



West Yorkshire
Ecology

West Yorkshire Local Wildlife Site Selection Criteria

**West Yorkshire Local Sites Partnership
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1 Introduction

1.1 BACKGROUND

These criteria have been drawn up to cover the 5 districts of West Yorkshire, Bradford, Calderdale, Kirklees, Leeds and Wakefield. As well as the planning authorities for the aforementioned districts, a small section within Kirklees, falls under the Peak District National Park planning authority.

This geographical area was first covered by Phase 1 Habitat Surveys in 1982 undertaken by the Ecological Advisory Service (now West Yorkshire Ecology). These recorded broad habitat types and included target notes for more interesting areas, where access permission allowed. The survey results were used by the Ecological Advisory Service in conjunction with the District Councils and the Nature Conservancy Council/ English Nature (now Natural England) and local naturalists to draw up the first lists of non-statutory nature conservation sites in 1984, with a second list being produced in 1991. These were termed Sites of Ecological/Geological Importance (SEGI) in Calderdale, Leeds and Bradford and Sites of Scientific Interest (SSI) in Kirklees and Wakefield. These had no specific written criteria for site selection, but followed the Ratcliffe criteria used by the Nature Conservancy Council (NCC) for SSSI evaluation. In 1997 a major re-survey was undertaken by the Ecological Advisory Service of all of these sites, together with a number of additional candidate sites. At the same time the first set of written criteria was drawn up, against which the sites were assessed. This process resulted in some sites being added to the list and others being de-designated. Most of the sites were again re-surveyed by West Yorkshire Ecology in 2002.

In February 2006 Defra brought out “Local Sites, Guidance on their Identification, Selection and Management”, the first national guidelines for non-statutory nature conservation site systems. It was apparent from this document that the selection criteria for West Yorkshire SEGIs and SSIs fell short of the new best practice guidance.

Running in parallel to the SEGI/SSI systems was a lower tier of non-statutory sites. These were selected by a less formal process which did not include written criteria. Many had attributes associated with public enjoyment of wildlife, an issue not covered by the SEGI/SSI criteria. Some of these sites have only limited supporting ecological records and no formal citations.

On 20 May 2009 a workshop was held to discuss the non-statutory nature conservation sites system in West Yorkshire and agree the way forward. The meeting was attended by local authority ecologists, West Yorkshire Ecology and Natural England. The key issues which emerged from this workshop were:

A single agreed name “Local Site” - Sites of Ecological/Geological Importance (SEGIs) and Sites of Scientific Interest (SSIs) as well as Bradford Wildlife Areas (BWAs), Wakefield Nature Areas (WNAs), Leeds Nature Areas, Site of Wildlife Significance (SWSs) and Regionally Important Geological/Geomorphological Sites (RIGSs) will all be merged into a single system under the generic term Local Sites. This will be divided into Local Wildlife Sites and Local Geological Sites, as set out in the national guidelines.

Local Sites Partnership – a new Local Sites Partnership will be established for Calderdale, Bradford, Kirklees, Leeds and Wakefield which will steer the Local Sites system.

Selection criteria – these will be revised by West Yorkshire Ecology to bring them into line with the Defra (2006) national guidance.

1.2 LOCAL SITES

1.2.1 Statutory nature conservation site designations

In England there are a variety of different site designations that impart statutory protection to sites of national or international importance for nature conservation. These sites are the most important in the UK and in West Yorkshire and have been designated under national legislation and European Union directives. They include Special Protection Areas, Special Areas of Conservation, Sites of Special Scientific Interest and National Nature Reserves. Key legislation for the designation of these sites includes: National Parks and Access to the Countryside Act 1949 (as amended) Wildlife and Countryside Act 1981 (as amended) Countryside and Rights of Way Act 2000 (as amended) The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended) Council Directive 79/409/EEC on the conservation of wild birds (The Birds Directive) Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora (The Habitats Directive) and The Conservation of Habitats and Species Regulations 2010

There are also statutory locally designated site called Local Nature Reserves (LNR) which have been designated by local authorities in combination with Natural England under the National Parks and Access to the Countryside Act 1949. LNRs are normally greater than 2ha and are capable of being managed for the conservation of biodiversity and the maintenance of special opportunities for the study, research or enjoyment of nature. There is a degree of over-lap between Local Nature Reserves and Local Sites which is reflected in these selection criteria. Unlike LNRs, Local Sites do not require any control over the management of the site or need access for the public for designation. There is **no** implied right of public access to a Local Site. Some specific access may be available via the public rights of way network, other access legislation such as the Countryside and Rights of Way Act 2000 or individual management agreements with the landowners.

1.2.2 Non-statutory nature conservation site designation in West Yorkshire

The Defra 2006 guideline recommends the use of the terms “Local Site”, and sub-divisions into “Local Wildlife Site” and “Local Geological Site” for non-statutory nature conservation sites. These terms will be adopted across all districts in West Yorkshire. These site selection criteria will only deal with Local Wildlife Sites. Local Geological Sites selection criteria have been drawn up in a separate document however it is recognised that there may be some sites where geological and ecological interest combine to make the overall site of substantive conservation value.

“Local Sites are all areas of substantive value including both the most important and most distinctive species, habitats, geological and geomorphological features within a national, regional and local context. Sites within the series may also have an important role in contributing to the public enjoyment of nature conservation.” (Defra 2006)

The reference to “national” in the above definition is a reminder that the suite of Sites of Special Scientific Interest (SSSIs), have their own set of selection criteria, but it is only a representative sample of the best examples within an “Area of Search” which have actually been designated. This means that there may be areas which meet the national criteria thresholds, but have not been designated because other better sites exist within the “Area of Search”. The Defra 2006 guidance requires that all sites which meet the selection criteria are designated as Local Sites.

1.3 LOCAL SITES WITHIN THE PLANNING SYSTEM

This section outlines some of the key Government legislation, policy and guidance in relation to non-statutory Local Sites.

Much of current government policy and guidance is strongly influenced by the UK’s commitments to international conventions and agreements on the environment, biological diversity and sustainable development. The emergence of the climate change agenda has highlighted the importance of safeguarding and appropriately managing biodiversity interests. It also emphasises the importance of biodiversity within sustainability and specifically, the economic benefits of biodiversity.

The publication of Planning Policy Statement 9 Biodiversity and Geological Conservation¹ in 2005 indicated the government’s approach to the protection of biodiversity and geological conservation through the planning system. PPS9 recognises that Local Sites have a fundamental role to play in helping to meet overall national biodiversity targets, contributing to the quality of life and well-being of the community, and in supporting research and education. This was superseded in 2012 by the National Planning Policy Framework which states in paragraph 117

“To minimise impact on biodiversity and geodiversity, planning policies should:

- *Plan for biodiversity at a landscape-scale across local authority boundaries;*
- *Identify and map components of the local ecological network, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation; ...”²*

¹ Planning Policy Statement 9: Biodiversity and Geological Conservation ODPM, August 2005.

² Amended 19/02/2016

1.4 THE RELEVANCE OF LEGISLATION AND PLANNING POLICY FRAMEWORK TO LOCAL SITES IN WEST YORKSHIRE.

Legislation/Policy/ Guidance Title, Date and Level	Articles/ Sections of Particular Relevance to Local Sites	Relevance to West Yorkshire Local Sites system
Natural Environment and Rural Communities (NERC) Act 2006	Section 40 (1)	Incorporates a general duty that “ <i>every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.</i> ” The term Public Authority includes all local authorities and local planning authorities. This includes Local Sites and positive management of the biodiversity interests within them.
National Planning Policy Framework 2012 ³	Paragraph 113	Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, ²⁴ so that protection is commensurate with their status and gives appropriate weight to their importance and the contribution that they make to wider ecological networks.
National Planning Policy Framework 2012 ⁴	Paragraph 117	To minimise impacts on biodiversity and geodiversity, planning policies should: <ul style="list-style-type: none"> • plan for biodiversity at a landscape-scale across local authority boundaries; • identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation; • promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations, linked to national and local targets, and identify

³ Amended 19/02/2016

⁴ Amended 19/02/2016

Legislation/Policy/ Guidance Title, Date and Level	Articles/ Sections of Particular Relevance to Local Sites	Relevance to West Yorkshire Local Sites system
		suitable indicators for monitoring biodiversity in the plan;
ODPM Circular August 2005 "Biodiversity and Geological Conservation – Statutory Obligations and their impact within the planning system ⁵ .	Section G Paragraph 95	Defra will be issuing separate guidance on Local Sites. The guidance will provide advice on the development and management of systems to identify these sites. It will propose framework and standards for their operation as well as for the selection, protection and management of the sites themselves.
NERC	Section 40 (3)	There are opportunities within the Local Site network for conserving, restoring and enhancing habitats. All of these measures contribute to the implementation of the duty.
NERC	Section 41 (1)	This section refers to the lists of species and habitats that are considered to be of principal importance for biodiversity conservation. The Local Sites network is a critical component in the conservation of these species and habitats.
Working with the grain of nature: a biodiversity strategy for England, Defra 2002.	All	The England Biodiversity Strategy recognises the importance of designated Local Sites and a consistent approach to their operation, in providing important wildlife refuges and stepping stones linking different habitats and helping to maintain biodiversity. The strategy also identifies the key role that Local Sites play in Local Biodiversity Action Plans and in community strategies.
The Conservation of Habitats and Species Regulations 2010	Regulation 39 (2) and (3)	Clarifies S17(a)(3) of the Planning and Compulsory Purchase Act 2004 and S12(d)(3) of the Town and Country Planning Act 1990 to include "policies encouraging the management of features of the landscape which are of major importance for wild fauna and flora".
Conservation (Natural Habitats &c.) Regulations 1994 (as amended)	Regulation 37	This Regulation implements Article 10 of the Council Directive of 21 May 1992 on the Conservation of Natural Habitats and of Wild Flora And Fauna (92/43/EEC) (known as the Habitats Directive) in the UK. The Regulation encourages member states to manage features

⁵ Amended 19/02/2016

Legislation/Policy/ Guidance Title, Date and Level	Articles/ Sections of Particular Relevance to Local Sites	Relevance to West Yorkshire Local Sites system
		of the landscape of major importance for wild flora and fauna such as rivers, traditional field boundaries and stepping stone habitats including ponds and small woods. These features can form Local Sites or be part of Local Sites. Such sites contribute to the maintenance of wildlife networks in West Yorkshire and provide opportunities to enhance and extend wildlife corridor networks by connecting sites together in the landscape.

The Defra Local Sites Guidance (paragraph 10) indicates that the Biodiversity Strategy for England⁶ is the core means of delivery of the NERC Act duty. The relationship between the national Biodiversity Action Plans, UK priority habitat types and the habitat types assessed under these guidelines is broadly outlined in the following table. The Local Sites network provides a key mechanism for the implementation of BAP objectives and targets.

In West Yorkshire, the approach to the Local Sites system is to use the best available resources for the identification, safeguarding and conservation based management of Local Sites. This approach is made possible through legislative provision, government guidance, opportunities identified by the West Yorkshire Local Site Partnership and closer engagement with Local Site owners and management at local authority level under National Indicator NI197. The aim is to deliver a healthy and thriving Local Sites network supporting priority biodiversity features for their intrinsic wildlife value, providing the ability and opportunity for species and habitats to move and develop over time accordingly and, where appropriate, provide opportunities for public enjoyment of nature.

1.5 RELATIONSHIP BETWEEN UK BIODIVERSITY HABITAT ACTION PLANS AND KEY HABITATS IN WEST YORKSHIRE

Local Sites Selection Criteria Habitat Types (including NVC types)	Other Important Habitats in West Yorkshire	Internationally Important Habitats in West Yorkshire	UK Key Habitats in West Yorkshire from UK BAP	UK BAP Broad Habitat Type
Flowing water	Canals		Rivers	Rivers and streams
Standing water	Canals		Oligotrophic and dystrophic lakes.	Standing open water and canals

⁶ Working with the grain of nature: A Biodiversity Strategy for England. Defra 2002.

Local Sites Selection Criteria Habitat Types (including NVC types)	Other Important Habitats in West Yorkshire	Internationally Important Habitats in West Yorkshire	UK Key Habitats in West Yorkshire from UK BAP	UK BAP Broad Habitat Type
		SAC – Denby Grange Colliery Ponds (great crested newts)	Ponds Mesotrophic lakes Eutrophic standing water Aquifer fed naturally fluctuating water bodies	
The longevity of arable field margins and easy with which they can be recreated does not make them an appropriate UK BAP habitat to address through the Local Sites system Arable weed communities (OV1-OV17)	Arable fields and fallow (ruderal/ segetal plant communities)		Arable field margins	Arable and horticultural
Ancient and/or species rich hedgerows (W8, W10, W21-W25) Dry ditches and banks	Dry ditches and banks Dry stone walls		Hedgerows	Boundary and linear features

Local Sites Selection Criteria Habitat Types (including NVC types)	Other Important Habitats in West Yorkshire	Internationally Important Habitats in West Yorkshire	UK Key Habitats in West Yorkshire from UK BAP	UK BAP Broad Habitat Type
(see NVC for relevant vegetation types)				
<p>Orchards</p> <p>Parkland (MG6, MG7, W10 + more see UK BAP).</p> <p>Upland oakwood (W10, W11, W16, W17)</p> <p>Upland mixed ash woodland? (W8d-g, W9 and W13)</p> <p>Wet woodland (W1 -W7)</p> <p>Lowland mixed deciduous woodland (Calcareous-neutral, W8 (a-d). Acid, W10(a-d), W16)</p> <p>Scrub (W21-W25)</p>	<p>Scrub</p>	<p>SAC – South Pennine Moors</p>	<p>Traditional orchards</p> <p>Wood-pasture and parkland</p> <p>Upland oakwood</p> <p>Lowland beech and yew woodland</p> <p>Upland mixed ashwoods</p> <p>Wet woodland</p> <p>Lowland mixed deciduous woodland</p>	<p>Broad leaved, mixed and yew woodland</p>

Local Sites Selection Criteria Habitat Types (including NVC types)	Other Important Habitats in West Yorkshire	Internationally Important Habitats in West Yorkshire	UK Key Habitats in West Yorkshire from UK BAP	UK BAP Broad Habitat Type
Planted coniferous woodland	Planted coniferous woodland (ancient woodland ground flora)		None	Coniferous woodland
Acid grassland U1, U2, U4, U5, U6, U20, M25	Upland dry acid grassland Road verges	Linked to South Pennine Moors SPA	Lowland dry acid grassland	Acid grassland
Calcareous grassland (CG2-CG5)	Road verges Disused quarries Railway lines		Lowland calcareous grassland	Calcareous grassland
Unimproved and semi-improved neutral grassland (species- rich) (MG1, MG4 - MG6)	Road verges		Lowland meadows Upland hay meadows	Neutral grassland
Improved grassland (includes species-poor semi-improved grassland) (MG6, MG7, MG9, MG10)			Coastal and floodplain grazing marsh	Improved grassland
Lowland heathland (includes lowland acid			Lowland heathland	Dwarf shrub heath

Local Sites Selection Criteria Habitat Types (including NVC types)	Other Important Habitats in West Yorkshire	Internationally Important Habitats in West Yorkshire	UK Key Habitats in West Yorkshire from UK BAP	UK BAP Broad Habitat Type
grassland mosaics(H9 and M16) Upland heathland (H9, H10, H12, M16)	Lowland acid grassland mosaics	SAC – South Pennine Moors	Upland heathland	
Fens, lowland mires, springs and flushes. Upland moorland habitats			Upland flushes, fens and swamps Purple moor grass and rush pasture Lowland fens Reedbeds	Fen, marsh and swamp
Upland moorland habitats. Fens, lowland mires, springs and flushes.	Degraded lowland raised bog	SAC – South Pennine Moors	Lowland raised bog Blanket bog	Bogs
None	None		Mountain heaths and willow scrub	Montane habitats
Inland rock outcrop and scree			Inland rock outcrop and scree habitats Open mosaic habitats on previously developed land	Inland rock

1.6 WEST YORKSHIRE GUIDELINES FOR LOCAL SITES SELECTION

The remit of the West Yorkshire Local Sites Partnership is to:

- provide the lead scientific body for the identification and ongoing assessment of sites supporting valuable flora and/or fauna that are of sufficient quality to become Local Sites within West Yorkshire;
- make recommendations to each local planning authority for the inclusion of a Local Site Partnership approved list of Local Sites within each authority's local development documents (to be supported by policy and be identified on associated LDF maps);
- maintain high quality standards to ensure that sites given protection in planning policies are of substantive nature conservation value in the context of West Yorkshire, to regularly review these standards according to the developing biodiversity knowledge base, and subsequently publish any amendments to the application of the Local Site selection guidelines as necessary; and
- maintain the system of Local Site designation in West Yorkshire and to support the district councils with the delivery of site management, land owner liaison and monitoring of Local Sites associated with National Indicators and best practice.

The West Yorkshire Local Sites Partnership has a core membership of ecologists from the local authorities, the local ecological records centre (West Yorkshire Ecology), West Yorkshire Geology Trust, the Yorkshire Naturalists' Union and Natural England. Additional expertise is also drawn from other governmental and non-governmental bodies as well as naturalists and ecological consultants. The membership expands and adapts in order to encompass the relevant expertise required for the matters under discussion, research and development as appropriate. In some instances the Local Sites Partnership will form working sub-groups for specific tasks and for a defined period of time. These groups will always include core members of the Local Sites Partnership. The recommendations of these sub-groups will always be required to be ratified by the full West Yorkshire Local Sites Partnership.

1.7 MEMBERSHIP OF THE WEST YORKSHIRE LOCAL SITES PARTNERSHIP

Type of organisation	Members
Public bodies	Natural England, Bradford Council, Calderdale Council, Kirklees Council, Wakefield Council, Leeds Council, Forestry Commission, Environment Agency
Non-Governmental Organisations	Yorkshire Wildlife Trust, Yorkshire Naturalists' Union, West Yorkshire Geology Trust
Local Record Centre	West Yorkshire Ecology
Consultancy/local surveyors	
Naturalist societies	Yorkshire Naturalists' Union
Academic institutions	
Other advisors and experts as temporary members on topic specific basis	

1.8 FORMAT OF THE LOCAL WILDLIFE SITES GUIDELINES

The guidelines for the selection of Local Wildlife Sites are divided into two parts:

- Habitat characteristics; and
- Species groups.

The guidelines describe the status of the habitat with reference to the International, National, Natural Area and West Yorkshire context, and set out the criteria and attributes on which the designation of a Local Wildlife Site is based. For each species group, details of the legal protection/status afforded are provided where applicable. Information on well-recorded groups can be found through direct contact with local recorders. Specific guidelines are subsequently provided which establish the selection thresholds on which a Local Wildlife Site is designated and set out the rationale for each guideline and how it should be applied.

1.8.1 The basis of the habitat guidelines

The guidelines are based on a process that utilises evaluation criteria. These criteria are based on measurable site attributes and assessment of the quality of a site is judged against selection thresholds for the attributes.

For example, under the criterion of rarity the selection guideline may indicate that a particular habitat type is so rare that any example of that type may qualify as a Local Wildlife Site. However, to ensure that the site is an example of the habitat that warrants protection, it may need to be greater than a certain size. Size is a selection criterion, the area of the site a measurable attribute and the minimum area requirement is a selection threshold. The relationship between criteria, attributes and thresholds is illustrated in the table below.

This approach to Local Wildlife Site selection recognises that all attributes are of equal importance regardless of the detail or extent of knowledge about the attributes within West Yorkshire, although some attributes on their own may not be sufficient to warrant designation. For example, the size (area) of a site may be used to set a minimum threshold for selection so long as the quality of the habitat comprising the site meets the selection thresholds for other site attributes. The thresholds used for selection can be adjusted as the nature conservation resource changes or as the knowledge about habitats and species of importance increases. The on-going monitoring of the guidelines and their application is part of the role of the Local Sites Partnership.

Possible relationships between selection criteria, attributes and thresholds.

Criterion	Attribute	Threshold
Size or extent	Area or population size	Minimum area or minimum number of breeding pairs etc.
Naturalness	Habitat features indicate the habitat is long established or has natural characteristics.	Sites on Ancient Woodland Inventory. Rivers with a dynamic range of natural features and a high water quality.
Typicalness	Habitat features and species assemblages that represent the combination of biotic and abiotic factors influencing the site.	Any sites that support more than the minimum threshold of species characteristic of the habitat type.
Rare or exceptional feature	Species rarity. Habitat and/or vegetation community rarity.	All sites that support populations of nationally scarce or Red Data Book Species. All examples of county rare habitats e.g. MG4 lowland hay meadow.
Diversity	Diversity of species in total or diversity of species from particular biotic groups. Diversity of habitat and vegetation structure.	Any sites that support more than the minimum threshold of a list of species. Mosaic of habitat where points given to each habitat exceed a specified threshold.
Connectivity within the landscape	The site is within a wildlife corridor or part of a collection of sites within a particular geographical location.	The site is within a threshold distance from another site of the same habitat type. The site is connected via an ecological corridor or linear habitat.
Value for appreciation of nature and learning	Site with public access, managed primarily for its nature conservation interest.	The area of the site exceeds a specified threshold and public access is assured for a minimum of 25 years.

The selection criteria for Local Wildlife Sites used by the Local Sites Partnership to develop these selection guidelines have been broadly based on the ten 'Ratcliffe Criteria' used in *A Nature Conservation Review*⁷. These criteria have been widely used for the assessment of nature conservation value for sites, for many years, ranging from National

⁷ Ratcliffe, D.A. (1977). *A Nature Conservation Review Volume 1*. Cambridge University Press.

Nature Reserves to the ecological interest of development proposal sites. In this document these have been modified in line with the “Annex C: Reference Criteria for the Selection of Local Sites” (Defra 2006)⁸. A comparison of the two is set out in Table 2 below.

Table 2 Comparison between criteria proposed by Ratcliffe (1977) and Defra (2006)

Ratcliffe Criteria (1977)	Defra Criteria (2006)
Size	Size or extent
Diversity	Diversity
Naturalness	Naturalness
Rarity	Rare or exceptional feature
Fragility	Fragility
Typicalness	Typicalness
Recorded history	Recorded history and cultural association
Position in ecological or geographical unit	Connectivity within the landscape
Potential value	
Intrinsic appeal	Value for appreciation of nature
	Value for learning

In these guidelines “Value for appreciation of nature” and “Value for learning” have been grouped under a single heading “Value for appreciation of nature and learning”.

It is not useful to attempt to use all of the criteria for all of the habitats as measurable attributes with thresholds can not always be satisfactorily defined or measured. The most frequently used and therefore key criteria are Rare or exceptional feature, Diversity, Size or extent and Typicalness.

Size or extent

This criterion can be applied in different ways. For habitats it does not act as a single selection criterion because it is used to set minimum thresholds for habitats that also have to be of a particular quality in order to be eligible for Local Wildlife Site selection. In relation to the guidelines for species groups size can be used to set a selection threshold for populations of particular species.

Diversity

This criterion can be applied to a range of characteristics of a site, but is most often measured in terms of diversity of species, habitats and vegetation communities, which in turn, reflect the physical characteristics of a site such as diversity of soil types, hydrology, micro-climate and topography. The criterion is utilised in the guidelines through the choice of selection thresholds that have been set for habitats and species. For habitats the selection thresholds for the number of characteristic species of a habitat type usually will reflect the species diversity of a site. For species groups diversity is reflected in the selection thresholds set for good species assemblages.

⁸ Defra (2006). *Local Sites Guidance on their Identification, Selection and Management*.

