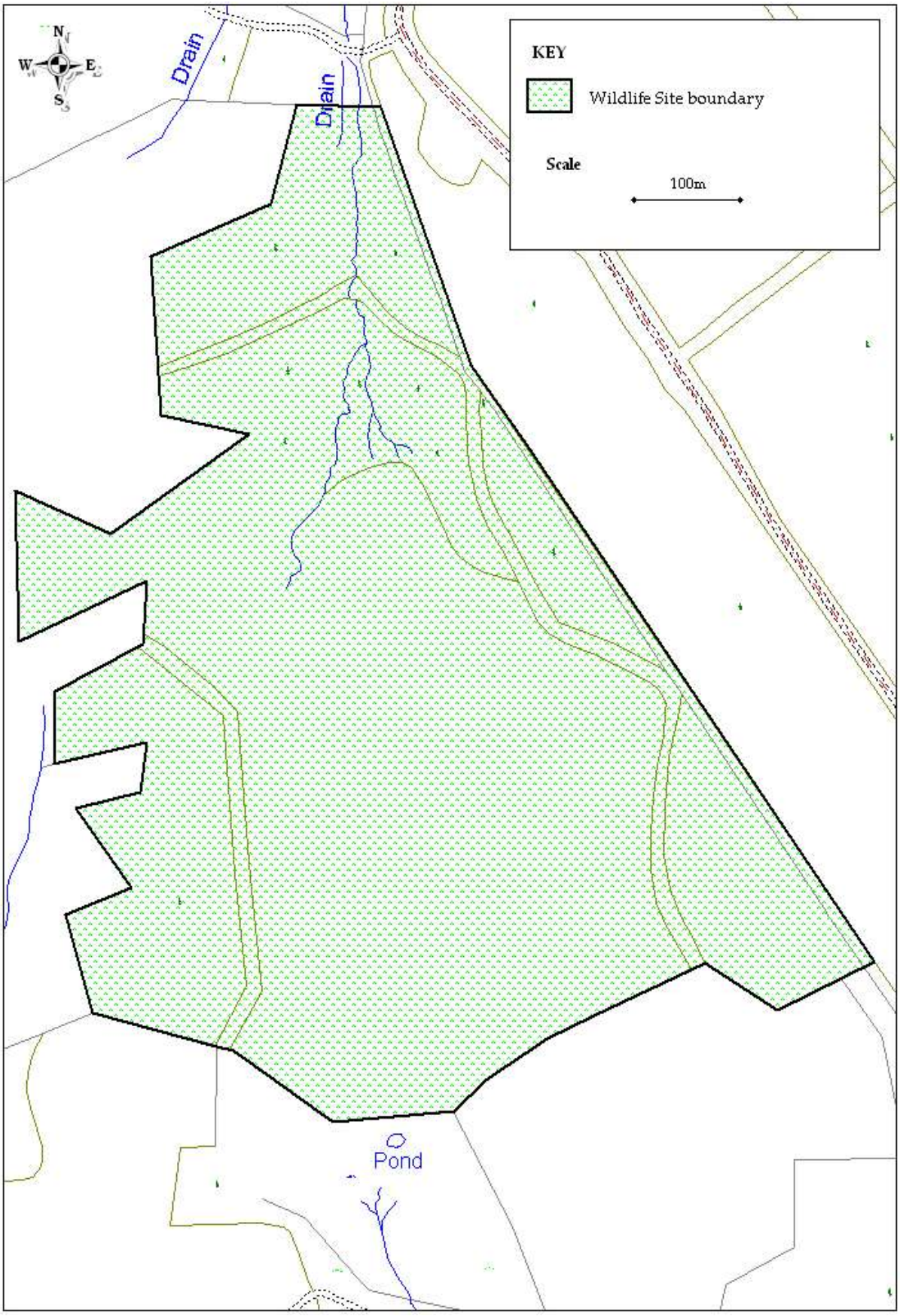
Species List for Cors Porffor, SN923456 at 04/08/2019

Genus	Taxon	Common Name	First	Last
Birds	Alauda arvensis	Skylark	24-Mar-05	24-Mar-05
Birds	Anthus pratensis	Meadow Pipit	10-May-07	22-Aug-17
Birds	Buteo buteo	Buzzard	10-May-07	10-May-07
Birds	Carduelis cabaret	Lesser Redpoll	12-Apr-05	12-Apr-05
Birds	Corvus corax	Raven	04-Oct-06	04-Oct-06
Birds	Erithacus rubecula	Robin	10-May-07	10-May-07
Birds	Fringilla coelebs	Chaffinch	12-Apr-05	12-Apr-05
Birds	Gallinago gallinago	Snipe	04-Oct-06	04-Oct-06
Birds	Garrulus glandarius	Jay	22-Aug-17	22-Aug-17
Birds	Milvus milvus	Red Kite	02-Sep-05	02-Sep-05
Birds	Periparus ater	Coal Tit	18-Mar-05	18-Mar-05
Birds	Phylloscopus collybita	Chiffchaff/willow warbler	22-Aug-17	22-Aug-17
Birds	Phylloscopus trochilus	Willow Warbler	10-May-07	10-May-07
Birds	Regulus regulus	Goldcrest	10-May-07	10-May-07
Birds	Saxicola torquatus	Stonechat	04-Oct-06	09-Oct-06
Birds	Troglodytes troglodytes	Wren	10-May-07	10-May-07
Birds	Turdus merula	Blackbird	04-Oct-06	04-Oct-06
Birds	Turdus philomelos	Song Thrush	18-Mar-05	18-Mar-05
Birds	Turdus pilaris	Fieldfare	21-Mar-05	21-Mar-05
Fungi_lichens	Cladonia	Fungus	05-Jul-05	22-Aug-17
Fungi_lichens	Cladonia ciliata	Lichen	01-Jun-05	01-Jun-05
Fungi_lichens	Cladonia floerkeana	Lichen	01-Jun-05	22-Aug-17
Fungi_lichens	Cladonia polydactyla	Lichen	01-Jun-05	01-Jun-05
Fungi_lichens	Cladonia portentosa	Lichen	01-Jun-05	01-Jun-05
Fungi_lichens	Cladonia squamosa	Lichen	01-Jun-05	01-Jun-05
Fungi_lichens	Cladonia uncialis	Lichen	04-Aug-07	04-Aug-07
Fungi_lichens	Hypogymnia physodes	Lichen	01-Jun-05	01-Jun-05
Fungi_lichens	Lactarius	milkcap fungus	19-Sep-05	19-Sep-05
Fungi_lichens	Peltigera	Lichen	05-Jul-05	11-Aug-05
Fungi_lichens	Peltigera	dog lichen	05-Jul-05	11-Aug-05