Naturalness

This criterion, like typicalness, can be difficult to apply because it can be utilised in a variety of different ways. However, in these guidelines it is primarily used in habitat selection guidelines to reflect the longevity of the habitat. For example, sites listed on the Ancient Woodland Inventory for West Yorkshire are highly valued because of their long or continuous history of woodland cover. Assemblages of species, or the presence of particular species that are strongly associated with long established habitats, have also been used to guide the selection of Local Wildlife Sites.

Rare or exceptional feature

This is an important criterion that reflects one of the primary aims of nature conservation, namely, the prevention of the further loss of species from their natural range. Rarity is also a valuable criterion because it can be measured more readily than some other criteria. For example, standards are set for the classification of species as rare or scarce at a national, local or county level. Rarity is not just applicable to species, but also habitats, geological and geomorphological features and assemblages of species. Rarity can be broadened to include those habitats and species that are rare, threatened or in decline over a wider geographic area, such as continental Europe, for which the UK has a particular responsibility (e.g. great crested newt, Natterer's bat and lowland heathland). *The Biodiversity Audit of Yorkshire and the Humber*⁹ lists rare and declining habitats and species within the region. These lists have been used to inform the preparation of the habitat and species selection guidelines for West Yorkshire.

Fragility

This criteria will generally be used in conjunction with other measurable criteria to add weight where habitats or group of species are likely to be under pressure from factors such as climate change or wide spread changes in land management.

Typicalness

This criterion can be difficult to apply and unless clearly defined can lead to a degree of confusion during site evaluation and Local Wildlife Site selection. It is, however, an important criterion because it reflects the desire to ensure that the full characteristic variety of the natural environment of West Yorkshire is maintained, not just the rare or particularly species diverse. Consequently, the criterion should enable the selection of habitats and species assemblages typical of the habitats and species groups over a wider geographical area, as well as, those that are locally distinctive in the West Yorkshire context.

Recorded history and cultural association

This will generally be used in conjunction with other criteria to reflect the added value which can be attributed to historical recording of a site. Such recording needs to be undertaken to rigorous standards, with results and methodology lodged with the local records centre.

⁹ Selman, R., Dodd, F and K. Bayes (1999). *A Biodiversity Audit of Yorkshire and The Humber*. Yorkshire and Humber Biodiversity Forum.

Connectivity within the landscape

This is one of the hardest criteria to apply to site selection. It is important however, in terms of our understanding of the adverse impact of habitat fragmentation on species populations. It is now recognised that it is important to maintain inter-linked habitat mosaics to reduce the effects of fragmentation and isolation (e.g. Article 10 of the EU Habitats Directive).

It is often not possible, to quantify the significance of the inter-relationships between different blocks of habitat in maintaining species populations. Consequently, this criterion has been used in the guidelines to encourage the protection of groupings of sites even when some of the sites within the grouping may fall just short of the selection thresholds.

Value for appreciation of nature and learning

In populous areas or areas which have historically suffered significant degradation of semi-natural habitats through factors such as industrial development or agricultural intensification, there is justification for designating sites which may score lower against other criteria thresholds but where public access is good and the site is managed to maintain and enhance its wildlife value. A site which has the added value which can be obtained from a relationship over a period of time between the site and an educational establishment or local naturalist group can also provide justification for substantive nature conservation value.

These criteria use tangible attributes for assessing this criteria and avoid utilising factors such as aesthetic appeal or contribution to a landscape which although recognised as important, are more subjective.

1.8.2 The basis of the species guidelines

The species guidelines for the selection of Local Wildlife Sites in West Yorkshire have been based on the use of 5 selection criteria. The principal criteria used have been Diversity, Rare or exceptional features and Typicalness. Naturalness and Size or extent have only been used for specific circumstances. Examples of how the criteria have been reflected in the guidelines are shown in Table 3. In many cases species related nature conservation issues are better handled through selection using habitat criteria, but this will not always be possible and in some instances species criteria can provide additional recognition for features of interest. In many cases where sites have been designated for particular habitats, additional species interest should be included on citations. This information should be divided between qualifying species information and other species data relevant to management decisions. So for example a woodland may qualify because it is ancient, and may also qualify because it has a rich assemblage of invertebrates, but may also have a species of fungi associated with a specific tree which in itself does not meet a selection criterion, but which could be relevant to planning a programme of management work on the site.

Table 3 Examples of how the selection criteria have been used in developing species selection guidelines.

Criterion	Attribute
Size or extent	The size of the population of a species has been used in some selection guidelines. For example the number of individuals and species of amphibian present at a site has been used to assess the significance of a population.
Typicalness	This criterion is reflected in some of the guidelines where a significant assemblage of species has been used to identify typical examples of particular species groups for particular habitats. E.g. the guideline for assemblages of breeding birds for particular habitats.
Diversity	This criterion is reflected in some of the guidelines where assemblages of species have been used to identify good, diverse populations of species belonging to a particular species group or plant community.
Rare or exceptional features	Presence of nationally rare, nationally scarce and county rare species has been used in the selection guidelines. The priority status of species within the UK BAP lists is also used to reflect the identification of important species in West Yorkshire that are significant in the UK context.
Naturalness	This criterion is not widely used, however one example of its use is with the Index of Ecological Continuity for identifying important lichen assemblages, which reflects the naturalness of sites.

Rarity is generally represented at different hierarchical levels. These different levels impart greater degrees of importance to the species. This can depend on the level at which rarity is measured, as some species that are rare at the national or international level can be relatively frequent at the county level if West Yorkshire is a stronghold for the species. In these circumstances, the management of the species at a local level takes on greater importance for the UK as a whole.

The different levels of rarity identified in the guidelines refer to:

- Species that are of international importance. These species are identified in European Community Directives (Habitats and Birds Directives).

- Species that are of national importance. The UK BAP priority species list is consulted to identify species that are nationally rare. It is acknowledged by the Local Site Panel that these lists also reflect threat and/or decline in addition to rarity.
- Species that are of national importance. These are taken from the Joint Nature Conservancy Council spreadsheet of conservation designations for UK taxa (www.jncc.gov.uk). This lists all species which are on the Red Data Books or listed as nationally rare/scarce.
- Species that are of local importance. Formal consultation is undertaken with recognised experts and/or specialist skills sought from the Botanical Society of the British Isles, the Yorkshire Naturalists Union and West Yorkshire Ecology with regard to the determination of the relevant level of rarity and status for a given population of a species flagged as rare in West Yorkshire. This provides the ability to ensure that the best, most reliable and up to date available records and information are used to assess local rarities due to changing distributions and geographic locations of species. This includes species migration due to changing climatic conditions.

Further, care has to be taken when considering rarity of particular species, as rarity can be a feature of the coverage of survey rather than a true reflection of the rarity of the species.

Where there is sufficient knowledge of the species group concerned, guidelines have been based on assemblages of species as a measurable attribute. This provides a measure of the diversity of a particular group of species at a particular site, and a way of assessing the representativeness of a particular habitat type.

The use of species assemblages for site selection is most useful for groups where there has been regular and widespread recording. This enables an overview of the importance of a particular site to be determined, as some assemblages of species are characteristic of longstanding habitats. The use of assemblages for some animal groups also allows assessment of habitats that may be inherently poor or uncharacteristic from a plant point of view.

The guidelines for selecting Local Wildlife Sites are based on a number of common issues that should be applied to the selection of sites.

For the purposes of these guidelines selection is based on species that are:

- native to West Yorkshire;
- native to Britain, but have recently naturally colonised the county; or
- native species that have been introduced through authorised species recovery programmes.

Species that have been, or are believed to have been, deliberately introduced or are casual in the county are not generally eligible for inclusion. In some situations such as the result of climate change it may be appropriate to acknowledge the value of species which have not been historically recorded in West Yorkshire, but which are now considered to be of nature conservation value.

The guidelines make use of a number of terms throughout including locality, good, significant and regularly. Where terms such as 'good' and 'significant' are used, an

explanation of how to determine what constitutes a good or significant site has been provided.

In relation to determining rarity within a county context the term 'locality' refers to an area up to or less than 1 square kilometre. This does not have to relate to a fixed national grid square.

1.8.3 Limitations imposed by availability of information

It is important that the guidelines are based on information that enables the substantive nature conservation value of sites to be determined and justified.

These new selection guidelines bring together two earlier systems for locally designated non-statutory nature conservation sites.

Sites of Ecological/Geological Importance / Sites of Scientific Interest; and Bradford Wildlife Areas/Wakefield Nature Areas/Leeds Nature Areas and Site of Wildlife Significance.

The former are well supported by ecological data which has been used to evaluate the sites against the new criteria. The latter have more patchy ecological data and may require further detailed surveys to qualify as Local Wildlife Sites. There may also be a need to obtain additional supporting species records to reassess some sites against the new criteria. Until resources can be found to undertake this additional survey and data collation work all the above sites will be considered provisional Local Wildlife Sites (pLWS) and should be given protection for the appropriate current policies in the Unitary Development Plans/ Local Development Frameworks. This situation should not continue indefinitely from the date of adoption of these selection guidelines.

For some species groups there is little or no systematic information for West Yorkshire and it is not possible to develop effective guidelines using these groups as a basis for selection. In time with further study some of these species groups may prove useful in Local Wildlife Site selection and the guidelines will be adapted accordingly.

Consequently, the selection guidelines are based upon the current best available, accessible information about the extent, quality and distribution of habitats and species in West Yorkshire. The data produced by the Local Wildlife Site surveys themselves is an effective tool in reviewing and adjusting the guidelines for site selection. In particular, adjusting the sensitivity of the thresholds used in the habitat guidelines, and the lists of indicator species is informed by increased knowledge of the geographical distribution of habitats and species as a result of the surveying of Local Wildlife Sites.

Data are more available for some habitats and species groups than others, which is reflected in the selection guidelines. For example, widely studied species groups such as birds feature prominently in the guidelines because the database on birds in West Yorkshire is substantial and being constantly monitored by a network of amateur and professional ornithologists. Species guidelines in particular will be reviewed as more information is gathered by the naturalist community.

More information is being released and shared by other organisations with an interest in the natural environment, particularly by the government organisations. This information is being fed into and informing the review of the Local Wildlife Site guidelines, particularly

for those habitats where substantive data was not previously available and is difficult or costly to capture by a small group such as the Local Wildlife Site Partnership.

1.9 LOCAL WILDLIFE SITE ASSESSMENT AND NOTIFICATION PROCEDURE

West Yorkshire Ecology in conjunction with individual local authority ecologists is responsible for the identification of sites that are of suitable quality to be designated Local Wildlife Site. Supporting data are then assessed against the Local Wildlife Site selection guidelines and a recommendation and supporting evidence presented to the Local Sites Partnership for ratification. A list of Local Wildlife Sites confirmed as of substantive nature conservation value are forwarded to the relevant local authority. The Local Sites Partnership advocates that District Councils include the list with their Local Development Documents, including associated maps, as part of the Local Development Framework. Any changes to Local Wildlife Sites, in terms of inclusion or amendment to boundaries, are made available to the District Council to maintain an up to date evidence base across West Yorkshire. Such changes may be identified through the Local Wildlife Site monitoring or survey programme or by notification to West Yorkshire Ecology by the District planning team of losses due to development. A close working relationship is envisaged between the District Council planners, West Yorkshire Ecology and the Local Sites Partnership with regard to site selection, protection, information and advice provision.

The West Yorkshire Ecology will keep records of proposed changes to the list of designated sites which will be referred to as provisional Local Wildlife Sites (pLWS). Once these have been approved by the Local Sites Partnership they should be protected under the relevant Local Sites policy in the LDF until formally adopted by the District Council.

This approach to Local Wildlife Site selection started across the county using written guidelines for the first time in 1997 following the completion of the detailed survey work and consultation with local naturalist for faunal records. Since then many of the Sites of Ecological / Geological Importance (SEGI) and Site of Scientific Interest (SSI) have been resurveyed in 2002 and a number covered by additional monitoring reports.

The survey results for each site are held at West Yorkshire Ecology. The information is held in the form of a written citation, habitat and boundary map and species list. This identifies the relevant guideline/s under which a site qualifies as a Local Wildlife Site. Evaluation data from the application of the criteria in this document is held by West Yorkshire Ecology and can also be made available on request.

Existing Local Wildlife Sites are re-evaluated using all relevant and available site data. The decision is recorded as a significant component of the Local Wildlife Site programme. This is in order to establish the continued significance of the nature conservation value and to inform potential positive management activities to retain or enhance that interest. As part of the ongoing survey programme, sites that previously had no designation may become provisional Local Wildlife Sites and a number of existing Local Wildlife Sites may no longer qualify and will be removed from the list. It is, therefore, a pre-requisite that consultation is undertaken with West Yorkshire Ecology in

order to establish the most up-to-date information pertaining to Local Wildlife Site status, as this can be subject to change during the period to which the relevant District based Local Development Documents apply.

It is important to note that the purpose of any potential changes to Local Wildlife Site designation is to ensure that the Districts maintain an up to date evidence base upon which to base their decisions¹⁰ in the exercise of their planning functions and that Local Wildlife Sites are identified and retained on the basis of the principle of supporting substantive nature conservation interest.

Local Wildlife Sites will be permitted to overlap biological or geological Sites of Special Scientific Interest however the features of national importance within the SSSI citation will be given precedence, unless an exception is agreed with Natural England and an appropriate license issued.¹¹

1.10 MONITORING AND RE-SURVEY

Ideally all Local Wildlife Sites will be revisited every 5 to 10 years (in accordance with the Defra Local Sites Guidance) to ensure that the appraisal of sites remains valid and up to date and to assess site condition. Sites will initially receive a monitoring visit, which will note major changes in land use and habitat type and will often be sufficient to confirm the site status and condition. Where major issues are noted the site will receive a full re-survey. Resulting survey and monitoring information will be entered into the Local Wildlife Site data by held by West Yorkshire Ecology.

To ensure that the monitoring and re-survey process does not just identify the decline of the Local Wildlife Site system. It is likely to be necessary to take action to help landowners and managers undertake positive management on their Local Wildlife Sites to enable good condition to be maintained or for condition to improve. This may be through the use of grant aid and advisory services or through practical management tasks, which can be undertaken by local volunteer services.

1.11 LOCAL WILDLIFE SITE REVIEW PROCEDURE

The Local Sites Partnership will consider any new sites put forward for Local Wildlife Site selection, evaluate them using the selection guidelines and make a decision. Similarly the Local Sites Partnership will also consider the deletion of sites that no longer satisfy the selection criteria. The process of review is essential to ensure a common standard is maintained in line with government guidance that sites should be of “substantive nature conservation value”. To ensure consistency, a standard form will be completed for each site proposed for addition or deletion to the system as appropriate.

¹⁰ Planning and Compulsory Purchase Act 2004 S13

¹¹ Added 12/12/2019, reversed 24/03/2022

The process for considering new sites should be as quick as possible within the restrictions imposed by the criteria, the season and resources of the relevant organisations. This should be treated as a high priority to ensure that important nature conservation sites are recognised as soon as possible.

Before de-designating a site consideration should be given to restoring the site's features of interest. This is particularly relevant where interest has been lost or reduced by deliberate damage, neglect or inappropriate management. Seed banks may remain in the soil for many years and in some cases may still make a site of substantive nature conservation value. Faunal interest may be subject to influences outside of the immediate site, such as international migration issues for birds or unusual weather events. The reason for loss of the interest in a site should be assessed and consideration given to whether it is temporary or likely to be permanent.

1.12 DETERMINING LOCAL WILDLIFE SITE BOUNDARIES

During the process of surveying and site evaluation consideration needs to be given to setting the boundaries, to ensure that all areas of land which meet the selection guidelines and are considered to be of substantive nature conservation value, fall within the boundaries. Where ecological consultants are used for site surveys it is recommended to include a clause which requires them to propose boundaries for the site which they have been contracted to survey and also to report on additional areas adjacent or nearby which are outside of their main survey area which may warrant further survey work.

Boundaries should be drawn so they can be readily located on maps and on the ground. Care has been taken to ensure they are not drawn to include significant areas of land that does not meet the selection guidelines and thus place an undue constraint on potential development. They may, however, include habitat that is of lesser value where it is an integral part of the management unit and occupies a minority (i.e. less than 50%) of area of the land parcel under consideration.

When determining Local Wildlife Site boundaries:

The boundary should be determined by readily identifiable management units (e.g. a hay meadow, a woodland, a roadside verge etc.) when the majority of the area concerned (generally over 50%) meets the Local Wildlife Site selection criteria.

Where there is an aggregation of separate management units adjacent to each other, the boundary should be drawn to include all sites as a single Local Wildlife Site. So for example a woodland and grassland which both qualify under different criteria but which are adjacent should have a single site boundary.

Where there is a grouping of separate management units of the same habitat type (e.g. a series of unimproved meadows) that are in close proximity to each other, they may also be referred to as a single Local Wildlife Site. There is not a requirement to designate intervening fields which do not meet the criteria.

For large stands of a single habitat type (for example upland heath) with only a minority of the area being of Local Wildlife Site quality or of marginal Local Wildlife Site quality, the boundary may be drawn to the nearest topographic feature or a line between two features, so that the majority of the area of land within the boundary is of Local Wildlife Site quality.

For wetland Local Wildlife Sites where the protection of the water supply and quality is vital to the maintenance of the interest of the Local Wildlife Site, the boundary may be drawn to include the immediate catchment of the site. These buffer zones should be identified by observable physical boundaries or topographic features.

For mixed habitat sites that are not part of recognised traditional land management units (e.g. post-industrial land) the boundary may be drawn to include all areas of individual habitats of Local Wildlife Site quality and all other areas of habitat that in combination meet the mixed habitat selection guidelines. The boundary may be drawn to the nearest topographic feature or a line between two features or an observable physical boundary habitat, so that the majority of the area is of Local Wildlife Site quality, these sites are often referred to as complexes.

For upland habitats the lower limit of unenclosed moorland would be taken to the moorland line, although in some instances the inclusion of allotments around the moorland edge would be appropriate where they contain stands of high quality upland habitat for species such as wading birds or twite.

For species or species assemblages of Local Wildlife Site quality that have a requirement for different habitats and land parcels during their life cycle, the Local Wildlife Site boundaries may be drawn to include all habitats or features that can be shown to be important to the maintenance of the interest of the Local Wildlife Site. One example could be the inclusion of scrub or boundary features adjacent to grassland or wetland.

For rivers it can be difficult to determine static boundaries, due to the dynamic nature of rivers, for example rivers may change course through erosion; quickly rendering Local Wildlife Site maps out of date. The Local Wildlife Site boundary should be to fixed points upstream and downstream such as bridges, weirs and field boundaries and to the bank-full point of the river. Flood banks should only be used to define the river channel where the flood bank directly abuts the river. For dynamic systems the boundaries should be regularly checked and/or determined on the ground as and when required.

For canals the Local Wildlife Site boundary will include all semi-natural habitat within 2m of standing water. Any linked habitat outside of the 2m zone needs to be tested against the relevant Local Site criteria for that habitat type.

1.13 ADMINISTRATION

The Local Sites Partnership will maintain records of sites, assessments and decisions which have been taken. Records will also be kept of sites which have been proposed for changes to the respective District Councils and the councils' responses.

West Yorkshire Ecology will hold these records and make them available upon request, within the constraints of the Data Protection Act and other policies agreed with the Local Sites Partnership.

West Yorkshire Ecology will maintain the definitive citations and boundary maps for all of the designated and proposed Local Wildlife Site.

West Yorkshire Ecology will maintain records of sites which have been assessed and rejected and sites which have been de-designated, together with a record of the reason.

This work will form part of the Service Level Agreements with the five District Councils.

Electronic data will be stored on the West Yorkshire Ecology computer system managed through West Yorkshire Joint Services. The information is stored on a Mapinfo Geographical Information System and Recorder 6 database.

The data may be released to third parties following the policies published on the West Yorkshire Ecology website (www.ecology.wyjs.org.uk). Any personal data, such as landownership information, covered by the Data Protection Act will be maintained separately from the ecological records.

West Yorkshire Ecology will continue to work closely with members of the Local Sites Partnership and District Council Planning Departments to enhance systems for the Local Wildlife Sites network

2 Habitat Selection Guidelines

2.1 GRASSLAND

The grassland habitat selection guidelines include meadows and pastures as well as a number of other grasslands with limited or no management. Some of these may be associated with post industrial sites.

Neutral grassland

Unimproved neutral grassland habitat underwent a major decline in the 20th century. It was estimated in 1994 that less than 15,000ha of species-rich neutral grassland remained within the UK (both upland and lowland). In England there is significantly less than 10,000ha of species rich neutral grassland. This habitat is now in small sites with a fragmented distribution throughout much of the UK.

Neutral grasslands support a high proportion of forbs (broad-leaved herbaceous species) relative to grasses. Characteristic species of this habitat, which are now scarce include pepper saxifrage (*Silaum silaus*), dyer's greenweed (*Genista tinctoria*), and adder's-tongue fern (*Ophioglossum vulgatum*). Commoner characteristic species include meadow crane's-bill (*Geranium pratense*), yellow rattle (*Rhinanthus minor*), pignut (*Conopodium majus*) and red clover (*Trifolium pratense*).

Semi-natural neutral grasslands occur in a range of circumstances in upland and lowland locations. Lowland neutral grasslands are covered by UK Habitat Action Plans for Lowland Meadows (includes pastures) and Coastal and Floodplain Grazing Marsh. In lowland areas species-rich neutral grasslands, as described in the Habitat Action Plan for Lowland Meadows, correspond to the NVC communities MG4 *Alopecurus pratensis-Sanguisorba officinalis*, MG5 *Cynosurus cristatus-Centaurea nigra* grasslands and MG8 *Cynosurus cristatus-Caltha palustris* grassland. MG4 is associated with seasonally flooded communities and is particularly rare in England and Wales covering less than 1500ha. The UK Biodiversity Action Plans for Upland Hay Meadows relates primarily to the MG3 Northern Hay Meadows community which contains wood cranesbill. This habitat is not thought to be present in West Yorkshire. Enclosed neutral grassland below the moorland line should all be considered "lowland" for the purposes of these criteria.

Other NVC communities also occur in unimproved neutral grasslands, extensively in some instances. They include stands of MG1 grassland and in wetter circumstances, stands of MG9, MG10, MG11, MG12 and MG13 grassland communities. MG7 and to a lesser extent MG6 are communities of agriculturally improved grassland and are, generally of less nature conservation interest from a botanical perspective. It should be noted that some stands of MG6 can be more species rich. These can be of more significance when they form part of a mosaic with MG5 communities.

In West Yorkshire neutral grassland occurs in all Natural Areas and administrative districts, however West Yorkshire Ecology estimate that in total species-rich neutral grassland is likely to be in the range of only 30-100ha. A useful breakdown of the

occurrence and estimated cover of species-rich neutral grassland by local planning authority boundaries is provided in Table 12 of the publication “A Biodiversity Audit of Yorkshire and the Humber” (Selman, Dodd and Bayes, 1999).

Acid grassland

Acid grasslands typically occur on nutrient-poor acid substrates situated on acidic rocks, sands or gravels. Acid grassland can also occur on wetter substrates such as peat that can mask the nature of the underlying rocks. These grasslands occur in a range of circumstances in upland and lowland locations and are often associated with other habitats such as upland and lowland heathland, parkland, flushes, blanket bogs and other mire types. They may also reflect topographic influences where steeper slopes result in leaching within the soil profile or reduced levels of agricultural improvement due to poor accessibility. In most circumstances, they are managed as grazing pasture whether in upland or lowland situations.