Fungi_lichens	Peltigera sp	Lichen	22-Aug-17	22-Aug-17
Fungi_lichens	Russula	brittlegill fungus	11-Aug-05	11-Aug-05
Fungi_lichens	Usnea florida	Lichen	01-Jun-05	01-Jun-05
Herpetofauna	Rana temporaria	Common Frog	11-Aug-05	22-Aug-17
Herpetofauna	Zootoca vivipara	Common Lizard	12-Apr-05	12-Apr-05
Insects_beetles	Adalia decempunctata	Ten-Spot Ladybird	01-Oct-05	01-Oct-05
Insects_butterflies	Aphantopus hyperantus	Ringlet	19-Jul-00	04-Aug-07
Insects_butterflies	Inachis io	Peacock	02-Sep-05	22-Aug-17
Insects_butterflies	Lycaena phlaeas	Small Copper	02-Sep-05	02-Sep-05
Insects_butterflies	Maniola jurtina	Meadow Brown	19-Jul-00	19-Jul-00
Insects_butterflies	Pieris brassicae	Large White	02-Sep-05	02-Sep-05
Insects_butterflies	Pieris napi	Green-veined White	19-Jul-00	22-Aug-17
Insects_butterflies	Vanessa atalanta	Red Admiral	03-Oct-06	22-Aug-17
Insects_butterflies	Vanessa cardui	Painted Lady	02-Sep-05	02-Sep-05
Insects_moths	Anarta myrtilli	Beautiful Yellow Underwing	04-Aug-07	04-Aug-07
Insects_moths	Autographa gamma	Silver Y	02-Sep-05	02-Sep-05
Insects_moths	Lasiocampa quercus	Oak Eggar	05-Jul-05	05-Jul-05
Insects_moths	Macrothylacia rubi	Fox Moth	22-Aug-17	22-Aug-17
Insects_Odonata	Aeshna cyanea	Southern Hawker	22-Aug-17	22-Aug-17
Insects_Odonata	Aeshnidae	hawker dragonfly	02-Sep-05	02-Sep-05
Insects_Odonata	Sympetrum danae	Black Darter	02-Sep-05	02-Sep-05
Insects_other	Bombus lucorum agg.	White-Tailed Bumble Bee	22-Aug-17	22-Aug-17
Insects_other	Bombus pascuorum	Common Carder Bee	22-Aug-17	22-Aug-17
Insects_other	Cicadella viridis	Insect - True Bug (Hemiptera)	22-Aug-17	22-Aug-17
Insects_other	Gerris	a pondskater	02-Sep-05	02-Sep-05

Insects_other	Helophilus pendulus	hoverfly	11-Aug-05	11-Aug-05
Insects_other	Lucilia	Greenbottle	11-Aug-05	11-Aug-05