Acid grasslands are typically botanically species-poor. In the uplands they can form large expanses of uniform habitat, but in other circumstances where there are differences in rainfall, altitude, and hydrology a range of communities can develop.

In the UK Biodiversity Action Plan there is a Habitat Action Plan for Lowland Dry Acid Grassland. No specific plan has been produced for upland acid grasslands.

Lowland dry acid grassland occurs on free-draining acidic soils. Characteristic plant species include heath bedstraw (*Galium saxatile*), sheep's fescue (*Festuca ovina*), sheep's sorrel (*Rumex acetosella*), common bent grass (*Agrostis capillaris*), wavy hair-grass (*Deschampsia flexuosa*), tormentil (*Potentilla erecta*) and heather species at low abundance. In the UK there is estimated to be only 30,000ha of lowland dry acid grassland with only approximately 50 to 100ha in West Yorkshire. The most interesting areas lie to the east of the county over exposures of Coal Measures sandstone with thin sandy soils or in some cases associated with coal mining. These form fragments of an older unimproved landscape of acid grassland, heath and acid woodland which is now very rare in West Yorkshire.

Estimated coverage of upland acid grassland in the UK, is over 1,200,000ha. In the uplands acid grassland is often of low botanical interest and can develop as a result of management such as overgrazing and drainage of other habitats including dwarf-shrub heath. More species rich upland acid grasslands are rarer and of value in the context of inbye land on moorland edge. These upland grasslands can also be of value for breeding birds associated with the South Pennine Moors Special Protection Area (SPA).

National Vegetation Communities U4 (*Festuca ovina* – *Agrostis capillaris*- *Galium saxatile*) and U5 (*Nardus stricta* – *Galium saxatile*) are relatively widespread in the Pennine fringes. They are of more note in the Coal Measures Natural Area, where agricultural improvement has had a much greater impact. Of particular note are U1 (*Festuca ovina* – *Agrostis capillaries* – *Rumex acetosella*) and U2 (*Deschampsia flexuosa*) communities which are considered rare.

Calcareous grassland

Calcareous grassland occurs on shallow lime-rich soils, usually derived from limestone rocks. Lowland Calcareous Grassland is a UK BAP priority habitat. In West Yorkshire this is generally associated with the Magnesian Limestone Natural Area in the east of the county, although calcareous substrates on post industrial sites have also resulted in some additional areas of habitat. NVC communities CG3 (*Bromus erectus*), CG4 (*Brachypodium pinnatum*) and CG5 (*Bromus erectus* - *Brachypodium pinnatum*) are the most widely encountered, but CG2 (*Festuca ovina* – *Avenula pratensis*) may occur where close cropping by sheep or rabbits occurs.

West Yorkshire lies towards the northern limits of a number of calcicolous plants such as squinancywort (*Asperula cynanchica*) and pasque flower (*Pulsatilla vulgaris*).

The Magnesian Limestone laid down in the Permian period, outcrops from Sunderland south to Nottingham. It forms a narrow belt running either side of the A1 that is no more than 8km wide at any given point. In West Yorkshire, the Magnesian Limestone falls into the Southern Magnesian Limestone Natural Area and it occurs within the districts of Leeds and Wakefield.

It is estimated that only 33,000-41,000ha of lowland calcareous grassland occurs in the UK. There are only a few hundred hectares of calcareous grassland on Magnesian Limestone remaining within England¹². “*A Biodiversity Audit of Yorkshire and the Humber*” (Selman, Dodd and Bayes, 1999) provides an estimate for the calcareous grassland in West Yorkshire of <92ha. The 1997 ascribed NVC survey of Local Sites (SEGI and SSI only) augmented with SSSI NVC surveys of 1999 and 2000 contain 63ha of calcareous grassland. This scarce resource is generally fragmented and on relatively small sites. Much of the Magnesian Limestone ridge is intensively managed arable land. Remaining calcareous grassland has been pushed out to steeply sloping ground, quarries, railway track beds and road verges. A large area also still exists within the former munitions works, now an industrial estate at Thorpe Arch.

Calcareous grasslands often support a very rich flora with many locally and nationally rare species. Invertebrate faunas can also be very rich supporting a good number of nationally scarce species.

¹² Drewett, J. Magnesian Limestone Grassland and its Conservation. In: British Wildlife Volume 9, Number 4, April 1998

2.1.1 Selection Criteria and Attributes

Selection criteria and attributes for grassland Local Sites

CRITERION	ATTRIBUTE
Size or extent	Area of site or length of verge.
Typicalness	Presence of typical/characteristic species that represent good examples of the habitat type within the county, the relevant Natural Area or locality. This will be as defined by NVC community types where data is available. Presence of habitats or species that are characteristic, distinctive or unique to the county, Natural Area or locality.
Diversity	Number of grassland plant species recorded as a total and presence of characteristic grassland species.
Rare or exceptional feature	Presence of nationally rare or declining plant species. Presence of regionally important species. Presence of locally rare or declining plant species. Presence of vegetation communities that are rare or of restricted distribution.
Naturalness	Presence, cover & variety of semi-natural grassland communities and species that correspond to long established grassland habitat.
Connectivity within the landscape	Location or proximity of site in relation to other recognised sites of interest either as similar habitat or habitat mosaic. The site is part of a recognised wildlife corridor.

The species referred to above are included within the species list associated with each grassland type i.e. calcareous, unimproved and semi-improved neutral and acid. Nationally rare, declining or scarce plant species are included in the lists where appropriate and they are also the subject of separate selection guidelines for rare plants.

Where the use of species is specified as a measurable attribute, reference should be made to the species list for each of calcareous, acid and neutral grassland and to the nationally important species lists produced by JNCC (www.jncc.gov.uk). The status of species within the lists for different grassland habitats, are either regionally important species, locally rare, scarce or declining or locally distinctive species based on current available data.

2.1.2 General application to all grassland guidelines

The following guidelines are applicable to grassland communities with semi-natural characteristics on a variety of natural and non-natural substrates. Recently sown 'wildflower meadows' (i.e. sown within the last 15 years) are not eligible for consideration

under these guidelines. Grassland communities occurring on road verges, disused quarries, disused railway cuttings are all included here. Seasonally flooded grasslands of the MG4 NVC community are included in this section, whereas marshy grassland as defined in the Phase 1 Habitat survey methodology can be included under neutral grassland or the fen, lowland acid mires, springs & flushes guidelines.

The species listed in Tables 1, 2 and 3 not in bold type score 1 point, whilst those in bold type, which are rare or uncommon, score 2 points. The species included in the tables are representative of species characteristic of agriculturally unimproved, species-rich grassland swards. Examination of the NVC communities and experience of past habitat and vegetation surveys indicates these species are largely restricted to good examples of the semi-natural grassland communities in West Yorkshire. Commonly occurring species such as false oat-grass (*Arrhenatherum elatius*), Yorkshire Fog (*Holcus lanatus*) and cock's-foot (*Dactylis glomerata*) are not included in the lists as they can occur in improved and relatively species-poor grassland communities and do not impart a sense of quality.

The selection of a grassland Local Site using the species lists in the tables should ensure the species recorded exhibit a reasonable distribution throughout the sward across a significant proportion of the site. If the species recorded from the lists, excluding those in bold type, are present but in low numbers or restricted to small patches within the sward or to the edges of the site then the site will not normally be eligible for Local Site selection.

2.1.3 Grassland Selection Guidelines

Grassland sites will be eligible for selection as a Local Site if they meet any of the following guidelines.

Guideline

Gr1 Areas of semi-natural neutral and calcareous grasslands of at least 0.1 ha in size, or a road verge of at least 50m in length (area unquantified), that support stands of one or more of the following NVC community types:

- | | |
|------------|--|
| MG4 | <i>Alopecurus pratensis - Sanguisorba officinalis</i> |
| MG5 | <i>Cynosurus cristatus - Centaurea nigra</i> |
| MG8 | <i>Cynosurus cristatus - Caltha palustris</i> |
| CG2 | <i>Festuca ovina - Avenula pratensis</i> |
| CG3 | <i>Bromus erectus</i> |
| CG4 | <i>Brachypodium pinnatum</i> |
| CG5 | <i>Bromus erectus - Brachypodium pinnatum</i> |

Application

This guideline will be applied to areas of long established semi-natural grassland that have been identified as supporting the NVC communities listed above. A competent surveyor should base classification of the community on field assessment.

Rationale

These grassland communities represent some of the rarest and most endangered grassland types in the UK and West Yorkshire. The presence of these communities also indicates the grassland has not been improved through intensive agricultural management. As a consequence these grasslands support a good diversity of flowering plants, some of which are restricted to these habitats. Many of these grassland communities are now restricted to small areas but often continue to support rare or localised species.

Guideline

Gr2 Areas of long-established semi-natural neutral to calcareous grassland of at least 0.25 ha in size, or a road verge at least 50m in length, scoring 10 or more from the neutral grassland plant species listed in Table 1 or the calcareous grassland species listed in Table 2 within the Southern Magnesian Limestone Natural Area.

Application

This guideline is applicable to dry and wet neutral to calcareous grassland communities within the Southern Magnesian Limestone Natural Area. This guideline should be applied to long-established grasslands only. Grasslands of known recently sown origin (<15 years old) are not eligible under this guideline. The grassland community may support a wide range of NVC types, but collectively overall species recorded must score 10 or more from either Table 1 or 2.

Rationale

Long-established species-rich semi-natural grasslands have declined considerably throughout the UK and West Yorkshire over the last 50 years. Further losses will diminish the nature conservation resource within West Yorkshire and once lost these habitats are difficult to replace.

Vegetation stands, such as roadside verges, that are not within agricultural units have often been colonised from such grasslands in the locality, when these communities were much more widespread in the agricultural environment and may represent a significant part of the surviving more diverse grassland.

The calcareous influence of underlying geology can be partially masked by leaching within the soil profile. This can lead to gradation between calcareous and neutral grassland types. This does not diminish the value of the grassland.

Guideline

Gr3 Areas of long-established semi-natural ¹³neutral to calcareous grassland of at least 0.25 ha in size, or a road verge at least 50m in length, which lie outside of the Southern Magnesian Limestone Natural Area, scoring 8 or more from the combined neutral and calcareous grassland plant species listed in Table 1 and Table 2.

Application

This guideline will only be applied to semi-natural neutral and calcareous grasslands outside of the Southern Magnesian Limestone Natural Area, where species diversity is typically more restricted.

Rationale

Owing to widespread agricultural intensification in these Natural Areas, there are few remnants of species-rich semi-natural neutral and calcareous grasslands. To ensure the full variety of biodiversity and habitat types is maintained throughout all Natural Areas in West Yorkshire the lower threshold of 8 species has been selected to ensure that good examples of long-established semi-natural grassland in these Natural Areas are included in the Local Site list. Calcareous influence outside of the Southern Magnesian Limestone Natural Area is most likely to occur on post industrial sites where imported limestone hardcore, concrete, cement or lime mortar has influenced pH. Some of these sites have established important grassland communities.

Guideline

Gr4 a) Areas of lowland acid to ¹⁴neutral grassland typically below 250m of at least 0.25ha in size, or a road verge at least 50m in length, that score 8 or more from the combined acid and neutral grassland plant species lists in Table 1 and Table 3.

or

b) Areas of enclosed upland acid grassland typically above 250m, but below the moorland line, of at least 0.5ha in size, which score 12 or more from the combined acid and neutral grassland plant species lists in Table 1 and Table 3 and have less than 25% heath cover.

Application

This guideline is applicable to dry and wet acid grassland communities in lowland areas and enclosed areas below the moorland line. These communities may occur in combination with lowland heathland and mire habitats and typically supports NVC community types U1 & U2. The upland acid grassland guideline is applicable to communities that typically support U4 & U5.

Rationale

¹³ Amended 21/01/2016

¹⁴ Amended 21/01/2016

Lowland acid grassland is a rare habitat in West Yorkshire being restricted to between 50ha and 100ha in total. Species rich acid grassland typically above 250m is a scarce habitat in West Yorkshire as agricultural “improvement” from application of lime and fertilizer leads towards more species poor, neutral grassland.

Guideline

Gr5 Areas of semi-natural grassland, which adjoin or lie within 500 metres of an existing grassland management unit of a Local Site or Site of Special Scientific Interest with grassland interest which meets the criteria in Gr1 to Gr4 above and have a score or size within 20% of the thresholds listed in the other Gr Guidelines.

Application

This guideline can be applied to any grassland site that does not meet any of the thresholds in the above guidelines but is of reasonable quality and which is within close proximity to an existing grassland which does fully meet at least one of the other Gr Guidelines.

Rationale

The role and importance of linear continuous habitats and blocks of habitat that act as stepping stones or patches of habitat has been well studied in relation to population dynamics and rates of extinction, immigration and emigration of individuals of species from one habitat patch to another. As a consequence, the importance of linear habitats in the countryside and urban areas is recognised in planning policy guidance and the EU Habitats Directive. This guideline enables groupings of grassland of similar quality to be included in a Local Site where some components of the group individually do not quite meet the thresholds for Local Site selection.

Table 1: Plant species of semi-natural neutral grassland

<u>Scientific name</u>	<u>Common name</u>
<i>Achillea ptarmica</i>	sneezewort
<i>Agrimonia eupatoria</i>	agrimony
<i>Agrimonia procera</i>	fragrant agrimony
<i>Agrostis canina</i>	velvet bent
<i>Alchemilla xanthochlora</i>	pale lady's-mantle
<i>Alchemilla vulgaris</i>	lady's-mantle
<i>Alchemilla glabra</i>	smooth lady's-mantle
<i>Alchemilla filicaulis ssp. vestita</i>	hairy lady's-mantle
Allium oleraceum	field garlic
Allium scorodprasum	sand leek
<i>Ajuga reptans</i>	bugle
<i>Anemone nemorosa</i> ¹⁵	wood anemone
<i>Anthoxanthum odoratum</i>	sweet vernal-grass
Botrychium lunaria	moonwort
<i>Briza media</i>	quaking grass

¹⁵ Added 24/07/2015

<i>Bromus commutatus</i>	meadow brome
<i>Caltha palustris</i>	marsh marigold
<i>Campanula rotundifolia</i>	harebell
<i>Cardamine pratensis</i>	lady's smock
<i>Carex caryophylla</i>	spring-sedge
Carex dioica	dioecious sedge
Carex disticha	brown sedge
<i>Carex flacca</i>	glaucous sedge
Carex hostiana	tawny sedge
<i>Carex laevigata</i> ¹⁶	smooth-stalked sedge
<i>Carex nigra</i>	common sedge
<i>Carex otrubae</i>	false fox-sedge
<i>Carex ovalis</i>	oval sedge
Carex pallescens	pale sedge
<i>Carex panicea</i>	carnation sedge
Carex pulicaris	flea sedge
<i>Carex spicata</i>	spiked sedge
<i>Carex viridula</i>	yellow sedge
<i>Carex viridula oedocarpa</i>	common yellow-sedge
<i>Centaurea nigra</i>	black knapweed
<i>Centaurium erythraea</i>	common centaury
Cirsium heterophyllum	melancholy thistle
Coeloglossum viride	frog orchid
<i>Conopodium majus</i>	pignut
<i>Dactylorhiza fuchsii</i>	common spotted orchid
Dactylorhiza x grandis	hybrid spotted orchid
<i>Dactylorhiza praetermissa</i>	southern marsh-orchid
<i>Danthonia decumbens</i>	heath grass
Euphrasia agg. ¹⁷	eyebright species
<i>Festuca pratensis</i>	meadow fescue
<i>Filipendula ulmaria</i>	Meadowsweet
<i>Galium palustre</i>	common marsh bedstraw
<i>Galium verum</i>	lady's-bedstraw
Galium uliginosum	fen bedstraw
Genista tinctoria	dyer's greenweed
<i>Geranium pratense</i>	meadow cranesbill
Geranium sylvaticum	wood cranesbill
Helictotrichon pratense	meadow oat-grass
<i>Helictotrichon pubescens</i>	Downy oat-grass
Hordeum secalinum	meadow barley
<i>Hyacinthoides non-scripta</i> ¹⁸	bluebell
<i>Hypericum tetrapterum</i>	square-stalked St John's-wort
Isolepis setacea	bristle club-rush
<i>Juncus acutiflorus</i>	sharp-flowered rush
Juncus subnodulosus	blunt-flowered rush
<i>Knautia arvensis</i>	field scabious
<i>Lathyrus linifolius</i>	bitter vetchling
<i>Lathyrus pratensis</i>	meadow vetchling
<i>Leontodon hispidus</i>	rough hawkbit
Leontodon saxatilis	lesser hawkbit

¹⁶ Added 12/12/2019

¹⁷ Amended 21/01/2016

¹⁸ Added 24/07/2015

<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Linum catharticum</i>	fairy flax
<i>Listera ovata</i>	common twayblade
<i>Lotus corniculatus</i>	bird's-foot trefoil
<i>Lotus pedunculatus</i>	greater birds-foot-trefoil
<i>Lychnis flos-cuculi</i>	ragged robin
<i>Odontites vernus</i>	red bartsia
<i>Ononis repens</i>	common restharrow
<i>Ophioglossum vulgatum</i>	adder's-tongue fern
<i>Ophrys apifera</i>	bee orchid
<i>Dactylorhiza incarnata</i>	early marsh-orchid
<i>Dactylorhiza maculata</i>	heath spotted-orchid
<i>Dactylorhiza purpurella</i>	northern marsh-orchid
<i>Dactylorhiza x venusta</i>	hybrid c.s. x n.marsh orchid
<i>Orchis morio</i>	green-winged orchid
<i>Pedicularis palustris</i>	marsh lousewort
<i>Pedicularis sylvatica</i>	lousewort
<i>Persicaria bistorta</i>	common bistort
<i>Pimpinella saxifraga</i>	burnet-saxifrage
<i>Polygala vulgaris</i>	common milkwort
<i>Potentilla erecta</i>	tormentil
<i>Primula veris</i>	cowslip
<i>Pulicaria dysenterica</i> ¹⁹	common fleabane
<i>Ranunculus bulbosus</i>	bulbous buttercup
<i>Ranunculus flammula</i>	lesser spearwort
<i>Rhinanthus minor</i>	yellow rattle
<i>Sanguisorba minor</i>	salad burnet
<i>Sanguisorba officinalis</i>	great burnet
<i>Silaum silaus</i>	pepper saxifrage
<i>Stachys officinalis</i>	betony
<i>Stellaria graminea</i>	lesser stitchwort
<i>Stellaria uliginosa</i>	bog stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Thalictrum flavum</i>	common meadow rue
<i>Trifolium medium</i>	zigzag clover
<i>Triglochin palustris</i>	marsh arrow grass
<i>Trisetum flavescens</i>	yellow oat-grass
<i>Trollius europaeus</i>	globeflower
<i>Valeriana dioica</i>	marsh valerian
<i>Valeriana officinalis</i>	common valerian
<i>Viola hirta</i>	hairy violet
<i>Viola lutea</i>	mountain pansy
<i>Viola odorata</i>	sweet violet

Table 2: Plant species of semi-natural calcareous grassland

<u>Scientific name</u>	<u>Common name</u>
<i>Agrimonia eupatoria</i>	agrimony
<i>Allium scorodprasum</i>	sand leek
<i>Anacamptis pyramidalis</i>	pyramidal orchid
<i>Anthyllis vulneraria</i>	kidney vetch

¹⁹ Amended 21/01/2016

<i>Aphanes arvensis</i>	parsley-piert
<i>Arabis hirsuta</i>	hairy rock-cress
<i>Astragalus danicus</i>	purple milk-vetch
<i>Astragalus glycyphyllos</i> ²⁰	wild liquorice
<i>Blackstonia perfoliata</i>	yellow-wort
<i>Brachypodium pinnatum</i>	tor-grass
<i>Briza media</i>	quaking grass
<i>Bromopsis erecta</i>	upright brome
<i>Campanula glomerata</i>	clustered bellflower
<i>Carduus nutans</i>	musk thistle
<i>Carex caryophyllea</i>	spring-sedge
<i>Carex flacca</i>	glaucous sedge
<i>Carex laevigata</i> ²¹	smooth-stalked sedge
<i>Carex panacea</i>	carnation sedge
<i>Carex spicata</i> ²²	spike sedge
<i>Carlina vulgaris</i>	carline thistle
<i>Centaurea nigra</i>	common knapweed
<i>Centaurea scabiosa</i>	greater knapweed
<i>Centaureum erythraea</i>	common centaury
<i>Cirsium eriophorum</i> ²³	woolly thistle
<i>Clinopodium vulgare</i>	wild basil
<i>Coeloglossum viride</i>	frog orchid
<i>Dactylorhiza fuchsii</i>	common spotted orchid
<i>Dactylorhiza x grandis</i>	hybrid spotted-orchid
<i>Daucus carota</i>	wild carrot
<i>Erigeron acer</i>	blue fleabane
<i>Euphrasia agg.</i> ²⁴	eyebright species
<i>Festuca ovina</i> ²⁵	sheep's-fescue
<i>Filipendula vulgaris</i>	dropwort
<i>Fragaria vesca</i> ²⁶	wild strawberry
<i>Galium verum</i>	lady's-bedstraw
<i>Genista tinctoria</i>	dyer's greenweed
<i>Gentianella amarella</i>	autumn gentian
<i>Gymnadenia conopsea</i>	fragrant orchid
<i>Helianthemum nummularium</i>	common rock-rose
<i>Helictotrichon pratense</i>	meadow oat-grass
<i>Helictotrichon pubescens</i>	downy oat-grass
<i>Knautia arvensis</i>	field scabious
<i>Inula conyzae</i> ²⁷	Ploughman's-spikenard
<i>Koeleria micrantha</i>	crested hair-grass
<i>Leontodon hispidus</i>	rough hawkbit
<i>Leontodon saxatilis</i>	lesser hawkbit
<i>Leucanthemum vulgare</i>	ox-eye daisy
<i>Linum catharticum</i>	fairy flax
<i>Listera ovata</i>	common twayblade

²⁰ Added 13/12/2018

²¹ Added 12/12/2019

²² Added 12/12/2019

²³ Added 21/01/2016

²⁴ Amended 21/01/2016

²⁵ Added 21/01/2016

²⁶ Added 21/01/2016

²⁷ Added 13/12/2018

<i>Lithospermum officinale</i> ²⁸	common gromwell
<i>Lotus corniculatus</i>	bird's-foot trefoil
<i>Odontites vernus</i>	red bartsia
<i>Ononis repens</i>	common restharrow
<i>Ononis spinosa</i>	spiny restharrow
<i>Ophioglossum vulgatum</i>	adder's-tongue fern
<i>Ophrys apifera</i>	bee orchid
<i>Ophrys insectifera</i>	fly orchid
<i>Origanum vulgare</i>	wild marjoram
<i>Parnassia palustris</i>	grass-of-Parnassus
<i>Phleum bertolonii</i>	smaller cat's-tail
<i>Pilosella officinarum</i> ²⁹	mouse-ear hawkweed
<i>Pimpinella saxifrage</i>	burnet-saxifrage
<i>Plantago media</i>	hoary plantain
<i>Platanthera chlorantha</i>	greater butterfly-orchid
<i>Polygala vulgaris</i>	common milkwort
<i>Primula veris</i>	cowslip
<i>Ranunculus bulbosus</i>	bulbous buttercup
<i>Rhinanthus minor</i>	Yellow rattle
<i>Sanguisorba minor</i>	salad burnet
<i>Scabiosa columbaria</i>	Small scabious
<i>Spiranthes spiralis</i>	autumn lady's-tresses
<i>Stachys officinalis</i>	betony
<i>Thalictrum flavum</i> ³⁰	meadow-rue
<i>Thalictrum minus</i> ³¹	lesser meadow-rue
<i>Thymus polytrichus</i>	wild thyme
<i>Trifolium medium</i>	zigzag clover
<i>Trisetum flavescens</i>	yellow oat-grass