Insects_other	Melanostoma	hoverfly	11-Aug-05	11-Aug-05
Insects_other	Myrmica	red ant	05-Jul-05	05-Jul-05
Insects_other	Sericomyia silentis	Insect - True Fly (Diptera)	04-Aug-07	22-Aug-17
Insects_other	Tachina grossa	Insect - True Fly (Diptera)	22-Aug-17	22-Aug-17
Invertebrates_other	Arion	slug	05-Jul-05	05-Jul-05
Mammals	Lepus europaeus	Brown Hare	12-Apr-05	12-Apr-05
Mammals	Sorex	shrew	12-Apr-05	19-Sep-05
Mammals	Vulpes vulpes	Fox	04-Aug-07	04-Aug-07
Plants	Agrostis canina	Velvet Bent	04-Aug-07	04-Aug-07
Plants	Agrostis canina agg	Velvet Bent	22-Aug-17	22-Aug-17
Plants	Agrostis capillaris	Common Bent	04-Aug-07	22-Aug-17
Plants	Agrostis stolonifera	Creeping Bent	04-Aug-07	04-Aug-07
Plants	Agrostis vinealis	Brown Bent	22-Aug-17	22-Aug-17
Plants	Aira praecox	Early Hair-Grass	05-Jul-05	05-Jul-05
Plants	Andromeda polifolia	Bog-Rosemary	05-Jul-05	22-Aug-17
Plants	Aulacomnium palustre	Bog Groove-Moss	04-Aug-07	04-Aug-07
Plants	Betula pubescens	Downy Birch	05-Jul-05	22-Aug-17
Plants	Blechnum spicant	Hard Fern	04-Aug-07	22-Aug-17
Plants	Calluna vulgaris	Heather	05-Jul-05	22-Aug-17
Plants	Caltha palustris	Marsh Marigold	22-Aug-17	22-Aug-17
Plants	Cardamine flexuosa	Wavy Bitter-Cress	04-Aug-07	04-Aug-07
Plants	Carex binervis	Green-Ribbed Sedge	22-Aug-17	22-Aug-17
Plants	Carex canescens	White Sedge	04-Aug-07	22-Aug-17
Plants	Carex echinata	Star Sedge	05-Jul-05	22-Aug-17
Plants	Carex nigra	Common Sedge	04-Aug-07	04-Aug-07
Plants	Carex ovalis	Oval Sedge	05-Jul-05	05-Jul-05
Plants	Carex rostrata	Bottle Sedge	04-Aug-07	22-Aug-17
Plants	Chamerion angustifolium	Rosebay Willowherb	04-Aug-07	22-Aug-17
Plants	Cirsium palustre	Marsh Thistle	04-Aug-07	22-Aug-17
Plants	Cladopodiella fluitans	Bog Notchwort	01-May-06	31-Jul-07
Plants	Deschampsia cespitosa	Tufted Hair-Grass	04-Aug-07	22-Aug-17