Table 3: Plant species of semi-natural acid grassland

Species	English Name
<i>Achillea ptarmica</i>	sneezewort
<i>Agrimonia procera</i>	fragrant agrimony
<i>Agrostis canina</i>	velvet bent
<i>Aira caryophyllea</i>	silvery hair-grass
<i>Aira praecox</i>	early hair-grass
<i>Alchemilla filicaulis</i> ssp. <i>vestita</i>	hairy lady's-mantle
<i>Alchemilla glabra</i>	smooth lady's-mantle
<i>Alchemilla xanthochlora</i>	pale lady's-mantle
<i>Anthoxanthum odoratum</i>	sweet vernal-grass
<i>Botrychium lunaria</i>	moonwort
<i>Calluna vulgaris</i>	heather
<i>Campanula rotundifolia</i>	harebell
<i>Carex binervis</i>	green-ribbed sedge
<i>Carex laevigata</i> ³²	smooth-stalked sedge

²⁸ Added 21/01/2016

²⁹ Added 21/01/2016

³⁰ Added 13/12/2018

³¹ Added 13/12/2018

³² Added 12/12/2019

<i>Carex nigra</i>	common sedge
<i>Carex ovalis</i>	oval sedge
<i>Carex pilulifera</i>	pill sedge
<i>Carex spicata</i> ³³	spike sedge
<i>Cerastium arvense</i>	field mouse-ear
<i>Conopodium majus</i>	pignut
<i>Dactylorhiza fuchsii</i>	common spotted-orchid
<i>Dactylorhiza maculata</i> ³⁴	heath spotted-orchid
<i>Danthonia decumbens</i>	heath grass
<i>Deschampsia flexuosa</i>	wavy hair-grass
<i>Empetrum nigrum</i>	crowberry
<i>Erica cinerea</i>	bell heather
<i>Erica tetralix</i>	cross-leaved heath
<i>Euphrasia</i> agg. ³⁵	eyebrights
<i>Festuca ovina</i>	sheep's fescue
<i>Filago minima</i>	small cudweed
<i>Galium saxatile</i>	heath bedstraw
<i>Genista tinctoria</i>	dyer's greenweed
<i>Gnaphalium sylvaticum</i>	heath cudweed
<i>Hypericum pulchrum</i>	slender St. John's wort
<i>Jasione montana</i> ³⁶	sheep's bit
<i>Juncus squarrosus</i>	heath rush
<i>Lathyrus linifolius</i>	bitter-vetch
<i>Linum catharticum</i> ³⁷	fairy flax
<i>Lotus corniculatus</i>	common bird's-foot-trefoil
<i>Luzula campestris</i>	field wood-rush
<i>Luzula multiflora</i>	heath wood-rush
<i>Molinia caerulea</i>	purple moor-grass
<i>Myosotis ramosissima</i>	early forget-me-not
<i>Myosotis discolor</i>	changing forget-me-not
<i>Myosotis secunda</i>	creeping forget-me-not
<i>Myosotis stolonifera</i>	pale forget-me-not
<i>Nardus stricta</i>	mat-grass
Orchidaceae	any orchid species
<i>Ornithopus perpusillus</i>	bird's-foot
<i>Pedicularis palustillus</i>	marsh lousewort
<i>Pedicularis sylvatica</i>	lousewort
<i>Pilosella officinarum</i>	mouse-ear hawkweed
<i>Polygala serpyllifolia</i>	heath milkwort
<i>Polygonum bistorta</i> ³⁸	common bistort
<i>Potentilla anglica</i>	trailing tormentil
<i>Potentilla erecta</i>	tormentil
<i>Rumex acetosella</i>	sheep's sorrel
<i>Stachys officinalis</i>	betony
<i>Stellaria graminea</i>	lesser stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Thymus polytrichus</i>	wild thyme
<i>Trichophorum cespitosum</i>	deergass
<i>Vaccinium myrtillus</i>	bilberry

³³ Added 12/12/2019

³⁴ Added 24/07/2015

³⁵ Amended 21/01/2016

³⁶ Added 15/09/2016

³⁷ Added 24/07/2015

³⁸ Added 24/07/2015

<i>Veronica officinalis</i> ³⁹	heath speedwell
<i>Vulpia bromoides</i>	squirreltail fescue

2.2 WOODLAND, SCRUB AND HEDGEROWS

Woodlands under this section includes both ancient semi-natural woodland (ASNW) and plantation ancient woodland sites (PAWS), which may have non-native tree canopies, and woodland sites of more recent origin with semi-natural characteristics. Hedgerows, Wood Pasture and Parkland, and Traditional Orchards UK Biodiversity Action Plan Priority Habitats are also included in this section, as well as some uncommon scrub communities.

Ancient Woodland

Ancient woods are those which have had a continuous woodland cover since at least 1600 AD and have only been cleared for underwood or timber production.

The great majority are believed to be primary, that is they are surviving fragments of primeval forest, the climax vegetation type of much of this country. In some instances woodlands have developed on land which may have been open ground or farmland before 1600 AD. These are termed ancient secondary woodlands and are difficult to separate from primary woodlands. Both are referred to as “ancient woodland” in the West Yorkshire Inventory of Ancient Woodland (provisional)(Nature Conservancy Council 1988). Ancient woodlands have had a long time to acquire species and form rich communities of plants and animals. Their soils are also important having remained largely undisturbed for centuries.

All primary woodlands are ancient, whereas secondary woodlands may be ancient or recent. Ancient woodlands generally have richer, more characteristic flora and fauna, greater vegetation structure and age class diversity and in general a high nature conservation value. It is now widely recognised that ancient woodlands support a suite of species, which are confined to older sites.

The term semi-natural woodland refers to woodland comprised of species native to the locality that have not obviously been planted. Ancient and semi-natural woodland is not necessarily the same thing. Ancient refers to the site as woodland over time, whereas semi-natural refers to what is growing on the site.

The majority of woodland that existed in 1800 AD are believed to have been primary woodland, but new woodland planting was becoming increasingly common place during the 18th century.

The most definitive data on the county's ancient woodland resource is the provisional Ancient Woodland Inventory (AWI). Sites of less than 2 ha are deliberately excluded from the Inventory and as a consequence some small stands of ancient woodland are omitted. The AWI also only provides basic data and does not give any indication of the relative

³⁹ Added 24/07/2015

conservation value of individual woods. The AWI data indicates that in 1988 approximately 3414 ha (1.69% of the total land area of West Yorkshire) was ancient woodland, comprising 1803 ha (0.89%) semi-natural and 1611 ha (0.80%) plantation ancient woodland.

The majority of ancient woodland within West Yorkshire is to be found on steep valley sides. Connectivity between such woodlands in Calderdale, Kirklees, Bradford and the south-west of Wakefield remains reasonable. Urbanisation poses the main threat. There are also significant blocks in the east Leeds area, where agriculture has been a more significant influence with woodland blocks frequently separated by arable cultivation. In central and eastern Wakefield and central Leeds ancient woodland has suffered a combination of both of the above threats as well as extensive coal mining, which has left only small isolated areas of relict woodland.

The West Yorkshire Inventory of Ancient Woodland (1988) recognised that the impact of replanting on ancient woodland sites was more pronounced on larger sites than on the smaller size classes. For woodland under 5ha, 23% of the woodland by area had been replanted, compared with 59% by area for sites over 50ha. In the latter this affected 7 out of the 8 sites in this size class. The impact of replanting varies depending on the species used, their distribution and techniques used for clearing and planting. Extensive stands of pure conifer tend to be rare, with mixed woodland being favoured. Species used include larch, spruce and pine, with beech, sycamore and native oaks forming the broad-leaved component. Replanting may be restricted in extent within woodland, with margins left relatively undisturbed or planted with broad-leaved species. Shrub layers can be suppressed or removed by forestry activity and over-mature and veteran trees are uncommon or rare. Health and safety concerns associated with increased recreational objectives for urban and urban fringe woodland place an increased pressure on such older trees, which tend to be of higher biodiversity value for a range of species including bats, birds, lower plants and invertebrates. Woodland management has declined in recent decades, which has led to less structural diversity within woodlands and an impact on species distribution within woodlands resulting from increased levels of shade.

Woodland and scrub communities

The UK Biodiversity Action Plan includes priority Habitat Action Plans which have been updated in June 2007. Those which are relevant to West Yorkshire are “Lowland Mixed Deciduous Woodland”, “Upland Oakwood”, “Wet Woodland” and “Wood Pasture and Parkland”. “Lowland Beech and Yew Woodland” will only be relevant where beech woodland has acquired high nature conservation value. This will be linked with the flora and fauna associated with the woodland structure (eg saproxylic invertebrates or fungi) or species associated with higher quality beech woods such as bird’s nest orchid (*Noettia nidus-avis*). “Upland Ash Woodland” in this context are not clearly associated with altitude and specifically include yew woodland on the Magnesian Limestone W13, but can also include woodland stands where communities predominantly fall into NVC communities W8d-g and W9. W8a-c and sometimes W8d are generally considered under Lowland Mixed Deciduous Woodland.

Lowland Mixed Deciduous Woodland

This is the dominant woodland type within most of West Yorkshire and includes most ancient woodland and semi-natural plantation woodlands. On lime-rich soils which tend to be associated with the Magnesian Limestone Natural Area the dominant NVC communities are W8a-d (*Fraxinus excelsior* - *Acer campestre* - *Mercurialis perennis* woodland). The dominant canopy species in these woodlands are ash and wych elm sometimes replaced by introduced sycamore. In West Yorkshire these woodlands are towards the north edge of the range of a number of species including field maple, spindle, buckthorn, dogwood and wild privet. The ground flora tends to be very diverse with typical species such as dog's mercury, bluebell, false brome, early dog violet and enchanters nightshade. Notable species include green hellebore, broad-leaved helleborine, green-flowered helleborine and greater butterfly orchid. Good examples include Fryston Park and Barwick and Becca Banks.

On shales and sandstones of the Coal Measures and other sites masked by glacial drift the soil conditions are more acidic leading to woodland dominated by pedunculate oak of NVC communities W10a-d (*Quercus robur* - *Pteridium aquilinum* - *Rubus fruticosus* woodland). Silver birch, sessile oak, hybrid oaks and sycamore are common canopy trees, with holly becoming more frequent in the shrub layer alongside hazel and hawthorn. The field layer can be quite variable but the most dominant species tend to be bluebell, wood anemone, dog violet, greater stitchwort, bramble, honeysuckle and ramson. Good examples can be seen at Saw Wood, Hirst Wood and Elland Park Wood.

Reference should be made to the UK BAP Habitat descriptions for Upland Oakwood, Upland Mixed Ashwoods, Lowland Beech and Yew Woodland and Wet Woodland before using the term Lowland Mixed Deciduous Woodland, as there is a continuum between these habitat types, with the latter tending to be more loosely defined.

Upland Oakwood

This habitat is more associated with thin sandy soils in the uplands on the Millstone Grit. There is a tendency for pedunculate oak to be replaced by sessile oak and the range of species within the ground flora to include more wood sorrel, wavy hair-grass, hard fern, bracken, common cow-wheat and wood sage. Other species associated with acid grassland and upland heath such as heather, bilberry, tormentil, heath bedstraw and common bent enter the ground flora.

Although not defined within the UK BAP Habitat the NVC communities associated with Upland Oakwood in West Yorkshire are W16 (*Quercus* spp - *Betula* spp – *Deschampsia flexuosa* woodland), W10e (*Quercus robur* - *Pteridium aquilinum* – *Rubus fruticosus*, *Acer pseudoplatanus* - *Oxalis acetosella* sub-community woodland) and in limited circumstances where rainfall is very high (>1000mm per annum) W11 (*Quercus petraea* - *Betula pubescens* - *Oxalis acetosella*).

Typical woodland of this type would include Hardcastle Crag and Broadhead Clough.

Lowland Beech and Yew Woodland

This UK BAP Habitat has a predominantly southerly distribution as beech is not considered likely to have reached West Yorkshire before its spread was halted by

woodland clearance. This has not prevent the tree being extensively planted, and in some instances, such as the beech avenue in Bramham Park, this was undertake several centuries ago, resulting in very sizable over-mature specimens. The UK BAP includes “long established beech woods outside of the native range, where they have acquired high nature conservation value”. In West Yorkshire we have interpreted this to include example where other typical beechwood specialist species are present, such as bird’s nest orchid; where the beech has been planted on an ancient woodland site; and where the structure of the woodland is known to be providing important niches for other specialist flora and fauna such as saproxylic invertbrates.

Upland Mixed Ashwoods

“Upland” in the context of this UK BAP Habitat does not equate to altitude alone. The term is relatively poorly defined in the UK BAP by reference to sites with a more northerly distribution. The Lowland Beech and Yew Woodland Habitat definition specifically states that “yew on the Magnesian Limestone is considered under the Upland Mixed Ashwoods plan, which implies to a degree that the Magnesian Limestone might be considered “upland” in this context! With the specific exception of W13 (*Taxus baccata* woodland) on the Magnesian Limestone, these guidelines consider that all other W8 and W9 woodlands will fall within the Lowland Mixed Deciduous Woodland UK BAP Habitat. W13 habitat is likely to be extremely rare within West Yorkshire, but may form a small component of a larger woodland.

Wet woodlands

The UK Habitat Action Plan describes wet woodland as including NVC community types W1 to W7. These woodlands are found on poorly drained and/or seasonally wet soils with alder, willow and birch species dominating the woodland canopy and understory.

Junctions between sandstone and shale produce ground water seepages and flushes, often accentuated by glacial drift on lower valley sides, which typically result in W7 (*Alnus glutinosa* - *Fraxinus excelsior* - *Lysimachia nemorum*) woodland. The combination of moisture, some lime and moderate nutrient-enrichment can result in an attractive ground flora including meadow sweet, yellow pimpernel, bugle, opposite-leaved golden saxifrage wild angelica and marsh marigold. Example of this can be seen at Middleton Woods, Colden Clough and Lepton Great Wood.

On more nutrient rich soils associated with washed down silt the ground flora becomes dominated by stinging nettle and cleavers and falls within the W6 community (*Alnus* – *Urtica* woodland). Common alder dominates the canopy but crack willow (*Salix fragilis*) can be locally prominent. Other species which creep into the ground flora include common reed, reed canary grass, yellow iris and bittersweet. This type of woodland is often associated with silted up margins of standing water bodies such as at Nostell Priory and Newmillerdam.

Another wet woodland type, only found occasionally is W5 (*Alnus* - *Carex paniculata* woodland). Typically found in very swampy conditions, such as at Adel Dam, with common alder growing between greater tussock sedge and scattered fen species on silt

and peaty substrate. Wood club-rush a regional rarity is found associated with this habitat.

Another locally uncommon habitat is the W4 (*Betula - Molinia* woodland) associated with acid bog peat rather than fen peat. Downy birch is generally the leading colonist sometimes with common willow and occasionally rowan. As well as purple moor-grass the ground flora may also include species such as sphagnum mosses, common sedge and brown bent. Where there is a little movement within the water the ground flora can become richer with species such as marsh pennywort, marsh violet, marsh thistle, greater bird's-foot trefoil, devil's-bit scabious and wild angelica.

Scrub

Scrub communities are a natural component of many habitat types often where past management has lapsed or been reduced. In some circumstances such as high altitude, scrub can be the climax vegetation community. Scrub can be seen as a threat and in some circumstances does need to be controlled in order to protect grassland, heathland or wetland communities. Scrub can be of significant nature conservation value in its own right, for example, species-rich scrub on limestone soils. Depending on the stage of development of scrub it can form dense single-species stands or scattered open stands. The presence of scrub in a grassland, heathland or wetland provides valuable structural variation for a range of animals that would not otherwise occur on a site. This is particularly the case in relation to breeding birds and invertebrate fauna. Establishing a balance between open habitats and scrub can be important in maintaining the ecological interest of a site.

Rare scrub communities are included in these guidelines, but other types of scrub community are included under the guidelines relating to habitat mosaics. In addition, scrub is recognised as being an important component of grassland, heathland and wetland communities and as such the guidance on determining boundaries of Local Wildlife Sites allows for the inclusion of stands of scrub associated with these habitat types.

Bog myrtle (*Myrica gale*) has historically been recorded in Howarth parish (Bolton 1775) and Huddersfield, SE11 (FH Perring and SM Walters (1962)) but is currently considered to be extinct (JC Lavin and GTD Wilmore (1994)). The species is generally associated with wet heaths and mires. Any example of this scrub community within its natural range would be considered important.

Eared willow (*Salix aurita*) stands are found in Calderdale associated with damp upland woodland cloughs and heathy rocky zones on acidic soils. However, we have insufficient data to determine whether this is a 'County rare' vegetation type. Consequently it is recognised as a significant component of mixed habitats. Similar significance is afforded to aspen (*Populus tremula*) stands and species-rich woodland/scrub edge vegetation (sometimes referred to using the continental term *saum*).

Of more clear-cut importance are naturally-occurring thickets and pioneer woodland communities of exposed riverine sediments. These are characterised by native willows, with *Salix purpurea* apparently being frequent, as opposed to the widely planted or

naturalised *S. fragilis* and *S. viminalis*. These communities are specifically associated with sand, gravel and shingle deposits on meander bends, shoals and islands in actively eroding and depositing rivers such as the River `Wharfe. There is usually a distinct woodland component to the herb layer flora including, for example, *Allium* species, yellow star-of-Bethlehem (*Gagea lutea*) and giant bellflower (*Campanula latifolia*). From the limited data available, such habitats are of high entomological interest (e.g. Crossley, 2000) and may also be important for otter and various wet woodland birds. Riparian woodlands more extensively dominated by canopy trees should be assessed using the woodland guidelines.

Species-rich thorn scrub is also rare in West Yorkshire with a small number of examples known from the Magnesian Limestone Natural Area and calcareous alluvial substrates. Such communities are characterised by the occurrence of various calcicole shrubs, small trees and climbers alongside more ubiquitous scrub dominants and equate to a northern version of the *Viburnum lanata* subcommunity of hawthorn scrub described in the NVC as W21d. Although invasive in a few places, burnet rose (*Rosa spinosissima*) underscrub is a rare component of species-rich scrub on the Magnesian Limestone.

Hedgerows

No comprehensive surveys of the hedgerows of West Yorkshire have been undertaken, but nationally and within West Yorkshire hedgerows have been lost at a steady rate over the last 50 years. In West Yorkshire the Countryside Agency estimate that in 1990 there was approximately 4,500 kilometres of hedgerow, however, the proportion of this total that is ancient or species-rich hedgerows is unknown. It was estimated that between 1984 and 1990 1,300 km of hedgerows were lost.

The UK Biodiversity Action Plan has recently changed from “Ancient and Species-Rich Hedgerows” to “Hedgerows”. This broad definition now includes any hedgerow with 1 native woody species and which is over 20m long and less than 5m wide, where any gaps are less than 20m wide. The definition also includes banks, walls, ditches and trees as well as other vegetation within 2m of the centre of the hedgerow.

Ancient hedgerows are taken as those that were in existence prior to the Enclosures Acts which were passed primarily between 1720 and 1840. Most ancient hedgerows support a good diversity of woody plant species (e.g. hazel, field maple, wych elm and dogwood) and often a ground flora with ancient woodland indicators. They also can be associated with physical features such as parish boundary ditches and banks and are common along country lanes. By contrast enclosure hedges tend to comprise few species such as hawthorn, blackthorn and elder and are less associated with particular physical features.

Species rich hedgerows are considered to be those supporting at least 4 woody species in an average 30m section. Hedgerows with fewer species but with a rich basal flora of herbaceous plants should also be included.

For the purpose of Local Wildlife Site designation the earlier UK BAP definition for Ancient and/or Species-rich Hedgerows (Biodiversity: The UK Steering Group Report Volume 2:Action Plans (1995) p243) has been retained as it is considered to better

reflect the requirement to have substantive nature conservation value within the site. This does not diminish the importance which should be placed on hedgerows as corridors within the wider landscape.

Hedgerows are important for a wide range of common and rare species and are especially valuable habitat for farmland birds, bats, moths and butterflies. It is also recognised that as linear habitats they can act as links between areas of semi-natural habitat, encouraging movement and dispersal for some species through what is generally an intensively managed landscape.

2.2.1 Selection Criteria and Attributes

Selection criteria and attributes for woodland Local Wildlife Sites

CRITERION	ATTRIBUTE
Size or extent	Area of site (ha) or length of hedgerow
Diversity	Number of recorded vascular plant species. This also reflects habitat diversity. Diversity of tree and shrub species per length of hedgerow.
Naturalness	Presence of semi-natural/unplanted (Ancient Woodland Indicator & Phase 1 criteria); AWI listed; number and/or cover ancient indicator species; presence and cover/number of native coppice/over-mature native trees. Presence of native veteran trees.
Rare or exceptional features	Presence of nationally or regionally uncommon vegetation types. Presence of significant populations of bluebell.
Typicalness	Presence of habitat and/or species characteristic of county or Natural Area
Connectivity within the landscape	Proximity to other sites or position in wildlife corridor.
Recorded history and cultural association	Presence of historic documentation and cartographic evidence of ancient

	woodland or continuity of semi-natural woodland cover.
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2.2.2 Woodland Selection Guidelines

Sites that meet one or more of the following guidelines will be eligible for designation as a Local Wildlife Site.

Guideline

Wd1 Ancient semi-natural woodland of 0.5ha or more in size.

Application

This guideline is to be applied to woodland sites that meet the definition of Ancient Semi-Natural Woodland (ASNW) as defined in the Ancient Woodland Inventory (AWI) for West Yorkshire i.e. sites believed to be under continuous woodland cover since 1600 supported by mapped evidence. The survival of ancient features should be evident, such as the presence of banks or ditches. Historical evidence of the woodland from reliable map data is essential. Those sites that have been felled and ploughed or converted to an alternative land-use other than woodland, and have not retained some of their ancient features, should be considered under other guidelines in this section. This is not restricted to ASNW listed within the West Yorkshire AWI alone as the AWI only considers sites over 2ha in size. Sites may require reliable site survey information prior to designation as a Local Wildlife Site⁴⁰.

Rationale

Ancient Woodland sites are those where there has been woodland cover for many hundreds of years if not dating back to the original wild wood that once covered much of the British Isles. This guideline reflects the importance of the ecological continuity of such woodlands and the scientific value of ancientness, as once lost it cannot be replaced. The soil resource including the soil biota which result from and the lack of general disturbance from activities such as ploughing or historical development are of high ecological and pedological value value. Ancient semi-natural woodlands have not stood untouched throughout this time, but have been traditionally managed or neglected at intervals and to various degrees throughout their history. They all have remained as woodland or scrub; or if converted to an alternative land-use, this has occurred many hundreds of years ago (pre 1600) and such sites have subsequently become re-colonised by species with a strong affinity to ancient woodlands. In West Yorkshire ancient semi-natural woodlands are rare. They represent some of the most natural habitat in the county, often with a high diversity of plant and animal groups. Ancient woodlands were estimated to occupy only 1803ha of the area of West Yorkshire in 1988. Some areas of this scarce resource are known to have been lost since this date.

Guideline

Wd2 Stands of semi-natural woodland or scrub larger than 0.25ha that are assigned to the following NVC communities:

⁴⁰ Added 09/05/2013

- W2** *Salix cinerea-Betula pubescens-Phragmites australis* woodland
W3 *Salix pentandra-Carex rostrata* woodland
W4 *Betula pubescens-Molinia caerulea* woodland
W5 *Alnus glutinosa-Carex paniculata* woodland
W9 *Fraxinus excelsior-Sorbus aucuparia-Mercurialis perennis* woodland
W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland
W17 *Quercus petraea-Betula pubescens-Dicranum majus* woodland

Application

This guideline will be applied to stands of semi-natural woodland that has been identified as supporting the NVC communities listed above. The definition of the site boundary will be a recognisable management unit usually using contours or woodland coups as the NVC community stands are likely to lie within larger woodlands. A competent surveyor should base the woodland community classification on field assessment.

Rationale

These woodland communities represent types of vegetation that are rare, fragmented and transitional within the county and should be provided appropriate protection.

Guideline

Wd3 Woodland sites of 0.5ha or more that support field evidence of features of ancient or long standing woodland. Field evidence includes:

- (a)** If it is an acidic woodland a score of 8 or more derived from the species listed on Table 5.
- (b)** If it is a neutral to calcareous woodland a score of 12 or more from the species listed in Table 4.
- (c)** If it is a wet woodland or scrub community a score of 10 or more derived from the species listed in Table 6.

Application

This guideline will apply to all areas of semi-natural woodland not listed on the Ancient Woodland Inventory and to plantations (some of which will be included in the Ancient Woodland Inventory). Wd3(c) will probably apply to good quality examples of NVC community types that are more widespread, than those cited in Wd2, such as W1, W6 and W7. These wet woodland sites may be linear riverine woodlands. In sites with a re-planted coniferous or broadleaf stand, indicator species in Tables 4, 5 or 6 should occur throughout the body of the wood and not be just restricted to the boundaries.

Rationale

Much ancient woodland has been felled and replanted with coniferous and broadleaf plantation. These woodlands can continue to support features of ancient woodlands such as species-rich rides and remnants of the ancient woodland flora and fauna. This remaining interest and the potential for recovery cannot be replaced once lost and should be protected from adverse land-use change such as development or agricultural conversion and intensification. Plantation woodland, on sites which have had other historical land uses, over time can develop significant biodiversity value. These woodlands are considered an important part of the woodland nature conservation resource in West Yorkshire.

Guideline

Wd4 Areas of woodland that support:

**80 or more species of native woodland vascular plants; or
8 or more species of fern (excluding bracken); or
5 or more veteran or over mature trees.**

Application

This guideline can be applied to all areas of semi-natural and plantation woodland.

Rationale

The characteristics selected in this guideline represent valuable specific features of woodlands in West Yorkshire reflecting the criteria of rarity, diversity and naturalness. Old and over mature trees are very valuable wildlife habitats providing habitat for a wide variety of mammals, birds, invertebrates and plants.

Guideline

Wd5 Bluebell woodlands greater than 0.5 ha with a NVC random quadrat constancy for bluebell of III or over and a ground cover by bluebells of 40% or greater in at least 10% of the woodland area.

Application

This guideline should be applied to native British bluebell (*Hyacinthoides non-scripta*). Non-native (*H. hispanica*) and obvious hybrid bluebells should not be included within the assessment.

Rationale

The UK supports a significant proportion of the European population of bluebell (*Hyacinthoides non-scripta*) and, as such, has a particular duty to ensure the survival of this species through the protection of bluebell woodland habitat.

Guideline

Wd6 Semi-natural woodlands of 0.5 ha or more that have a score from Tables 4, 5 or 6 within 20% of the thresholds for any of the different woodland types and which adjoins, or lies within half a kilometre of an existing woodland statutory designated site or Local Wildlife Site.

Application

This guideline can be applied to any woodland site which does not meet any of the other Wd Guidelines which is within a wildlife corridor or is within close proximity to an existing woodland statutory site or a Local Wildlife Site that does fully meet at least one of the other Wd Guidelines.

Rationale

The role and importance of linear continuous habitats and blocks of habitat which act as stepping stones or patches of habitat has been well studied in relation to population dynamics and rates of extinction, immigration and emigration of individuals of species from one habitat patch to another. As a consequence the importance of networks of natural habitats in the countryside and urban areas is recognised in Planning Policy Statement 9 (PPS9) and the EU Habitats Directive.

Guideline

Wd7 A hedgerow that is at least 30 metres in length and meets at least one of the following criteria;

- (a) 8 or more species of native trees and/or shrubs;
- (b) if it supports 6 or more native tree and/or shrubs species; and has a score of 5 or more for non-woody species listed in Tables 4, 5 and 6
- (c) supports 3 or more veteran/over mature trees;
- (d) is an ancient woodland “ghost” hedge;
- (e) supports 6 or more species of native trees and/or shrubs and is shown on the 1st edition Ordnance Survey Maps (~1854)

Application

This guideline can be applied to ancient and/or species rich hedgerows. Ancient is defined as originating from the pre-Enclosure Acts period. Determination of the origin of a hedge can be based on map evidence and, if no map evidence is available, from field evidence that indicates the hedgerow is ancient. Guidance is given in the Hedgerows Regulations 1997⁴¹ on relevant documents which can be used to determine ‘pre-Enclosure Acts hedgerows’, including estate maps, tithe maps and awards, various enclosure maps, charters and manorial records. Consideration should be made of the general distribution of different tree and shrub species throughout the hedgerow when

⁴¹ HM Government (1997). The Hedgerow Regulations 1997. A guide to the law and good practice. HMSO.

determining the designation of a Local Wildlife Site. The practice of only measuring woody species within standard lengths within a hedgerow should be avoided. A “ghost” hedge is defined as a linear strip of ancient woodland that has hedgerow dimensions (Oliver Rackham *The History of the Countryside* (1995)). A hedgerow should not generally contain significant gaps. As well as the woody species the hedgerow Local Wildlife Site should be taken to include any associated features such as ditches, banks, wetlands or other species rich linear habitat (for example road verges). Hedgerow which have been planted within the last 30 years should not generally be included, although hedgerows which have been gapped-up are acceptable.

Rationale

Ancient and species rich hedgerows support a diverse range of plants and animals. A small number may be remnants of ancient woodland and as such cannot be replaced once lost. Veteran and over-mature trees are invaluable wildlife habitats providing habitat for a wide variety of mammals, birds, invertebrates and plants. New hedgerows will not generally have the range of non-woody botanical or faunal species associated with longer established habitats.

Guideline

Wd8 A hedgerow or hedgerows, which connect Local Wildlife Sites which are 0.5km or less apart and support 4 or more tree and shrub species and have a score of 5 or more for non-woody species listed in Table 4, 5 or 6.

Application

This guideline can be applied to any hedgerow whether pre-Enclosure Acts or not. The hedgerow(s) should be more or less continuous and there should be no gaps in the hedgerows greater than 20 metres. If there is a series of gaps each less than 20 metres, but accounting collectively for more than 40% of the line of the hedge, it should not be selected. The Local Wildlife Sites do not have to be woodland, but the general importance of the link connecting the two sites should be explained (for example the passage of invertebrates between grassland communities).

Rationale

Hedgerows are recognised as important habitats in their own right for a range of plant and animals species, and also as linear habitats that aid the dispersal and distribution of species throughout the countryside. Hedges or combinations of hedges connecting Local Wildlife Site quality woodland blocks are more likely to support a diverse range of species and help to provide direct physical connections between fragments of woodland.

Guideline

Wd9 Any stands of the following types of scrub communities:

a) Bog myrtle (*Myrica gale*)

- b) Willow scrub on exposed riverine sediments, including banks, islands and shorelines of dynamic rivers
- c) Species-rich thorn scrub normally corresponding to the *Viburnum lanata* subcommunity of *Crataegus monogyna* – *Hedera helix* scrub coded W21d in the NVC containing three or more of the following species:
 - i. spindle (*Euonymus europaeus*)
 - ii. wild privet (*Ligustrum vulgare*)
 - iii. purging buckthorn (*Rhamnus catharticus*)
 - iv. dogwood (*Cornus sanguinea*)
 - v. burnet rose (*Rosa spinosissima*)
 - vi. wild clematis (*Clematis vitalba*)
 - vii. wild service tree (*Sorbus torminalis*)
 - viii. alder buckthorn (*Frangula alnus*)

Application

This guideline can be apply to any naturally-occurring example of the above communities but does not cover stands of planted origin, hedgerows or woodland-edges. Bushes or small trees should comprise >25% cover of the designated area, with less than 25% cover of canopy trees. In the case of wild service tree, even single plant could be considered for designation since they may be valuable in maintaining genetic diversity. The scrub component of a Local Wildlife Site may form one component of a larger site.

Rationale

These types of scrub are rare in West Yorkshire and important to conserve both in their own right and as habitats for their associated fauna.

Table 4 Vascular indicator plants of neutral to calcareous woodlands in West Yorkshire.

Scientific name	Common name
<i>Acer campestre</i>	field maple
<i>Actaea spicata</i>	baneberry
<i>Adoxa moschatellina</i>	moschatel
<i>Ajuga reptans</i> ⁴²	bugle
<i>Allium ursinum</i>	ramsons
<i>Anemone nemorosa</i>	wood anemone
<i>Aquilegia vulgaris</i> +	columbine
<i>Campanula latifolia</i>	giant bellflower

⁴² Added 21/01/2016

Scientific name	Common name
<i>Campanula trachelium</i> ⁴³	nettle-leaved bellflower
<i>Carex pallescens</i>	pale sedge
<i>Carex remota</i>	remote sedge
<i>Carex strigosa</i>	starved wood sedge
<i>Carex sylvatica</i>	wood sedge
<i>Chrysosplenium alternifolium</i>	alternate-leaved golden saxifrage
<i>Chrysosplenium oppositifolium</i>	opposite-leaved golden saxifrage
<i>Convallaria majalis</i> +	lily of the valley
<i>Cornus sanguinea</i> +	dogwood
<i>Daphne laureola</i>	spurge laurel
<i>Epipactis helleborine</i> ⁴⁴	broad leaved helleborine
<i>Euonymus europaeus</i> +	spindle
<i>Festuca altissima</i>	wood fescue
<i>Fragaria vesca</i>	wild strawberry
<i>Frangula alnus</i>	alder buckthorn
<i>Gagea lutea</i>	yellow-star-of-Bethlehem
<i>Galium odoratum</i>	sweet woodruff
<i>Geranium sylvaticum</i>	wood crane's-bill
<i>Hordelymus europaeus</i>	wood barley
<i>Hyacinthoides non-scripta</i>	bluebell
<i>Lamiastrum galeobdolon</i> ssp. <i>montanum</i>	yellow archangel
<i>Lathraea squamaria</i> ⁴⁵	toothwort
<i>Ligustrum vulgare</i>	wild privet
<i>Listera ovata</i> ⁴⁶	common twayblade
<i>Luzula sylvatica</i>	great wood-rush
<i>Lysimachia nemorum</i>	yellow pimpernel
<i>Melica nutans</i>	mountain melick
<i>Melica uniflora</i>	wood melick
<i>Mercurialis perennis</i>	dog's mercury
<i>Milium effusum</i>	wood millet
<i>Neottia nidus-avis</i>	bird's-nest orchid
<i>Orchis mascula</i>	early-purple orchid
<i>Oxalis acetosella</i>	wood sorrel
<i>Paris quadrifolia</i>	herb Paris
<i>Phyllitis scolopendrium</i>	hart's tongue fern
<i>Pimpinella major</i> ⁴⁷	greater burnet-saxifrage
<i>Platanthera chlorantha</i>	greater butterfly orchid
<i>Poa nemoralis</i> ⁴⁸	wood meadow-grass
<i>Polystichum aculeatum</i>	hard shield fern
<i>Polystichum setiferum</i>	soft shield fern
<i>Potentilla sterilis</i> ⁴⁹	

⁴³ Added 13/12/2018

⁴⁴ Added 12/12/2019

⁴⁵ Added 13/12/2018

⁴⁶ Added 09/05/2019

⁴⁷ Added 13/12/2018

⁴⁸ Added 14/12/2017

Carex pendula removed 10/01/2023

⁴⁹ Added 14/12/2017

Scientific name	Common name
<i>Primula veris</i> ⁵⁰	barren strawberry
<i>Primula vulgaris</i>	cowslip
<i>Prunus padus</i> +	primrose
<i>Pyrola minor</i>	bird cherry
<i>Ranunculus auricomus</i>	common wintergreen
<i>Rhamnus catharticus</i>	goldilocks buttercup
<i>Sanicula europaea</i>	buckthorn
<i>Stellaria holostea</i> ⁵¹	sanicle
<i>Tilia cordata (ancient)</i> +	greater stitchwort
<i>Veronica montana</i>	small-leaved lime
<i>Vicia sylvatica</i>	wood speedwell
<i>Viola hirta</i>	wood vetch
<i>Viola oderata</i> ⁵²	hairy violet
<i>Viola reichenbachiana</i> ⁵³	sweet violet
	early dog violet

Key: + not obviously/recently planted.
Species in **bold** score 2.

Table 5 Vascular indicator plants of acid woodland in West Yorkshire.

Scientific name	Common name
<i>Anemone nemorosa</i>	wood anemone
<i>Blechnum spicant</i>	hard fern
<i>Calluna vulgaris</i>	ling heather
<i>Carex binervis</i>	green-ribbed sedge
<i>Carex pilulifera</i> ⁵⁴	pill sedge
<i>Carex remota</i>	remote sedge
<i>Ceratocarpus claviculata</i>	climbing corydalis
<i>Chrysosplenium oppositifolium</i> ⁵⁵	opposite-leaved golden saxifrage
<i>Convallaria majalis</i> +	lily-of-the-valley
<i>Corylus avellana</i>	hazel
<i>Dryopteris affinis</i>	scaly male-fern
<i>Frangula alnus</i>	alder buckthorn
<i>Gymnocarpium dryopteris</i>	oak fern
<i>Hyacinthoides non-scripta</i>	bluebell
<i>Lonicera periclymenum</i>	honeysuckle
<i>Luzula pilosa</i>	hairy wood-rush
<i>Luzula sylvatica</i>	great wood-rush
<i>Lysimachia nemorum</i>	yellow pimpernel
<i>Melampyrum pratense</i>	common cow wheat

⁵⁰ Added 21/01/2016

⁵¹ Added 14/12/2017

⁵² Added 13/12/2018

⁵³ Added 13/12/2018

⁵⁴ Added 24/07/2015

⁵⁵ Amended 18/10/2012

<i>Oreopteris limbosperma</i>	lemon scented fern
<i>Oxalis acetosella</i>	wood sorrel
<i>Phegopteris connectilis</i>	beech fern
<i>Polypodium vulgare</i>	common polypody
<i>Potentilla sterilis</i> ⁵⁶	barren strawberry
<i>Pyrola minor</i>	common wintergreen
<i>Quercus petraea</i>	sessile oak
<i>Salix aurita</i>	eared willow
<i>Stellaria holostea</i> ⁵⁷	greater stitchwort
<i>Teucrium scorodonia</i>	wood sage
<i>Trientalis europaea</i>	chickweed wintergreen
<i>Vaccinium myrtillus</i>	bilberry

Key: + not obviously/recently planted.
Species in **bold** score 2.

Table 6 Vascular indicator plants of wet woodland in West Yorkshire.

Scientific name	Common name
<i>Adoxa moschatellina</i>	moschatel
<i>Ajuga reptans</i> ⁵⁸	bugle
<i>Allium ursinum</i>	ramsons
<i>Anemone nemorosa</i>	wood anemone
<i>Angelica sylvestris</i>	wild angelica
<i>Apium nodiflorum</i>	fool's watercress
<i>Athyrium filix-femina</i>	lady fern
<i>Berula erecta</i>	lesser water parsnip
<i>Calamagrostis canescens</i>	purple small-reed
<i>Caltha palustris</i>	marsh marigold
<i>Campanula latifolia</i>	giant bellflower
<i>Cardamine amara</i>	large bittercress
<i>Carex acuta</i>	slender tufted sedge
<i>Carex acutiformis</i>	lesser pond sedge
<i>Carex elata</i>	tufted sedge
<i>Carex laevigata</i>	smooth-stalked sedge
<i>Carex nigra</i>	common sedge
<i>Carex paniculata</i>	greater tussock sedge
<i>Carex pendula</i>	pendulous sedge
<i>Carex remota</i>	remote sedge
<i>Carex riparia</i>	greater pond sedge
<i>Chrysosplenium alternifolium</i>	alternate leaved golden saxifrage
<i>Chrysosplenium. oppositifolium</i>	opposite leaved golden saxifrage
<i>Crepis paludosa</i>	marsh hawk's-beard
	scaly male-fern

⁵⁶ Added 14/12/2017

⁵⁷ Added 14/12/2017

⁵⁸ Added 13/12/2018

<p><i>Dryopteris affinis</i>⁵⁹ <i>Dryopteris carthusiana</i> <i>Epipactis helleborine</i> <i>Equisetum fluviatile</i> <i>Equisetum sylvaticum</i> <i>Equisetum telmateia</i> <i>Erica tetralix</i> <i>Eupatorium cannabinum</i> <i>Frangula alnus</i> <i>Geum rivale</i> <i>Hyacinthoides non-scripta</i>⁶⁰ <i>Hydrocotyle vulgaris</i> <i>Iris pseudacorus</i> <i>Lamium galeobdolon ssp. montanum</i> <i>Luzula sylvatica</i>⁶¹ <i>Lycopus europaeus</i> <i>Lychnis flos-cuculi</i> <i>Lysimachia nemorum</i>⁶² <i>Lysimachia nummularia</i>⁶³ <i>Mercurialis perennis</i> <i>Molinia caerulea</i> <i>Myosotis laxa ssp. caespitosa</i> <i>Myosotis scorpioides</i> <i>Myosotis secunda</i> <i>Oenanthe crocata</i> <i>Oxalis acetosella</i> <i>Paris quadrifolia</i> <i>Phragmites australis</i> <i>Primula vulgaris</i> <i>Ranunculus flammula</i> <i>Scirpus sylvaticus</i> <i>Sphagnum spp.</i>⁶⁴ <i>Stellaria alsine</i> <i>Stellaria neglecta</i> <i>Stellaria nemorum</i> <i>Thalictrum flavum</i> <i>Valeriana dioica</i> <i>Valeriana officinalis</i> <i>Viburnum opulus</i> <i>Viola palustris</i></p>	<p>narrow buckler fern broad-leaved helleborine water horsetail wood horsetail giant horsetail cross-leaved heath hemp-agrimony alder buckthorn water avens bluebell marsh pennywort yellow flag iris yellow archangel greater woodrush gypsywort ragged robin yellow pimpernel creeping jenny dog's mercury purple moor grass tufted forget-me-not water forget-me-not creeping forget-me-not hemlock water-dropwort wood sorrel herb Paris common reed primrose lesser spearwort wood club-rush <i>Sphagnum</i> spp. bog stitchwort great chickweed wood stitchwort common meadow-rue marsh valerian common valerian guelder rose marsh violet (N.B. score 1 in uplands)</p>
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Key: + not obviously/recently planted.

⁵⁹ Added 13/12/2018

⁶⁰ Added 13/12/2018

⁶¹ Added 13/12/2018

⁶² Corrected 14/12/2017

⁶³ Corrected 14/12/2017

⁶⁴ Added 13/12/2018

Species in **bold** score 2.

2.3 PARKLAND, WOOD PASTURE, SCATTERED TREES AND TRADITIONAL ORCHARDS.

Wood-pastures and parkland are the products of historic land management systems, and represent a vegetation structure rather than being a particular plant community. Typically this structure consists of large, open-grown or high forest trees (often pollards) at various densities, in a matrix of grazed grassland, heathland and/or woodland flora.⁶⁵

Wood-pasture and parkland is a UK Biodiversity Action Plan Priority Habitat which is defined as including:

- Wood-pastures and parklands derived from medieval forests and emparkments, wooded commons, parks and pastures with trees in them. Some have subsequently had a designed landscape superimposed in the 16th to 19th centuries. A range of native species usually predominates amongst the old trees but there may be non-native species which have been planted or regenerated naturally.
- Parklands with their origins in the 19th century or later where they contain much older trees derived from an earlier landscape.
- Under-managed and unmanaged wood-pastures with veteran trees, in a matrix of secondary woodland or scrub that has developed by regeneration and/or planting.
- Parkland or wood-pasture that has been converted to other land uses such as arable fields, forestry and amenity land, but where surviving veteran trees are of nature conservation interest. Some of the characteristic wood-pasture and parkland species may have survived this change in state.

Not normally included are:

- Upland sheep-grazed closed-canopy oak woodland, derived from coppice.
- Parklands with 19th century origins or later with none of the above characteristics.

Parklands and wood pasture habitats develop as the result of historic land management, and in many cases landscape design. Such sites may once have been royal hunting forests, wooded pastures or commons, and semi-formal parkland associated with large country houses. These sites often comprise a combination of large, old and veteran standard trees, as scattered specimens, and high forest woodland blocks with a mixture of grazed grassland or heathland. In some circumstances, the parkland or wood pasture may also include ornamental or natural standing water bodies and flowing water habitats.

In parkland the combination of habitats and the presence of old and veteran trees provide a variety of habitat mosaics and a diversity of structure that support a wide range of species. The close geographical proximity of a range of habitats, including hard

⁶⁵ UK Biodiversity Action Plan Priority Habitat Descriptions 2007

structures such as buildings and walls, provide habitat corridors, links, mosaics and stepping stones for species activity, movements, food and shelter.

West Yorkshire has 38 Registered Historic Parks and Gardens (English Heritage) including a number of cemeteries. Typical features which may be of nature conservation value include:

- Woodland with old and/or veteran trees
- Walled gardens
- Mature tree belts
- Pasture with/without scattered old or veteran trees
- Tree lined avenues
- Scattered trees
- Hedgerows
- Plantations including exotic species
- Arboretums
- Topiary
- Shrubberies
- Ponds
- Becks
- Streams
- Ha-has
- Lakes
- Estate buildings
- Brick and/or stone walls
- Ice houses
- Grave stones and monuments

The ecological significance of some of these features may have not been fully investigated as they frequently require knowledge of more specialist biotic groups, in physically difficult to access places. Others may require destructive method to prove a more comprehensive range of species. Similarly, historic wood pasture sites provide habitat mosaics and structural diversity, which contribute to their ecological value. Such sites may still be managed using traditional methods, but for many sites such management has now lapsed. Both parkland and wood pasture sites can support distinctive and important assemblages of fungi, epiphytic ferns, bryophytes and lichens, invertebrates associated with deadwood, bats and birds.

Potential threats to these areas include a change in land use practice from pasture to arable, increased public access leading to the felling or significant pruning of dead wood in old and veteran trees. Other ecological features may be lost by drainage or the repair of structures and buildings. Failure to plan for a gradual succession of open grown trees can also threaten sites as old trees are lost and there are no emerging replacements. Great Britain probably holds a high proportion of veteran trees in Europe and, therefore, all veteran trees are important for nature conservation.⁶⁶ The historical continuity and management of parkland and wood pasture habitats not only provides an important

⁶⁶ David Clayden, English Nature *pers.comm.*

setting for veteran trees now, but also significant potential for future veteran trees to grow. The ecological habitat value of old and veteran tree populations is often great, for example within avenues. This is because there are more ecological habitat niches available and they are more likely to support viable long-term populations of associated species and habitats. Trees in avenues and in groupings are particularly valuable. New plantings adjacent to existing veterans provide a good opportunity for species colonisation and movement between trees.