Plants	Deschampsia flexuosa	Wavy Hair-Grass	04-Aug-07	22-Aug-17
Plants	Drosera rotundifolia	Round-Leaved Sundew	05-Jul-05	22-Aug-17
Plants	Dryopteris carthusiana	Narrow Buckler-Fern	04-Aug-07	22-Aug-17
Plants	Dryopteris dilatata	Broad Buckler-Fern	04-Aug-07	22-Aug-17
Plants	Empetrum nigrum	Crowberry	04-Aug-07	22-Aug-17
Plants	Epilobium obscurum	Short-Fruited Willowherb	04-Aug-07	04-Aug-07
Plants	Epilobium palustre	Marsh Willowherb	04-Aug-07	22-Aug-17
Plants	Equisetum fluviatile	Water Horsetail	04-Aug-07	22-Aug-17
Plants	Erica cinerea	Bell Heather	05-Jul-05	05-Jul-05
Plants	Erica tetralix	Cross-Leaved Heath	05-Jul-05	22-Aug-17
Plants	Eriophorum angustifolium	Common Cottongrass	05-Jul-05	22-Aug-17
Plants	Eriophorum vaginatum	Hare's-Tail Cottongrass	05-Jul-05	22-Aug-17
Plants	Euphrasia officinalis agg.	Eyebright	04-Aug-07	04-Aug-07
Plants	Festuca ovina agg.	Sheep's Fescue Agg.	04-Aug-07	04-Aug-07
Plants	Festuca rubra agg.	Red Fescue	05-Jul-05	22-Aug-17
Plants	Galium palustre	Common Marsh-Bedstraw	22-Aug-17	22-Aug-17
Plants	Galium saxatile	Heath Bedstraw	04-Aug-07	22-Aug-17
Plants	Hedera helix	Common Ivy	22-Aug-17	22-Aug-17
Plants	Heracleum sphondylium	Hogweed	04-Aug-07	04-Aug-07
Plants	Holcus lanatus	Yorkshire-Fog	04-Aug-07	22-Aug-17
Plants	Holcus mollis	Creeping Soft-Grass	04-Aug-07	04-Aug-07
Plants	Hypnum jutlandicum	Heath Plait-Moss	04-Aug-07	04-Aug-07
Plants	Juncus bulbosus	Bulbous Rush	04-Aug-07	04-Aug-07
Plants	Juncus conglomeratus	Compact Rush	04-Aug-07	04-Aug-07
Plants	Juncus effusus	Soft Rush	04-Aug-07	22-Aug-17
Plants	Juncus squarrosus	Heath Rush	04-Aug-07	04-Aug-07

Plants	Lolium perenne	Perennial Rye-Grass	04-Aug-07	04-Aug-07
Plants	Luzula multiflora	Heath Wood-Rush	04-Aug-07	04-Aug-07
Plants	Molinia caerulea	Purple Moor-Grass	05-Jul-05	22-Aug-17