The Veteran Trees Initiative (VTI) has produced a book regarding all aspects of veteran trees and their management.⁶⁷ In this publication a veteran tree is “*defined as a tree that is of interest biologically, culturally or aesthetically because of its age, size or condition.*” This includes trees that are in the ancient stage of their life and trees which are old relative to other specimens of the same species. There are various types of veteran trees, which are differentiated according to management practice - past or present. The VTI indicate that veteran trees are characterised by the presence of features such as:

- large girth for the species concerned,
- major trunk cavities or progressive hollowing,
- naturally forming water pools,
- decay holes,
- physical damage to trunk,
- bark loss,
- large quantity of dead wood in the canopy in damp, shady and dry, open conditions,
- sap runs,
- crevices in the bark, under branches or on the root plate sheltered from direct rainfall,
- fungal fruiting bodies (e.g. from heart rotting species),
- high number of interdependent wildlife species,
- epiphytic plants,
- an “old” look,
- high aesthetic interest,
- heart rot.

The VTI guide is an essential aid in the determination of veteran and old trees. Age alone is not a sufficient criterion.

Traditional orchards as defined in the UK Biodiversity Action Plan Priority Habitat Description (2007) are another type of mixed habitat. Although dominated by a mixture of planted fruit and nut bearing tree species they also support other associated habitats such as meadows, scrub and ponds. Traditional orchards can easily be distinguished from other wooded habitats based on the preponderance of domestic fruit and nut species: apple, plum, pear, damson, cherry, walnut and cobnut. Only in a very few cases will there be a significant number of other tree species in a traditional orchard, unless the orchard is becoming woodland through neglect.

Traditional orchards, as distinct from non-traditional orchards are defined for UK BAP priority habitat purposes as orchards managed in a low intensity way. They contrast with

⁶⁷Helen Read (2000). Veteran Trees - A guide to good management. English Nature.

orchards managed intensively for fruit production, where there are inputs 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 (stems generally 75 cms or less). The simplest visual indicator of intensive management is the presence of herbicided strips along the tree rows, where the ground is generally bare or with some annual plant regrowth, contrasting with the permanent grassland of the between-row spaces⁶⁸. Spacing of trees in traditional orchard can vary quite widely from around 3 m to over 20 m between trees. There is some overlap of density of planting with intensive orchards but planting densities < 3m are generally likely to be intensive and therefore to be excluded from the definition.

2.3.1 Selection Criteria and Attributes

Selection criteria and attributes for parkland and wood pasture Local Wildlife Sites.

CRITERION	ATTRIBUTE
Size or extent	Area of site (ha)
Rare or exceptional features	Presence of rare saproxylic fungi ⁶⁹ Presence of saproxylic invertebrates found which are listed in the Index of Ecological Continuity. ^{70 71 72} Presence of lichens found listed in the Revised Index of Ecological Continuity ^{73 74}
Diversity	Diversity of habitats (number of habitats and structural diversity) within the site and/or species groups. Number of veteran trees and quantity of standing & fallen dead-wood material Availability of varied nectar sources
Naturalness	Presence of native veteran trees Absence of ploughing and/or fertiliser input Absence of intensive grazing
Typicalness	Presence of habitat and/or species characteristic of parkland & wood pasture

⁶⁸ UK BAP Priority Habitat Descriptions (2007)

⁶⁹ Ted Green. Index in prep.

⁷⁰ Alexander, KNA. (1988). The development of an Index of Ecological Continuity for deadwood associated beetles. In: Welch, RC (ed) Invertebrate indicators of ancient woodland (East Region Regional News) Antenna 12: 69-71.

⁷¹ Harding, PT & Alexander, KNA. (1993) The Saproxylic Invertebrates of Historic Parklands: Progress and Problems. In: xxx (eds) Kirby & Drake (1993).

⁷² Harding, PT & Alexander, KNA. (1994). The use of Saproxylic Invertebrates in the Selection and Evaluation of Areas of Relic Forest in Pasture-Woodlands. British Journal of Entomological Natural History, 7 (Suppl), pp21-26.

⁷³ Rose, F. (1976). Lichenological indicators of age and environmental continuity in woodlands. In (eds) Brown, DH, Hawksworth, DL & Bailey, RH. (1976) Lichenology: progress and problems. pp279-307. London, Academic Press.

⁷⁴ Harding & Rose 1986. Pasture woodlands in lowland Britain. Huntingdon, Institute of Terrestrial Ecology.

	Presence of habitat and/or species characteristic of the county or Natural Area
Connectivity within the landscape	Proximity of site to other Local Wildlife Sites or within a wildlife corridor. Proximity of site to other semi-natural habitats Location of site in relation to other sites supporting veteran trees
Recorded history and cultural association	Presence of historic documentation and cartographic evidence of past land-use. Presence of ancient woodland.

2.3.2 Parkland, wood pasture and scattered trees selection guidelines.

Sites will be eligible for selection as a Local Wildlife Sites if they meet either of the following guidelines.

Guideline

Pk1 Parkland or wood pasture sites greater than 5 ha that support habitats and species traditionally associated with parkland or wood pasture and/or support blocks, groupings or scattered old or veteran trees in combination with either grazed woodland or grassland.

Application

This guideline can be applied to historic parkland and wood pasture sites with a combination of habitat types. These should include veteran and/or old trees, at densities of two or more per hectare, and additional habitat features such as watercourses, lakes, dead wood (lying or standing), grazed or ungrazed grassland, woodland and old walls supporting various lichens. Additional interest should also be present such as dead wood invertebrates, fungi, bats, other mammals and/or birds. Parkland sites, in part or wholly, could also be identified under other habitat specific guidelines or the species guidelines.

The determination of veteran or old trees should be relative to the species concerned and in accordance with the definitions and features specified within the publication *Veteran Trees: a guide to good management*.

This habitat guideline does not apply to sites which are significantly altered, such as those parklands in primarily arable uses or sites that support heavily improved grassland and a large number of non-native trees, unless old or veteran trees are recognised as having a particular “value for the appreciation of nature” within a management plan or objectives. Trees can also be considered under Pk2.

Additional guidance may also be sought from the UK BAP Priority Habitat Descriptions 2007, which discusses wood pasture in particular in more detail. It is noted in this document that wood pasture may grade into other more open grazing habitats. Consideration of management units is particularly relevant in considering boundary setting for such Local Wildlife Sites.

Rationale

Parkland and wood pasture is a localised habitat and can support some of the oldest surviving trees in West Yorkshire. Parkland and wood pasture support habitat mosaics

and diversity, which does not occur widely in the county, providing suitable conditions for a wide range of plant and animal species.

Guideline

Pk2 Groupings (normally 5 or more) of comparatively old (normally 100 years +) and/or veteran broad-leaved trees in former parkland or wood pasture or similar sites and known to support fungi and/or invertebrates and/or lichens which are either characteristic or specialist species of veteran trees.

Application

This guideline will normally be applied to groupings of native and non-native trees. These may be as historically important avenues or as other planting patterns. Traditional woodland management practices such as pollarding may have been employed. It should not be applied to hedgerow trees (see Wd7). The presence of recorded species groups indicates the value of the ecological habitats the tree(s) provide. Trees can also be designated under the species guidelines, in addition to, or independently of these habitat guidelines. An individual veteran tree of significant importance may also be designated although ideally the boundary should include other nearby mature or over mature trees which might provide continuity for associated species into the future.

Rationale

Veteran and old trees are a rare habitat in West Yorkshire and small groupings of trees or a single veteran tree can support a significant and important variety of plant and animal species. Groupings of these trees generally have a higher ecological value due to the presence of a greater diversity of habitat niches, which in turn are more likely to support viable species populations and are generally less threatened by change than an individual tree.

Guideline

Pk3 Traditional orchards as defined by the UK Biodiversity Action Plan containing at least 20 trees.

Application

This guideline should normally be applied to orchards meeting the threshold in traditional medium to large sized trees, not dwarf or bush sized specimens, although these may also be present. Use of intensive management practices especially pesticides will greatly reduce the biodiversity value and such sites should be excluded. Rare local varieties of tree bring with them strong cultural and educational value and in such situation a smaller number of trees may be acceptable. The crown edge of trees should generally be within 20m of each other. The use of herbicide by spraying around the base of lines of trees can usually be identified by aerial photograph and such sites should be excluded. Boundary structures such as hedgerows and walls should be included within the site. Evidence collected should include a recent aerial photograph showing the trees; numbers of each species of tree; boundary types including species within hedgerows; grassland management status (grazed, mown, unmanaged); species list for the grassland; other habitats such as ponds/fen; other species; percentage of mature and over-mature trees.

If information is available on fruit varieties and historical management, particularly pesticides, this should also be included.⁷⁵

Rationale

Traditional orchards are recognised as a rare habitat, with many being lost in the last century to other land uses or their biodiversity value reduced by more intensive agricultural methods. Traditional orchards provide complex habitat structures which are important for invertebrates, lichens, mosses, bats,⁷⁶ birds and other habitats such as species rich grassland.

2.4 FENS, LOWLAND MIRES, SPRINGS AND FLUSHES.

The terminology surrounding wetland habitats can be confusing depending on different definitions of terms such as 'fen', 'swamp', 'mire' and 'marsh' (see glossary). Marsh covers a range of circumstances and is often found in combination with fen and grassland. Marsh habitats typically support species of periodically waterlogged soils, but with a water table that falls below the soil surface in the summer months. These communities whilst often associated with the edge of fen habitats, are often managed, and referred to as grasslands, but technically have been clarified as mire communities. As such, these communities are covered by these selection guidelines.

Fens are characterised by a summer water table at or just below the sediment surface, but which increases periodically leading to flooding or waterlogging of the land surface. Owing to the high water table there is suppression of organic matter decomposition and the potential for the accumulation of partially decomposed or undecomposed organic material (peat).

Fens receive water and nutrients from rainfall, soil and groundwater. They are predominantly made up of herbaceous vegetation, although small shrubs may occur and many sites will contain an element of scrub or wet woodland. Unlike swamps, the vegetation comprises mixtures of species in which tall grasses and sedges may be abundant but do not form extensive mono-dominant stands. Fens occupy a range of habitats from the margins of open water to relatively well-drained sites, where humid conditions are maintained by seepages, flushes or groundwater.

Two types of fen can be broadly distinguished based on water movement. Topogenous fens are those where water movements are primarily up and down within the soil. Soligenous fens are those where the water moves primarily laterally over the surface and through the upper soil profile. Fens have also been categorised based on their nutrient and base status as 'poor-fens' and 'rich-fens'.

Grasses and/or tall forbs or species of rush often dominate the vegetation communities of lowland mires. The soils are often waterlogged during the winter months, but the water table falls below the soil surface during the summer enabling the vegetation to be grazed or even cut. They can occur in locations irrigated by base-poor and base-rich water.

⁷⁵ Paragraph amended 15/09/2016

⁷⁶ Amended 15/09/2016

Swamp and reedbed habitats can be included within both fens and mires as well as standing and flowing water selection guidelines because they may be associated with open water or later succession stages.

Poor-fens and lowland acid mires

Poor-fens and lowland acid mires occur on geological formations, such as sandstone and shale, and on surface deposits that give rise to base-poor substrates. They support low-growing vegetation irrigated by acid water of low nutrient status. These habitats tend to occur in upland areas or in association with lowland heath and acid grassland, and range from marginally acidic rush-pastures to *Sphagnum* (bog moss) mires. Separate guidelines apply for upland blanket bogs and lowland raised bogs. Bingley South Bog SSSI is a good example of poor-fen. Sections of Coppice Bog and Pond have significant areas of poor-fen surrounding very small areas of lowland raised bog (NVC community M3).

Rich-fens and lowland mires

Rich-fens are generally irrigated with base-rich waters and are predominantly lowland in distribution. Very locally there are flush and spring vegetation communities associated with limey material in the underlying rocks or boulder clay which brings slight base enrichment. In Withens Clough for example, above Mytholmroyd, a series of *Carex-Sphagnum* flushes emerges among *Eric-Sphagnum* wet heath and *Molinia-Potentilla* vegetation developed over shallow peat, with more base-demanding plants like tawny sedge (*C. hostiana*), flea sedge (*C. pulicaris*) and butterwort (*Pinguicula vulgaris*) in the sward. At Sconce Crag, Baildon, mosaics of rich *Molinia-Potentilla* vegetation and *Carex Sphagnum* flushes provide the only locality for lesser twayblade (*Listera cordata*). Very locally the influence of lime is sufficiently strong to support *Carex dioica-Pinguicula vulgaris* mire M10 for example Marley Bog near Keighley.

Within typical MG10 *Juncus-Holcus* rush-pasture characterised by soft rush (*Juncus effuses*), Yorkshire fog, creeping bent, cuckoo flower (*Cardamine pratensis*) and creeping buttercup (*Ranunculus repens*), are less common areas of wet ground among farm fields, around pools and streams or springs that are difficult to drain can retain more floristic interest. Here sharp flowered rush (*J. acutiflorus*) predominates in the *Juncus-Galium Palustre* rush pasture (M23) with marsh bedstraw (*Galium palustre*), marsh thistle (*Cirsium palustre*), great birdsfoot trefoil (*Lotus pedunculatus*), lesser spearwort (*Ranunculus flammula*), sneezewort (*Achillea ptarmica*), water mint (*Mentha aquatica*) and common fleabane (*Pulicaria dysenterica*). Example can be found at Stanley Marsh, Bullcarr Mires and Hollinhurst Wood. They sometimes provide a locus for scarce plants such as pepper saxifrage (*Silaum silaus*).

Where ground water or springs are a little more base rich, hard rush (*J. inflexus*) and jointed rush (*J. articulatus*) can dominate with associates like carnation sedge (*C. panacea*), quaking grass (*Briza media*) and marsh arrowgrass (*Triglochin palustre*). This habitat along with the county rarity common meadow rue (*Thalictrum flavum*) occurs at Willowgarth, Knottingley.

Another prominent member of the various rush-pastures is meadowsweet (*Filipendula ulmaria*) which, in the absence of grazing can become dense and tall in stands of *Filipendula-Angelica* mire (M27) with other tall herbs including wild angelica (*Angelica sylvestris*), common valerian (*Valeriana officinalis*), ragged robin (*Lychnis flos-cuculi*) and yellow iris (*Iris pseudacorus*).

These habitats collectively support a wide range of plant communities and species. In more eutrophic (nutrient-rich) situations tall-herb communities can dominate such fens. The more eutrophic tall-herb fens are characterised by dense vegetation canopies with limited species diversity. Despite the reduced species diversity, however, they are an important and characteristic vegetation type in many areas often representing the only type of fen in intensively farmed lowland landscapes. In the most disturbed and eutrophicated stands rank nitrophile herbs, such as greater willowherb and stinging nettle, replace more characteristic fen plants. Rich fens are also sometimes associated with grass dominated communities that are managed as fen meadows which support a characteristic variety of species.

In less eutrophic conditions, but where the influence of base-rich water remains strong (including sites where calcareous flushes irrigate acid soils), fen and fen meadow vegetation is characterised by a generally species-rich flora.

There UK Biodiversity Habitat Action Plan for “Lowland Fens” and “Upland Flushes, Fens and Swamps”. There is also a UK Biodiversity Habitat Action Plan for “Purple Moor Grass and Rush Pasture” which incorporates some of the lowland acid mire communities included in these selection guidelines.

There is a national Wetland Inventory which collates information on known fen, swamp and reedbed communities. There has been a long historical trend towards fragmentation of fens in West Yorkshire through land drainage, agricultural intensification, afforestation and urban development. The fens that do remain in the county include a variety of different types, depending on how they were formed, the existing and historical land-use and the nature of underlying rocks and substrates. In the West Yorkshire context some fen and mire communities do not conform well to the National Vegetation Classification, especially in the lowland vales and foothills. Fen meadows, for example, often bear comparison with NVC communities such as M10, M22 or M24 mires but lack important characteristic species especially where West Yorkshire falls outside of their natural range.

2.4.1 Selection Criteria and Attributes

Selection criteria and attributes for fen ,lowland acid mire, spring and flush Local Wildlife Sites.

CRITERION	ATTRIBUTE
Size or extent	Area of site (ha). Larger sites are likely to have greater hydrological integrity and will usually be less affected by surrounding land use. However, small sites may be of great interest. Some of the most valuable fens and mires in Yorkshire

	as associated with small man made or natural geomorphological features.
Rare or exceptional features	Rarity of plant species, community or fen type.
Diversity	Diversity of plant species, especially fen/mire indicators. Diversity of plant communities can reflect zonations related to hydrological and edaphic differences.
Naturalness	Absence of artificial drainage or agricultural improvement. Evidence of historical continuity eg deep deposits of peat. Presence of natural hydrological influences eg springs, flooding etc. Presence of ancient wetland indicators eg invertebrates such as flightless water beetles.
Typicalness	Presence of typical examples of NVC community types. Presence of locally distinctive fen/mire types.
Connectivity within the landscape	Connectivity with other semi-natural habitats especially those representing different stages in the hydrosere (eg fens associated with wet woodland or species rich grassland). Location and extent in relation to the physical environment eg where a site forms part of a series of valley or floodplain fens.
Recorded history and cultural association	Past biological recording, e.g. historical records of flora and fauna which may reflect change or continuity in a site's biota. Historical confirmation of hydrological or management influences e.g. documented sites of springs, sites shown as wetland on early maps, sites with common rights of turbary, and sites with a palynological record.
Fragility	Vulnerability of sites to eutrophication, agricultural improvement, drainage or unchecked successional change.

2.4.2 Fens, Lowland Acid Mire, Spring and Flush Selection Guidelines

Sites will be eligible for selection as Local Wildlife Sites if they meet one or more of the following guidelines.

Guideline

Fe1 Lowland acid mire sites greater than 0.1ha that support the following NVC community type:

M22 *Juncus subnodulosus-Cirsium palustre* fen meadow

M24 *Cirsio- Molinietum caeruleae* fen meadow

Application

This guideline will be applied to areas of lowland acid mire and fen meadow that have been identified as supporting the NVC communities listed above. The classification of the

community should be based on a field assessment by a competent surveyor and where necessary quadrat data. The size threshold may be reduced to 0.05ha in situations where the fen lies in another habitat type which meets at least 80% of the Local Site guideline qualifying threshold for that habitat.

Rationale

In the lowland areas of West Yorkshire these plant communities and the assemblage of plants and animals they support have become rare. Important fen communities can form part of a mosaic of habitats which collectively are considered to have substantive nature conservation value.

Guideline

Fe2 Stands of tall-herb fen and/or reedbed that do not qualify on other fen selection guidelines but are greater than 2ha in area and are predominantly comprised of one or more the following NVC communities:

S4 *Phragmites australis* swamp

S5 *Glyceria maxima* swamp

S27 *Carex rostrata-Potentilla palustris* tall-herb fen

S28 *Phalaris arundinacea* tall-herb fen

M27 *Filipendula ulmaria-Angelica sylvestris* mire

Application

This guideline will be applied to areas of tall-herb fen that has been identified as supporting the NVC communities listed above. The classification of the community should be based on field assessment by a competent surveyor. The tall-herb fen habitat should normally dominate the site, but may occur in combination with other fen, grassland, swamp and mire communities and open water or scrub.

Rationale

Tall-herb fens have been adversely affected by agricultural intensification over the last 50 years resulting in the reduction and fragmentation of this habitat. Sites of this habitat of 2ha or greater are now rare within West Yorkshire. Larger tall-herb fens and reedbeds are generally of higher value for their faunal communities, in particular breeding, wintering and passage birds, semi-aquatic mammals and invertebrates.

Guideline

Fe3 Rich-fen sites greater than 0.25ha scoring 10 or more from the species listed in Table 7

Application

This guideline may be applied to any fen site that includes a representative selection of the species listed in Table 7. These species are characteristic of species-rich, good quality rich-fen habitats.

Rationale

Rich-fen sites have been adversely affected by agricultural and other land-use changes in West Yorkshire and remaining sites are often small and isolated from other similar habitat. Such sites continue to be of high nature conservation value as typical examples of the rich-fen habitat and plant and animal communities which it supports.

Guideline

Fe4 Poor-fen and lowland acid mire sites greater than 0.25ha scoring 8 or more from the species listed in Table 8

Application

This guideline may be applied to any fen site, which includes a representative selection of the species listed in Table 8. These species are characteristic of good quality poor-fen habitat. The size threshold may be reduced to 0.1ha in situations where the fen lies in another habitat type which meets at least 80% of the Local Site guideline qualifying threshold for that habitat.

Rationale

Poor-fen sites are rare within West Yorkshire and support specialised groups of plants and animals adapted to the particular environmental conditions associated with this habitat.

Guideline

Fe5 Mixed fen and mire sites greater than 0.25ha scoring 10 or more from the combined species lists in Tables 7 and Table 8

Application

This guideline should be applied to fen and/or lowland acid mire complexes that cannot readily be distinguished as rich-fen, poor-fen or lowland mire and do not qualify under any of the other selection guidelines. Species that are present in both Tables 7 and 8 should not be counted twice. The size threshold may be reduced to 0.1ha in situations where the fen lies in another habitat type which meets at least 80% of the Local Site guideline qualifying threshold for that habitat.

Rationale

This mixed fen and mire sites may not meet the selection guidelines for the different fen types that may be present. These sites represent valuable transitional fen communities, which reflect complex variations in topography, substrate and hydrology.

Guideline

Fe6 Any fen of 0.25 ha or more that has a score from Tables 7 and/or 8 within 20% of the thresholds and which lies within 500m of an existing statutory designated site or Local Wildlife Site supporting an important fen community.

Application

This guideline can be applied to any fen site which does not meet any of the other Fe Guidelines which is within a wildlife corridor or is within close proximity to an existing fen statutory site or a Local Wildlife Site that does fully meet at least one of the other Fe Guidelines.

Rationale

The role and importance of linear continuous habitats and blocks of habitat which act as stepping stones or patches of habitat has been well studied in relation to population dynamics and rates of extinction, immigration and emigration of individuals of species from one habitat patch to another. As a consequence the importance of networks of natural habitats in the countryside and urban areas is recognised in Planning Policy Statement 9 (PPS9) and the EU Habitats Directive.

Table 7 Plant species characteristic of rich-fens.

Scientific name	Common name
<i>Achillea ptarmica</i>	sneezewort
<i>Alisma lanceolatum</i>	narrow-leaved water-plantain
<i>Alisma plantago-aquatica</i>	water-plantain
<i>Anagallis tenella</i>	bog pimpernel
<i>Angelica sylvestris</i>	angelica
<i>Apium inundatum</i>	lesser marshwort
<i>Apium nodiflorum</i>	fool's water-cress
<i>Athyrium filix-femina</i>	lady fern
<i>Berula erecta</i>	lesser water-parsnip
<i>Bidens cernua</i>	nodding bur-marigold
<i>Bidens tripartita</i>	trifid bur-marigold
<i>Bolboschoenus maritimus</i>	sea club-rush
<i>Butomus umbellatus</i>	flowering rush
<i>Calamagrostis canescens</i>	purple small-reed
<i>Caltha palustris</i>	marsh marigold
<i>Carex spp.</i>	sedges (all species)
<i>Catabrosa aquatica</i>	whorl-grass
<i>Cirsium dissectum</i>	meadow thistle
<i>Dactylorhiza spp. (except D. fuchsii)</i>	marsh orchids (all species)
<i>Eleocharis spp. (except E. palustris)</i>	spike-rushes
<i>Epipactis palustris</i>	marsh helleborine
<i>Equisetum fluviatile</i>	water horsetail
<i>Equisetum telmateia</i>	giant horsetail
<i>Eriophorum spp. (other than above)</i>	cotton-grasses
<i>Eupatoria cannabinum</i>	hemp agrimony
<i>Filipendula ulmaria</i>	meadowsweet
<i>Galium palustre</i> ⁷⁷	marsh bedstraw
<i>Galium uliginosum</i>	fen bedstraw

⁷⁷ Amended 21/01/2016

Scientific name	Common name
<i>Geum rivale</i>	water avens
<i>Glyceria declinata</i>	small sweet-grass
<i>Glyceria notata</i>	plicate sweet-grass
<i>Gymnadenia conopsea</i>	fragrant orchid
<i>Hippuris vulgaris</i>	mare's-tail
<i>Hottonia palustris</i>	water-violet
<i>Hydrocotyle vulgaris</i>	marsh pennywort
<i>Hypericum tetrapterum</i>	square-stalked St. John's-wort
<i>Iris pseudacorus</i>	yellow flag
<i>Juncus acutiflorus</i>	sharp-flowered rush
<i>Juncus articulatus</i>	jointed rush
<i>Juncus subnodulosus</i>	blunt-flowered rush
<i>Juncus compressus</i>	round-fruited rush
<i>Listera ovata</i>	tway blade
<i>Lotus pedunculatus</i>	greater birdsfoot trefoil
<i>Lychnis flos-cucculi</i>	ragged robin
<i>Lycopus europaeus</i>	gypsywort
<i>Lysimachia nemorum</i>	yellow pimpernel
<i>Lysimachia nummularia</i>	creeping jenny
<i>Lysimachia vulgaris</i>	yellow loosestrife
<i>Lythrum salicaria</i>	purple loosestrife
<i>Mentha aquatica</i>	water mint
<i>Menyanthes trifoliata</i>	bogbean
<i>Molinia caerulea</i>	purple moor-grass
<i>Myosotis laxa ssp. cespitosa</i>	tufted forget-me-not
<i>Myosotis scorpioides</i>	water forget-me-not
<i>Parnassia palustris</i>	grass-of-Parnassus
<i>Pedicularis palustris</i>	marsh lousewort
<i>Pedicularis sylvatica</i>	lousewort
<i>Persicaria amphibia</i>	amphibious Bistort
<i>Persicaria hydropiper</i>	water-pepper
<i>Phragmites australis</i>	common reed
<i>Pilularia globulifera</i>	pillwort
<i>Pinguicula vulgaris</i>	butterwort
<i>Potentilla palustris</i>	marsh cinquefoil
<i>Pulicaria dysenterica</i>	fleabane
<i>Ranunculus flammula</i>	lesser spearwort
<i>Rumex hydrolapathum</i>	water dock
<i>Sanguisorba officinalis</i>	great burnet
<i>Schoenus nigricans</i>	black bog rush
<i>Scutellaria galericulata</i>	skullcap
<i>Scutellaria minor</i>	lesser skullcap
<i>Scirpus sylvaticus</i>	wood club-rush
<i>Serratula tinctoria</i>	saw-wort
<i>Stellaria palustris</i>	marsh stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Thalictrum flavum</i>	meadow-rue
<i>Triglochin palustris</i>	marsh arrow-grass

Scientific name	Common name
<i>Trollius europaeus</i>	globeflower
<i>Utricularia spp.</i>	bladderwort (all species)
<i>Valeriana dioica</i>	marsh valerian
<i>Valeriana officinalis</i>	common valerian
<i>Veronica catenata</i>	pink water-speedwell
<i>Veronica scutellaria</i>	marsh speedwell
<i>Viola palustris</i>	marsh violet

Table 8 Plant species characteristic of poor fens and lowland acid mires.

Scientific name	Common name
<i>Agrostis canina</i>	velvet bent
<i>Anagallis tenella</i>	bog pimpernel
<i>Andromeda polifolia</i>	bog rosemary
<i>Calluna vulgaris</i>	heather
<i>Carex spp.</i>	sedges (all species)
<i>Dactylorhiza spp. (except D. fuchsii and maculata)</i>	marsh orchids (all species)
<i>Danthonia decumbens</i>	heath-grass
<i>Drosera spp.</i>	sundew
<i>Empetrum nigrum</i>	crowberry
<i>Epilobium palustre</i>	marsh willowherb
<i>Erica tetralix</i>	cross-leaved heath
<i>Eriophorum spp.</i>	cotton-grasses (all species)
<i>Galium palustre</i>	marsh bedstraw
<i>Hydrocotyle vulgaris</i>	marsh pennywort
<i>Isolepis setacea</i>	bristle club rush
<i>Juncus acutiflorus</i>	sharp-flowered rush
<i>Juncus squarrosus</i>	heath rush
<i>Menyanthes trifoliata</i>	bogbean
<i>Molinia caerulea</i>	purple moor-grass
<i>Montia fontana</i>	blinks
<i>Myrica gale</i>	bog myrtle
<i>Narthecium ossifragum</i>	bog asphodel
<i>Pedicularis palustris</i>	marsh lousewort
<i>Pedicularis sylvatica</i>	common lousewort
<i>Potentilla palustris</i>	marsh cinquefoil
<i>Ranunculus flammula</i>	lesser spearwort
<i>Salix aurita</i>	eared willow
<i>Salix repens</i>	creeping willow
<i>Scutellaria galericulata</i>	skullcap
<i>Scutellaria minor</i>	lesser skullcap
<i>Sphagnum spp.</i>	bog moss
<i>Stellaria uliginosa</i>	bog stitchwort
<i>Succisa pratensis</i>	devil's-bit scabious
<i>Trichophorum caespitosum</i>	deer grass
<i>Utricularia spp.</i>	bladderwort
<i>Vaccinium oxycoccus</i>	cranberry
<i>Viola palustris</i>	marsh violet

2.5 STANDING WATER HABITATS

Standing water includes a variety of essentially non-flowing water habitats, although it is recognised that some standing waters do have inflows and outflows of water. Standing waters occur in many different shapes and sizes including lakes, ponds, reservoirs, ditches and canals. Some of these are natural features of the landscape, whilst others are created by human activity. All standing water habitats support areas of open water with associated submerged, floating and marginal plant communities where the water table is permanently above the sediment surface. Where water levels drop below the surface for part of the year, the habitat is included in other selection guidelines covering wet woodland and fen. By definition water filled ditches must have a rate of flow, this varies considerably from one ditch to another and according to time of year. These guidelines include ditches that usually support water throughout the year and thereby support a wetland or aquatic flora and fauna. Where ditches have obvious flow and are stream-like, they should be considered under the flowing water selection guidelines. If there is a level of uncertainty regarding perceptible flow, ditches can be tested under both flowing and standing water guidelines to establish which is most relevant.

Standing water sites can be broadly categorised into eutrophic, mesotrophic and oligotrophic water bodies based on the nutrient status of the water. Whilst chemical parameters have been defined, the interactions between nutrients and biota in standing waters are very complex and adequate data are rarely available. The ranges of concentrations stated are those that usually characterise the water body type; concentrations may vary outside these ranges according to the afore-mentioned interactions and the time of year. These different types of standing water support characteristic plant and animal assemblages. There are UK Biodiversity Habitat Action Plans for “Eutrophic Standing Waters”, “Mesotrophic Lakes”, Oligotrophic and Dystrophic Lakes” and “Ponds”.

Eutrophic standing water

According to the UK Habitat Action Plan, eutrophic waters are found throughout the UK, although they are most typical of hard water lowland areas in the south and east. In the north and west they occur especially near the coast. The total UK area for eutrophic waters is thought to be in the region of 1785km². In England, it is estimated there is an area of approximately 675km² of still inland waters, of which 80% is thought to be eutrophic.

Eutrophic Waters are characterised by their high levels of key plant nutrients. Phosphorus levels are typically greater than 0.035 mg/l and inorganic nitrogen concentrations are greater than 0.5mg/l. These are the lower limits of eutrophic waters and sites often support significantly higher concentrations than this. Owing to the high levels of nutrients these waters often support algal blooms in the summer.

Eutrophic waters can support a high biodiversity, including planktonic algae and zooplankton, as well as submerged, floating and marginal plant assemblages. Many eutrophic standing waters are also of importance for their invertebrate assemblages, in particular dragonflies and damselflies, water beetles and snails. In addition, they can also support a rich marginal fauna of non-aquatic species. Eutrophic standing waters can also

be important for coarse fish such as roach, tench and pike and salmonids where they occur naturally.

In water bodies which are heavily enriched as a result of human activity, biodiversity is depressed because planktonic and filamentous algae (blanket weed) increase rapidly at the expense of other aquatic organisms. This can be reflected in the disappearance of more sensitive species such as pondweeds (*Potamogeton*) and stonewort (*Chara*) species. Water bodies may reach relatively stable but impoverished states. Such water bodies may still be important for their macro-fauna such as wetland birds and amphibians.

Mesotrophic standing water

According to the UK Habitat Action Plan, mesotrophic standing waters are relatively infrequent in the UK and are largely confined to the margins of the upland areas in the north and west of the country. Mesotrophic waters are characterised by a moderate range of nutrients that is not so high as to be eutrophic or so low as to prevent reasonable plant growth in the summer, although normally almost all of the key plant nutrients are taken up by algal growth during the summer. Mesotrophic waters are defined here as those capable of supporting a diverse macrophyte flora, but with relatively clear water and limited growth of planktonic or filamentous algae. Macrophyte communities will include at least some vascular plants or charophytes intolerant of nutrient-enriched conditions particularly nitrogen and phosphorus. Typically, mesotrophic waters have a narrow range of nutrient levels inorganic nitrogen concentrations of 0.3-0.65 mg/l and total phosphorus concentrations of 0.01-0.035mg/l. As a consequence, this habitat is becoming increasingly rare as artificial inputs of nutrients from agriculture and industry increase the trophic status of such water bodies.

Mesotrophic waters can support a higher diversity of submerged water plants (macrophytes) than any other standing water type. They often also support populations of nationally scarce and rare species. Many fish species have been artificially introduced to mesotrophic waters and hence there are very few natural fish assemblages.

Oligotrophic and dystrophic standing water

Oligotrophic waters are primarily found in upland areas in association with hard, nutrient-poor rocks that provide a supply of, or maintain, mineral-poor waters. They support a low primary productivity due to low concentrations of dissolved nutrients, in particular nitrogen and phosphorous, which are primarily bound up in small amounts of organic sediment. The low rate of production and the high levels of dissolved oxygen in the water combine to ensure that the annual organic production is almost completely decomposed.

Oligotrophic waters are usually clear, there is little accumulation of organic matter and the substrate is often comprised of hard acidic rocks and mineral material. Marginal and submerged vegetation is characterised by a suite of plant species restricted to acid waters.

Dystrophic waters are associated with peatland systems and have a high content of colloidal organic material. The high level of organic matter suspended in the water imparts to it a dark brown colour. This high organic content also reduces the levels of dissolved oxygen in the water column to low levels. At the water surface where oxygen

levels are higher, there can be decomposition of the organic content of the water, which releases nitrogen and phosphorus in sufficient amount to allow the growth of algae on or near the water surface during the growing season.

These nutrient-poor water bodies can also sometimes support significant areas of exposed sediment and rocky shore, which support a valuable invertebrate fauna including nationally scarce species.

There is little data on the extent or distribution of oligotrophic and dystrophic waters in West Yorkshire, but they are mainly restricted to upland and upland fringe areas where they are often associated with peatland and upland heath habitats.

Ponds

For the purposes of the UK BAP ponds are defined as permanent and seasonal water bodies up to 2ha in extent. To qualify they must also meet one or more additional criteria: meet Annex I Habitats Directive criteria; support notable species; have exceptional assemblages of key biotic groups; meet the top score for the Predictive System for Multimetrics (PSYM); or have important geomorphological characteristics of limited distribution.

Data is being collated under the National Pond Monitoring Network using the PSYM methodology which should help to inform this selection process, although data is limited for West Yorkshire at the time of publication.

Types of standing water habitat in West Yorkshire

In West Yorkshire there is a wide variety of different standing water bodies, some of which are natural in origin, whilst many others have been created by human activity. Many of the best standing water sites support a range of habitat structures and some of the highest quality sites support only a small proportion of open water. The following list indicates the type and variety of this habitat within the county.

Oxbow lakes

Develop as a result of dynamic, migratory rivers changing course leaving isolated former meanders of the river. There are also artificial oxbow lakes created by river engineering, which can have similar characteristics. Examples can be found on the River Calder near Castleford. They are important for their naturalness and connectivity with the river corridor resulting in a diverse range of habitats in close proximity.

Peatland pools

Usually small and temporary they form as a result of the topography of the mire or fen. They lie mainly within the uplands and upland fringes associated with upland heath and blanket bog habitat. Some uncommon examples appear in the lowlands for example Coppice Pond in Bradford District. A slight variant of this habitat can be found associated with lowland heath/acid grassland on the Coal Measures in Wakefield.

Inland brackish waters

These standing waters are associated with coal mining activity where ponds, often formed as a result of mining subsidence, have elevated salt content as a result of ground

water seeping through colliery spoil or mine water contamination. A good example is Mickletown Ings SSSI which supports species such as saltmarsh rush (*Juncus gerardii*), the long-headed fly (*Porphyrops antennae*) and the amphipod (*Gammarus duebeni*) all of which are normally associated with more coastal locations.

Stock watering ponds

Usually originating from the time of the Enclosure Acts these ponds are traditionally associated with pasture, but may now have been subsumed by arable land. Some on common land may be of much older origin.

Reservoirs

Constructed for irrigation and water storage. Mainly of ornithological interest, although some support a specialised flora associated with draw-down zones. Dam wall structures may also support interesting assemblages of plants.

Borrowpits

Associated with river corridors, railway lines and roads these standing waters have arisen where material has been excavated for construction of floodbanks and other embankments. Concentrations of these pits are important. The vegetation is variable according to trophic status. For example, some can be excavated into underlying clay subsoils and, therefore, be relatively mesotrophic whereas others are highly eutrophic.

Mineral extraction sites

These are clay, coal mining, sandstone and sand and gravel extraction sites often associated with river corridors. These sites can be very variable ranging from deep gravel pits to new brick pits and small shallow hand dug clay ponds typical of Victorian brick works. These sites tend to become more natural with time by colonisation of plants and animals. Freedom from human disturbance, including pollution and recreation, is beneficial for wildlife interest particularly birds. A concentration of former gravel pits and coal mining sites along the River Aire and Calder form an important ecological feature of the valleys. Many of these pits are of value for breeding, passage and wintering waterfowl and passerines (perching birds). Extensive opencast coal mining has resulted in water bodies associated with restoration scheme such as that at St Aidans in Leeds. In the Pennines extensive working of sandstone for use as a building material has in some locations resulted in wildlife pond creation following restoration.

Subsidence flashes

These tend to be saucer shaped water bodies resulting from underground mine workings. They are generally extensive water bodies in winter with shallow margins and reduce significantly in size in the summer with extensive draw down zones. This makes them particularly valuable for wading birds and dabbling ducks.

Mill Ponds

There are significant numbers of mill ponds in West Yorkshire associated with all scales of mills, from large industrial complexes, down to much smaller sites. Some are associated with retaining water to power the mills, other were linked to industrial processes. With the decline of heavy industry many of these ponds have been in-filled or drained. They can provide important networks of sites for species such as great crested newts. The wildlife interest of mill ponds is often poorly recorded.

Fish ponds

Fishponds may support a range of features such as rich marginal vegetation, areas of relic fen or secondary wet woodland. They may be present as a series of interconnecting ponds, which provide a filtration system.

Ornamental lakes

Often associated with large estates or a parkland landscape. These sites can be of significant biological importance. They tend to be eutrophic, with marginal vegetation often including swamp communities. Larger lakes are important roosting sites for waterfowl and diving ducks. A good example would be Bretton Lakes and the ponds at Nostell Priory in Wakefield.

Canals

There is an extensive canal network in West Yorkshire including the Barnsley Canal which is now derelict. Parts of the Leeds Liverpool Canal have been designated as an SSSI for its assemblage of invertebrates which are associated with the marl used to line a section of the canal. Most of the canals have important submerged, floating and emergent plant communities. These include nationally notable species like floating water plantain (*Luronium natans*). The canals also provide important wildlife corridors contributing to a network of wetland habitats and rivers.

The invertebrate value of standing water bodies is generally linked to structural complexity which is related to a combination of substrate and vegetation structures. Complex vegetation architecture may be an attribute of a dominant plant species (e.g. the densely woven structure of *Chara* beds in open water). It may also be as a result of different species growing together, for example, where small sedges, species of spike rush, species of rush and mosses form a close mosaic in some types of fen and water margin vegetation. In most standing water habitats, the vast majority of macro-invertebrate biomass is associated with richly vegetated shallow water margins. Many aspects of these structures will be picked up within the habitats guidelines but consideration should also be given to species guideline later in this document.

2.5.1 Selection Criteria and Attributes

Selection criteria and attributes for standing water Local Wildlife Sites

CRITERION	ATTRIBUTE
Size or extent	The area of a site or length of canal
Rare or exceptional features	The presence of nationally rare or declining species; presence of regionally important species; presence of locally rare or declining plant species or species/communities of restricted distribution, which have a population stronghold in West Yorkshire.
Diversity	The diversity of vegetation structure and successional stages of marginal, emergent, submerged and floating aquatic vegetation.
Naturalness	The presence of natural features, evidence of longevity and maturation. Absence of invasive

	alien species. Use of trophic status/ nutrient level data. Absence of physical or chemical pollution including absence of human manipulation such as artificial fish stocking
Typicalness	The use of trophic status/nutrient level data, Conductivity, pH, hardness data where available. The presence of aquatic NVC communities, adjusted where necessary to reflect limits in the range of some species.
Connectivity within the landscape	The proximity to and connections with other wetlands or habitats necessary for the survival of other biotic groups (invertebrates & amphibians). Site in key migration routes for wildlife particularly birds.
Fragility	Point source or diffuse source pollution does not adversely affect the site. Particularly important where agricultural fertilizers have not yet resulted in significant eutrophication of mesotrophic or oligotrophic/dystrophic water bodies.

2.5.2 General application of Standing Water Guidelines

The guidelines for standing waters should be applied to areas of permanent or seasonal open water and associated swamp habitats of natural and artificial origin.

Subsidiary habitats such as wet woodland and fen that may be associated with standing water sites can also be included within the Local Wildlife Site if they warrant designation in their own right. If they do not merit designation in their own right, they may also be included within the standing water Local Wildlife Site if they are hydrologically contiguous with the standing water; provide important habitat for part of the life cycle of species of interest associated with the Local Wildlife Site; or provide buffering to protect the open water habitat from damage by for example, fertilizer or physical damage from people or livestock.

Working canals have a particularly important role as wildlife corridors within West Yorkshire, with opportunities for both flora and fauna to move by maintenance work, boat traffic, low flows or without assistance. Canals with identified botanical and/or faunal interest should therefore be designated as continuous wildlife corridors and not fragmented into short sections.

Plants which are nationally rare or scarce or otherwise locally notable are not required to be well distributed throughout the site.

Standing water sites should also be tested against species selection guidelines for example those for birds, amphibians and invertebrates.

2.5.3 Standing Water Selection Guidelines

Areas of standing water, with any integral marginal vegetation that meet any one or more of the following guidelines will be eligible for selection as a Local Wildlife Site.

Guideline

Sw1 A nutrient-rich standing water site that scores 10 or more from the species listed in Table 9 with at least one species recorded from each of two of the following habitat zones of submerged, floating and emergent/swamp habitat.

Application

The majority of the species recorded from Table 9 should be well distributed within the site. If they are rare (DAFOR) or restricted to a few areas, the site should not generally be designated.

Rationale

The species listed in Table 9 provide an indication of a diverse and good quality standing water habitat, with a range of different vegetation communities from open water through to marginal swamp vegetation that is of nature conservation value.

Guideline

Sw2 A nutrient poor standing water that scores 5 or more from the species listed in Table 10.

Application

The majority of the species recorded from Table 10 should be well distributed within the site. If they are rare (DAFOR) or restricted to a few areas, the site should generally not be designated on the basis of this guideline.

Rationale

The species listed in Table 10 are indicative of good examples of nutrient poor (mesotrophic and oligotrophic through to dystrophic) water bodies with a variety of habitat. These water bodies tend to be significantly more species poor than eutrophic water bodies covered by guideline Sw1.

Guideline

Sw3

A standing water body that supports one of the known rare aquatic habitats in West Yorkshire as follows:

- a) mesotrophic standing water in the Southern Magnesian Limestone or Coal Measures Natural Areas.
- b) *Littorella* vegetation
- c) 5 or more submerged aquatic species
- d) stable charophyte communities
- e) NVC community A20 *Ranunculus peltatus* community)
- f) maritime brackish water ponds characterised by the presence of the following species: *Myriophyllum spicatum* (spiked water millfoil), *Potamogeton pectinatus* (fennel pondweed), *Juncus gerardii* (saltmarsh rush), *Bolboschoenus maritimus* (sea club-rush), *Schoenoplectus tabernaemontani* (grey club-rush), *Ranunculus baudotii* (brackish water-crowfoot)

Application

This guideline is to be applied to those key habitats that are known to be rare and are valued within the county. Under a) mesotrophic standing water is defined in earlier text. Under d) this is not intended to be applied to pioneer communities dominated by *Chara* in the process of succession to macrophyte communities.

As information becomes available additional sites may be identified under f) based on stable populations of brackish faunal species.

Rationale

The above are rare habitats or vegetation community types in West Yorkshire and are worthy of protection.

Guideline

Sw4

A standing water site that supports seasonal draw down zones and open vegetation of inundation habitat characterised by:

- a) the presence of 1 or more of the specialist species asterisked in Table 11 and 1 or more of the other characteristic species shown in Table 11

- b) one of the following NVC communities:

OV29 *Alopecurus geniculatus* – *Rorippa palustris*
OV30 *Bidens tripartita* - *Persicaria amphibia*
OV31 *Rorippa palustris* – *Gnaphalium uliginosum*
OV35 *Lythrum portula* – *Ranunculus flammula*

Application

This applies to sites that hold standing water due to prolonged or seasonal flooding or standing water sites where the water levels fluctuate. These may for example be floodplain grasslands, fens or reservoirs.

Rationale

These narrow zones can support highly specialised flora including nationally scarce species.

Guideline

Sw5

Any standing water body which lies within 500m of an existing statutory designated or Local Wildlife Site supporting an important standing water community and which has a score from Tables 9 or 10 within 20% of the species diversity thresholds.

Application

This guideline can be applied to any standing water site which does not meet any of the other Sw Guidelines which is within a wildlife corridor or is within close proximity to an existing standing water statutory designated site or a Local Wildlife Site that does fully meet at least one of the other Sw Guidelines.

Rationale

The role and importance of linear continuous habitats and blocks of habitat which act as stepping stones or patches of habitat has been well studied in relation to population dynamics and rates of extinction, immigration and emigration of individuals of species from one habitat patch to another. As a consequence the importance of networks of natural habitats in the countryside and urban areas is recognised in Planning Policy Statement 9 (PPS9) and the EU Habitats Directive.