Plants	Myosotis secunda	Creeping Forget-Me-Not	04-Aug-07	04-Aug-07
Plants	Nardus stricta	Mat-Grass	22-Aug-17	22-Aug-17
Plants	Narthecium ossifragum	Bog Asphodel	05-Jul-05	22-Aug-17
Plants	Oxalis acetosella	Wood-Sorrel	01-Jun-08	01-Jun-08
Plants	Phleum pratense	Timothy	04-Aug-07	04-Aug-07
Plants	Picea sitchensis	Sitka Spruce	05-Jul-05	22-Aug-17
Plants	Plantago lanceolata	Ribwort Plantain	04-Aug-07	04-Aug-07
Plants	Plantago major	Greater Plantain	04-Aug-07	04-Aug-07
Plants	Pleurozium schreberi	Red-Stemmed Feather-Moss	04-Aug-07	04-Aug-07
Plants	Poa annua	Annual Meadow-Grass	04-Aug-07	04-Aug-07
Plants	Poa pratensis	Smooth Meadow-Grass	04-Aug-07	04-Aug-07
Plants	Polypodium vulgare	Polypody	22-Aug-17	22-Aug-17
Plants	Polytrichum	Moss	05-Jul-05	22-Aug-17
Plants	Potamogeton polygonifolius	Bog Pondweed	04-Aug-07	04-Aug-07
Plants	Potentilla erecta	Tormentil	04-Aug-07	22-Aug-17
Plants	Pteridium aquilinum	Bracken	04-Aug-07	04-Aug-07
Plants	Quercus	oak	22-Aug-17	22-Aug-17
Plants	Quercus robur	Pedunculate Oak	04-Aug-07	04-Aug-07
Plants	Racomitrium lanuginosum	Woolly Fringe-Moss	04-Aug-07	04-Aug-07
Plants	Ranunculus flammula	Lesser Spearwort	04-Aug-07	04-Aug-07
Plants	Ranunculus omiophyllus	Round-Leaved Crowfoot	04-Aug-07	04-Aug-07
Plants	Ranunculus repens	Creeping Buttercup	04-Aug-07	22-Aug-17
Plants	Rhinanthus minor	Yellow-Rattle	04-Aug-07	04-Aug-07
Plants	Rhynchospora alba	White Beak-Sedge	04-Aug-07	22-Aug-17
Plants	Rhytidiadelphus loreus	Little Shaggy-Moss	05-Jul-05	05-Jul-05
Plants	Rhytidiadelphus squarrosus	Springy Turf-Moss	04-Aug-07	04-Aug-07
Plants	Rubus fruticosus agg.	Bramble	04-Aug-07	22-Aug-17
Plants	Rumex acetosa	Common Sorrel	04-Aug-07	22-Aug-17
Plants	Salix cinerea	Grey Willow	04-Aug-07	22-Aug-17
Plants	Scorzoneroides autumnalis	Autumn Hawkbit	04-Aug-07	04-Aug-07
Plants	Sorbus aucuparia	Rowan	04-Aug-07	22-Aug-17
Plants	Sphagnum	Moss	05-Jul-05	05-Jul-05
Plants	Sphagnum capillifolium	Red Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum cuspidatum	Feathery Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum fallax	Flat-Topped Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum fuscum	Moss	15-Nov-06	15-Nov-06
Plants	Sphagnum magellanicum	Magellanic Bog-Moss	01-May-06	15-Nov-06
Plants	Sphagnum palustre	Blunt-Leaved Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum papillosum	Papillose Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum subnitens	Lustrous Bog-Moss	04-Aug-07	04-Aug-07
Plants	Sphagnum tenellum	Soft Bog-Moss	15-Nov-06	15-Nov-06
Plants	Stellaria alsine	Bog Stitchwort	04-Aug-07	22-Aug-17
Plants	Taraxacum officinale agg.	Dandelion	04-Aug-07	04-Aug-07
Plants	Trichophorum cespitosum	Deergrass	22-Aug-17	22-Aug-17
Plants	Trichophorum germanicum	Deergrass	04-Aug-07	01-Jun-10
Plants	Trifolium repens	White Clover	04-Aug-07	04-Aug-07
Plants	Ulex gallii	Western Gorse	22-Aug-17	22-Aug-17
Plants	Urtica dioica	Common Nettle	04-Aug-07	22-Aug-17
Plants	Vaccinium myrtillus	Bilberry	05-Jul-05	22-Aug-17
Plants	Vaccinium oxycoccos	Cranberry	05-Jul-05	22-Aug-17
Plants	Veronica arvensis	Wall Speedwell	04-Aug-07	04-Aug-07
Plants	Veronica scutellata	Marsh Speedwell	04-Aug-07	04-Aug-07
Plants	Viola palustris	Marsh Violet	04-Aug-07	04-Aug-07
Spiders	Araneus quadratus	spider (Araneae)	22-Aug-17	22-Aug-17
Spiders	Cheiracanthium erraticum	spider (Clubionidae)	22-Aug-17	22-Aug-17
Spiders	Lycosidae	wolf spiders	22-Aug-17	22-Aug-17

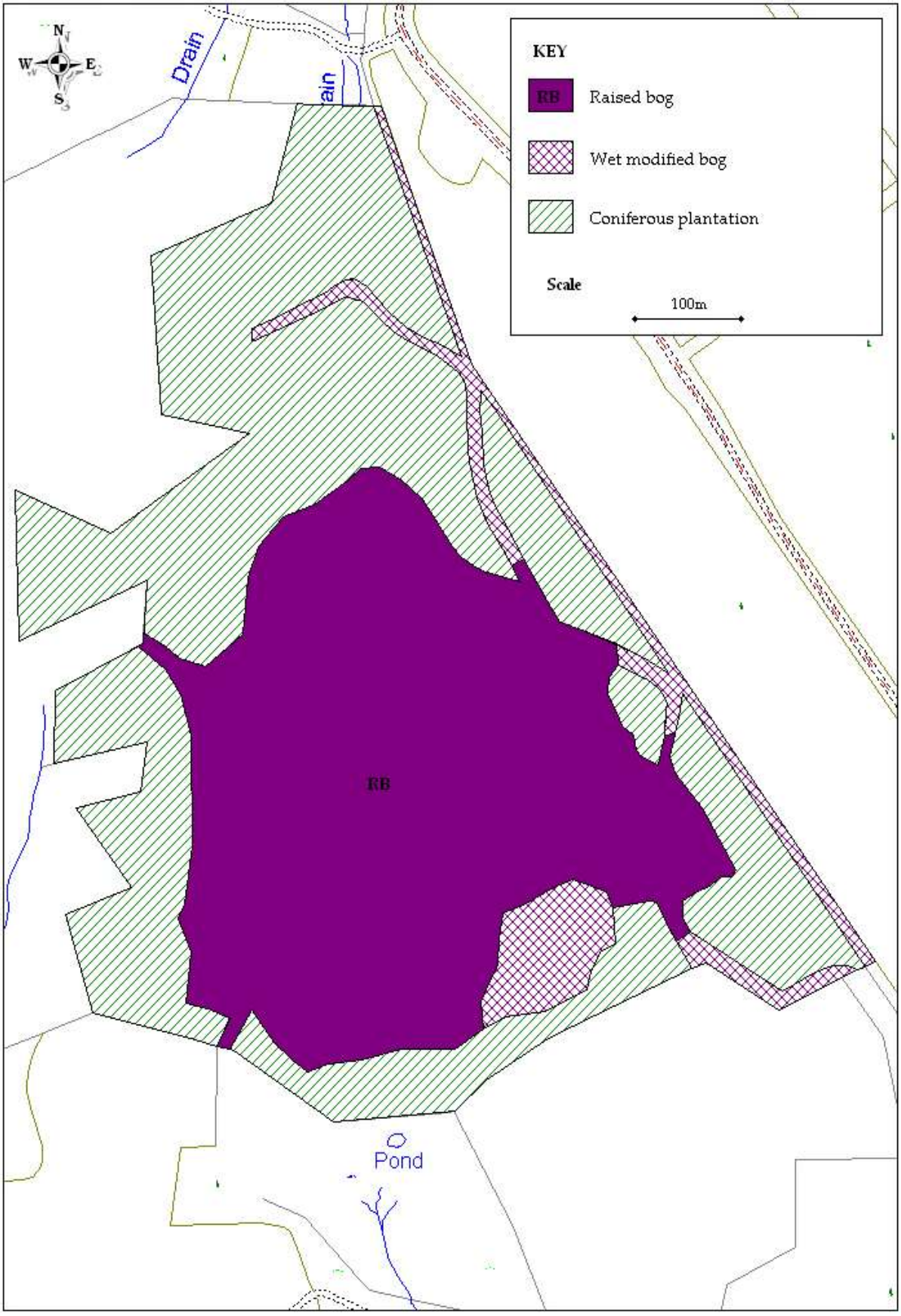
Cors Porffor boundary map



Grid reference: SN923456

Produced by: Tammy Stretton 04/08/2019

Cors Porffor habitat map



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