Table 9 Indicative species list for nutrient rich standing waters (eutrophic through to mesotrophic)

<u>Scientific name</u>	<u>Common name</u>	<u>Characteristic mesotrophic spp</u>
<i>Alisma lanceolatum</i>	narrow-leaved water-plantain	
<i>Alisma. plantago-aquatica</i>	water plantain	
<i>Apium inundatum</i>	lesser marshwort	*
<i>Apium nodiflorum</i>	fool's water-cress	
<i>Berula erecta</i>	lesser water-parsnip	
<i>Bidens cernua</i>	nodding bur-marigold	
<i>Bidens tripartite</i>	trifid bur-marigold	
<i>Bolboschoenus maritimus</i>	sea club-rush	
<i>Butomus umbellatus</i>	flowering rush	
<i>Callitriche sp.</i> ⁷⁸	water-starwort	
<i>Carex spp</i>	any sedge	
<i>Catabrosa aquatic</i>	water whorl-grass	
<i>Ceratophyllum demersum</i>	rigid hornwort	
<i>Charophytes</i>	any stonewort	*

⁷⁸ Changed 14/12/2017

<i>Eleocharis acicularis</i>	needle spike-rush	
<i>Eleocharis palustris</i>	common spike-rush	
<i>Equisetum fluviatile</i>	water horsetail	
<i>Eupatorium cannabinum</i>	hemp-agrimony	
<i>Filipendula ulmaria</i>	meadowsweet	
<i>Galium palustre</i> ⁷⁹	marsh bedstraw	
<i>Glyceria declinata</i>	small sweet-grass	
<i>Glyceria fluitans</i>	floating sweet-grass	
<i>Glyceria maxima</i>	reed sweet-grass	
<i>Glyceria notata</i>	plicate sweet-grass	
<i>Groenlandia densa</i>	opposite-leaved pondweed	
<i>Hippuris vulgaris</i>	mare's tail	
<i>Hottonia palustris</i>	water violet	*
<i>Hydrocharis morsus-ranae</i>	frogbit	*
<i>Hypericum tetrapterum</i>	square-stalked St. John's-wort	
<i>Iris pseudacorus</i>	yellow flag	
<i>Juncus acutiflorus</i>	sharp-flowered rush	
<i>Juncus articulatus</i>	jointed rush	
<i>Juncus bulbosus</i>	bulbous rush	
<i>Juncus conglomeratus</i>	compact rush	
<i>Juncus subnodulosus</i>	blunt-flowered rush	
<i>Juncus effusus</i>	soft rush	
<i>Juncus inflexus</i>	hard rush	
<i>Lemna gibba</i>	common duckweed	
<i>Lemna polyrhiza</i>	greater duckweed	
<i>Lemna trisulca</i>	ivy-leaved duckweed	
<i>Littorella uniflora</i>	shoreweed	*
<i>Luronium natans</i>	floating water plantain	
<i>Lycopus europaeus</i>	gypsywort	
<i>Lythrum portula</i>	water purslane	
<i>Lythrum salicaria</i>	purple loosestrife	
<i>Mentha aquatica</i>	water mint	
<i>Menyanthes trifoliata</i>	bogbean	*
<i>Myosotis laxa</i>	tufted forget-me-not	
<i>Myosotis scorpioides</i>	water forget-me-not	
<i>Myriophyllum spicatum</i>	spiked water milfoil	
<i>Nitella</i> spp.	any stonewort	
<i>Nuphar lutea</i>	yellow water-lily	
<i>Nymphaea alba</i>	white water-lily	
<i>Oenanthe crocata</i>	hemlock water-dropwort	
<i>Oenanthe fistulosa</i>	tubular water-dropwort	
<i>Persicaria amphibia</i>	amphibious bistort	
<i>Persicaria hydropiper</i>	water-pepper	
<i>Phalaris arundinacea</i>	canary reed-grass	
<i>Phragmites australis</i>	common reed	
<i>Pilularia globulifera</i>	pillwort	*
<i>Potamogeton berchtoldii</i>	small pondweed	
<i>Potamogeton friesii</i>	flat-stalked pondweed	

⁷⁹ Amended 21/01/2016

<i>Potamogeton crispus</i>	curled pondweed	
<i>Potamogeton natans</i>	broad-leaved pondweed	*
<i>Potamogeton obtusifolius</i>	blunt-leaved pondweed	
<i>Potamogeton pectinatus</i>	fennel-leaved pondweed	
<i>Potamogeton perfoliatus</i>	perfoliate pondweed	
<i>Potamogeton pusillus</i>	lesser pondweed	
<i>Potamogeton trichoides</i>	hairlike pondweed	
<i>Potentilla palustris</i>	marsh cinquefoil	
<i>Ranunculus spp (aquatic)</i>	water-crowfoot species	
<i>Ranunculus flammula</i>	lesser spearwort	
<i>Ranunculus lingua</i>	greater spearwort	
<i>Rorippa nasturtium-aquaticum</i>	water-cress	
<i>Rorippa amphibia</i>	greater yellow-cress	
<i>Rorippa palustris</i>	marsh yellow-cress	
<i>Rorippa sylvestris</i>	creeping yellow-cress	
<i>Rumex hydrolapathum</i>	water dock	
<i>Sagittaria sagittifolia</i>	arrowhead	
<i>Samolus valerandi</i>	brookweed	
<i>Schoenoplectus lacustris</i>	common club-rush	
<i>Schoenoplectus tabernaemontani</i>	grey club-rush	
<i>Scrophularia auriculata</i>	water figwort	
<i>Scutellaria galericulata</i>	common skullcap	
<i>Sparganium emersum</i>	unbranched bur-reed	
<i>Sparganium erectum</i>	branched bur-reed	
<i>Sparganium natans</i>	least bur-reed	*
<i>Spirodela polyrhiza</i>	greater duckweed	
<i>Stachys palustris</i>	marsh woundwort	
<i>Stratiotes aloides</i>	water-soldier	
<i>Typha angustifolia</i>	narrow-leaved bulrush	
<i>Typha latifolia</i>	bulrush	
<i>Utricularia spp.</i>	any species of bladderwort	*
<i>Valeriana officinalis</i>	common valerian	
<i>Veronica anagallis-aquatica</i>	blue water-speedwell	
<i>Veronica beccabunga</i>	brooklime	
<i>Veronica catenata</i>	pink water-speedwell	
<i>Zannichellia palustris</i>	horned pondweed	

Table 10 Indicative species list for nutrient poor standing waters (dystrophic and oligotrophic through to mesotrophic)

<u>Scientific name</u>	<u>Common name</u>	<u>Characteristic mesotrophic spp</u>
<i>Apium inundatum</i>	lesser marshwort	*
<i>Callitriche sp.</i> ⁸⁰	water-starwort	
<i>Carex paniculata</i>	greater tussock sedge	
<i>Carex rostrata</i>	bottle sedge	
<i>Charophyte spp</i>	any stonewort	*

⁸⁰ Amended 14/12/2017

<i>Equisetum fluviatile</i>	water horsetail	
<i>Eriophorum latifolium</i>	broad-leaved cotton grass	
<i>Eriophorum</i> spp.	any other species of cotton grass	
<i>Hippuris vulgaris</i>	mare's tail	
<i>Hottonia palustris</i>	water violet	*
<i>Hydrocharis morsus-ranae</i>	frogbit	*
<i>Juncus bulbosus</i>	bulbous rush	
<i>Littorella uniflora</i>	shoreweed	*
<i>Menyanthes trifoliata</i>	bogbean	*
<i>Myosotis stolonifera</i>	pale forget-me-not	
<i>Myriophyllum alterniflorum</i>	alternate water-milfoil	*
<i>Nitella</i> spp.	stonewort	
<i>Nymphaea alba</i>	white water-lily	
<i>Pilularia globulifera</i>	pillwort	*
<i>Potamogeton natans</i>	broad-leaved pondweed	
<i>Potamogeton obtusifolius</i>	blunt-leaved pondweed	*
<i>Potamogeton perfoliatus</i>	perfoliate pondweed	
<i>Potamogeton polygonifolius</i>	bog pondweed	
<i>Potentilla palustris</i>	marsh cinquefoil	
<i>Ranunculus flammula</i>	lesser spearwort	
<i>Ranunculus</i> spp. (aquatic)	water crowfoot species	
<i>Schoenoplectus tabernaemontani</i>	grey club-rush	
<i>Sphagnum</i> spp.	bog moss	
<i>Utricularia</i> spp.	any species of bladderwort	*

Table 11 Indicative species list for draw-down zones and open vegetation of inundation habitat.

<u>Scientific name</u>	<u>Common name</u>	<u>Characteristic mesotrophic spp</u>
<i>Agrostis stolonifera</i>	creeping bent	
<i>Alopecurus aequalis</i>	orange foxtail	*
<i>Alopecurus geniculatus</i>	marsh foxtail	
<i>Bidens tripartite</i>	trifid bur-marigold	
<i>Bidens cernua</i>	nodding bur-marigold	
<i>Callitriche</i> spp.	water-starworts	
<i>Chenopodium polyspermum</i>	many-seeded goosefoot	*
<i>Chenopodium rubrum</i>	red goosefoot	
<i>Eleocharis acicularis</i>	needle spike-rush	*
<i>Gnaphalium uliginosum</i>	marsh cudweed	
<i>Hydrocotyle vulgaris</i>	marsh pennywort	
<i>Juncus bufonius</i>	toad rush	
<i>Limosella aquatica</i>	mudwort	*
<i>Littorella uniflora</i>	shoreweed	*
<i>Lythrum portula</i>	water purslane	*
<i>Myosotis</i> spp	water forget-me-nots	
<i>Persicaria amphibia</i>	amphibious bistort	
<i>Persicaria laxiflora</i>	tasteless water-pepper	*

<i>Pilulifera globulifera</i>	pillwort	*
<i>Polygonum hydropiper</i>	water-pepper	
<i>Potentilla anserina</i>	silverweed	
<i>Potentilla palustris</i>	marsh cinquefoil	
<i>Ranunculus repens</i>	creeping buttercup	
<i>Rorippa spp</i>	the smaller yellow-cress species	
<i>Rorippa palustris</i>	marsh yellow-cress ⁸¹	*
<i>Rumex palustris</i> ⁸²	marsh dock	*
<i>Rumex maritimus</i>	golden dock	*
<i>Veronica scutellata</i>	marsh speedwell	

2.6 FLOWING WATER HABITATS

West Yorkshire supports a diverse range of flowing water habitats with fast flowing upland streams emanating from extensive blanket bog, heath and springs down to large lowland rivers flowing steadily across extensive alluvial floodplains. In upper and middle reaches most flow over siliceous rocks, sandstones and shales, but there are limited calcareous influences in the Magnesian Limestone Natural Area to the east.

Rivers are dynamic ecosystems in their natural state, however, there are few natural rivers remaining within the UK and such rivers represent a valuable resource.⁸³ Some of the head water streams of river systems in the Pennines provide the best examples of near natural characteristics, arising from blanket bog and upland heath before descending through steep sided wooded cloughs. Some have been altered by damming to form reservoirs or to take off water for mills. The influence of the industrial revolution, urbanisation and agricultural improvement has had a significant impact on the middle and lower reaches of most West Yorkshire rivers and streams. The River Wharfe is recognised as having the most near natural characteristics. Each stage of the river possesses its own in-channel features often associated with quite different waterside habitats. Flow rates, which change with the season and climate, as well as the fall and channel width of a reach, influence the sediment size of particles which the river is able to transport. It influences the patterns of erosion and deposition which lead to riffles and pools, shingle beds, sand bars, islands, meanders, oxbow lakes, levees, flood meadows and steeply sloping earth banks which are all of value to a range of flora and fauna.

Along many stretches of rivers, attempts have been and continue to be made to control and confine natural processes through dredging of silts and other substrates, construction of flood banks, re-enforcement of banks, culverting and straightening of watercourses. All these activities affect the diversity and nature of both in-channel habitats and those on the riverside. These physical modifications and controls affect the ability of a river to create the diversity of river habitat normally associated with natural

⁸¹ Error corrected 13/12/2018

⁸² Error corrected 13/12/2018

⁸³ UK Biodiversity Steering Group (1998). Biodiversity: The UK Steering Group Report, Volume 2 Action Plans, 1995.

river systems. This in turn affects the variety of habitats and niches available to plants and animals.

The diversity of plant and animal species is not only affected by the physical characteristics of the river, but also by the condition of the water itself. In general terms, upland rivers and watercourses near to source tend to have lower concentrations of dissolved plant nutrients, less pollution and much higher levels of dissolved oxygen. In contrast lowland courses of rivers receive large inputs of organic and inorganic material and increased levels of nutrients and other elements. In these parts of the rivers, where flows are slower and there is less incorporation of oxygen from the air, dissolved oxygen levels exhibit seasonal and diurnal fluctuations.

The chemical composition of some flowing waters is also greatly influenced by the bedrock within the catchment of the river. This can also significantly affect the variety of plants and animals found within the watercourse. Watercourses with a good water quality, for example, will generally support a higher diversity of aquatic invertebrates than those that are heavily polluted. Water quality can also affect the species of fish and other animals which can tolerate conditions or have a competitive advantage. Heavily polluted watercourses also exhibit changes in the submerged aquatic flora. Eutrophication of rivers and streams from artificial sources can result in a shift from submerged vegetation dominated by macrophytes to communities dominated by algae.

These guidelines primarily include rivers and specific types of streams. Springs are included in the guidelines for the selection of fen and lowland mire habitat. Waterside habitats closely linked to rivers and streams such as flood meadows, fens and wet woodland are covered by other selection guidelines. Canals are included under the standing water section as their plant communities are more characteristic of standing than flowing water systems.

Rivers in the UK have been divided into classes based on a number of physical characteristics and macrophyte communities. This is broadly the system adopted for the selection of Site of Special Scientific Interest, augmented where appropriate by consideration of additional faunal data on fish, birds, otters and invertebrates. The classification divides rivers into four Groups A to D and then subdivides these into Types. The movement from Group A through to Group D generally reflects an increase in altitude. The altitude of the source has a significant influence on the range of Groups transcended by the river. Some of the common plant species are more or less limited to one of the extremes Groups A or D but many more species are found to transcend the boundaries. The Types reflect more subtle changes in the geology and grain size of the river bed.

Group A - Lowland rivers with shallow gradients and rich geology

Sites with floras typical of eutrophic lowland rivers with low gradients and substrates tending to be clay, silt or sand. Good indicator species which are strongly associated with Group A include *Sparganium emersum*, *Callitriche stagnalis*, *Lemna minor*, *Nephar lutea*, *Veronica anagallis-aquatica*, *Rorippa nasturtium-aquaticum*, *Glyceria maxima*, *Lythrum salicaria* and *Carex riparia*. Less commonly-occurring are *Sagittaria sagittifolia* and *Schoenoplectus lacustris* and to some degree *Berula erecta*, *Dipsacus fullonum* and *Phragmites australis*.

Type IV Impoverished lowland rivers - possible in lower reaches of main rivers and canals in West Yorkshire

Group B - Meso-eutrophic rivers flowing predominantly over sandstone and hard limestone

Sites of an intermediate nature with generally lower nutrient levels than Group A. Substrates tend to fall between silt/sand and cobbles. There is a significant overlap with plant species in Group A with only 4 species which are unique to Group B, *Hildenbrandia rivularis* (alga), *Oenanthe crocata*, *Amblystegium riparium* (moss) and *Brachythecium rutabulum* (moss).

Type V Sandstone, mudstone and hard limestone rivers of England and Wales – more likely to be associated with Magnesian Limestone eg sections of the River Wharfe near Wetherby and Boston Spa.

Type VI Sandstone, mudstone and hard limestone rivers of Scotland and northern England – more likely on Coal Measures with moderate topographic influence eg sections of the River Wharfe around Addingham, Ilkley and Otley and middle reaches of the Rivers Aire and Calder.

Group C - Mesotrophic and oligo-mesotrophic rivers

Sites of an intermediate nature with relatively low nutrient status and tendency towards steeper channel gradients. Substrates tend to include more gravels through to boulders and increased areas of bedrock. Flora has little in common with Group A but a degree of overlap with both B and D. Unique taxa include *Chiloscyphus polyanthos* (livewort), *Fontinalis squamosa* (moss), *Hygrohypnum ochraceum* (moss), *Schistidium alpicola* (moss) and *Angelica sylvestris*. There is a marked prevalence of bryophytes as the main river-channel species.

Type VIII Oligo-mesotrophic rivers – most likely in Pennine Dales Fringe including both main rivers and tributaries.

Group D - Acid and nutrient-poor rivers

Sites with floras typical of torrent rivers and oligotrophic waters. Substrates increase in grain size to pebbles, cobbles and boulders with more visible bedrock. The plants in this group are dominated by bryophytes and oligotrophic moorland edge species which typically include species such as *Racomitrium aciculare* (moss), *Scapania undulata* (moss), *Sphagnum* spp (mosses), *Polytrichum commune* (moss), *Bryum pseudotriquetrum* (moss), *Nardia compressa* (liverwort), *Molinia carrulea* and *Juncus bulbosus*

Type X Ultra-oligotrophic rivers – likely in South Pennines associated with blanket bog and acid heath.

Although canals are generally covered under standing water in these criteria, there are sections which are slow flowing which have characteristics more typical of Group A lowland rivers and may be considered under these criteria.

2.6.1 Selection Criteria and Attributes

Selection criteria and attributes for flowing water Local Wildlife Sites

CRITERION	ATTRIBUTE
Size or extent	<p>When determining the boundaries of a flowing water habitat for assessing against these criteria use either</p> <p>1) “Evaluated Corridor Sections” [Common Standards Monitoring Guidance for Rivers JNCC March 2005] where the site is to be selected based upon habitat characteristics or wide ranging species; or</p> <p>2) A recognisable management unit defined by physical features on the ground, where the selection is based upon species or rare or exceptional features of more limited range.</p> <p>Width minimum 0.5m from wetland margin – wetland margin.</p>
Rare or exceptional features	<p>The presence of nationally rare or declining species; presence of regionally important species; presence of locally rare or declining species or species/communities of restricted distribution, which have a population stronghold in West Yorkshire. The presence of a rare habitat type at international to local level.</p>
Diversity	<p>The diversity of hydromorphological features as defined by River Habitat Survey (RHS) methodology (reference).</p> <p>The diversity of NVC types and plant and animal species.</p>
Naturalness	<p>The presence of features associated with natural rivers such as oxbows, riffles, pools, gravel shoals/shingle, sand bars. Evidence of active meandering.</p> <p>Absence of physical intervention or chemical pollution including absence of human manipulation such as artificial fish stocking.</p> <p>Absence of dominant or abundant non-native invasive plant species, in particular Japanese knotweed, Himalayan balsam and giant hogweed.</p>
Typicalness	<p>The presence of nationally important river types as defined by RHS or methodology developed by Nigel Holmes “Typing British Rivers According to their Flora.”</p> <p>Comparison of the observed characteristics of the river with Biological General Quality</p>

	Assessment (includes BMWP & RIVPACS) of what might be expected.
Connectivity within the landscape	The proximity to other habitats including wetlands. Known migration route for wildlife including fish.
Fragility	Point source or diffuse source pollution does not adversely affect the site. Particularly important where agricultural fertilizers have not yet resulted in significant eutrophication of mesotrophic or oligotrophic/dystrophic water bodies.

2.6.2 General application of Flowing water guidelines

These guidelines may be applied to all rivers and streams. The extent of the riverine or stream habitat will be defined as follows:

Rivers and streams are taken to extend from bank top to bank top, or where there are no distinctive banks or banks are never overtopped, it includes the extent of the mean annual flood. This includes the open water zone which may contain submerged, free floating or floating-leaved vegetation, water fringe vegetation and exposed sediments and shingle banks. Significant areas of adjoining habitats such as woodland, fen and grassland will not generally be included and should be addressed under other habitat criteria.

In some instances long stretches of rivers should be designated because they contain locally important habitats, geomorphological characteristics or species which are reliant on continuous high quality riparian habitat, such as migratory fish. In other cases substantive interest may be limited to a shorter reach in which case the management unit between physical features on the ground eg bridges or field boundaries should be designated. Rivers with semi-natural geomorphological characteristics can migrate across a flood plain, sometimes dramatically. Mapped boundaries should be presumed to include changes resulting from such phenomena.

2.6.3 Flowing Water Selection Guidelines

Water courses or sections of water courses will be eligible for selection as a Local Wildlife Site if they satisfy one of the following guidelines.

Guideline

Fw1

A stretch of river or stream that has 2 or more of the following:

a) Regularly supports a high and/or near natural water quality as determined by Biological General Quality Assessment methodology used by the Environment Agency.

b) A suite of 4 or more natural river habitat features that should normally occur in the stretch of water course being evaluated from those listed below:

waterfalls

- islands**
- oxbows**
- pools**
- rapids**
- riffle and run systems**
- river cliffs (earth or rock)**
- sand or mud banks**
- shingle banks/gravel shoals**
- unmodified bank profiles**
- unvegetated point bars**
- vegetated point bars**
- accumulations of coarse woody debris**
- c) A score of 12 or more from the species listed in Table 12**
- d) Significant water-crowfoot beds.**

Application

Rivers selected for habitat characteristics or wide ranging species, rather than for species of limited range, should use one or more "Evaluated Corridor Sections" [Common Standards Monitoring Guidance for Rivers JNCC March 2005]. These are generally channel lengths (not the valley length) of 10 to 30km with similar characteristics. For rare or exceptional features of more limited range a recognisable management unit defined by physical features on the ground should be used. Rivers and streams should generally be a minimum width of 0.5m from wetland margin to wetland margin. Headwater streams are generally well represented and protected within the South Pennine Moors SPA and will only be included within Local Wildlife Sites in exceptional circumstances.

Rationale

Unmodified near natural water courses support a greater diversity of plant and animal species than water courses that have been physically modified and have degraded water quality. Near natural water courses provide important habitat for a considerable range of species and are a rare habitat nationally.

Guideline

Fw2 Any stretch of river that is identified as a high quality representation of its type, as specified within the Vegetation Communities of British Rivers⁸⁴ classification system.

Application

This should be applied to stretches of river usually of 1km or more in length, as this is the standard length used by the classification system. Key river types & sub-communities within West Yorkshire are VI(a), VI(b), VI(c), VIII(c), X(c) and X(e). This should not be applied to rivers of Types II or IV as these indicate impoverished river communities. Liaison with Environment Agency ecologists and biologists will be valuable to assess riverine sites using this guideline.

⁸⁴ Holmes, Boon, Rowell. 1999. Vegetation Communities of British Rivers: A Revised Classification. Joint Nature Conservation Committee.

Rationale

Rivers observed to be representative of their national type are valued as true examples of the expected river quality for the respective environmental conditions local to the river corridor, such as geology and geomorphology. They reflect primary criteria, including representativeness, diversity and naturalness. Good examples of high quality rivers are scarce within England, as many rivers no longer occur in their natural state due to various man-induced physical or chemical modifications. Unmodified near natural watercourses, support more characteristic plant and animal species than those watercourses which have been physically modified and have a degraded quality of water. The classification system combines geology, river sediment size, lower plants and macrophytes within the analysis.

Guideline

Fw3 Any stream originating from the calcareous substrata of the Magnesian Limestone that supports 4 or more species of characteristic calcareous stream flora shown in Table 12 and/or characteristic invertebrate fauna as verified by an invertebrate ecologist.

Application

Springs, flushes and streams emanating from the Magnesian Limestone should only be selected to include lengths which have specialist flora and fauna associated with the calcareous water and substrate chemistry. This is likely to be limited by diffuse pollution and physical modification caused by agriculture, urban development, coal mining pollution and impoundment for ornamental lakes. Degraded sections should not be selected under this criterion.

Rationale

Minor Streams, Springs, Fens, Flushes, Mires and Fenny Fields (SFM) on the Southern Magnesian Limestone have been recognised as being of importance within the neighbouring Doncaster Local Biodiversity Action Plan January 2007. This indicates that there may be similar specialised interest within becks and streams of the Magnesian Limestone in Wakefield and Leeds. Examples might include sections of the Cock Beck, Collingham Beck, Bramham Beck, Carr Beck, Sheffield Beck, River Went and Little Went. These are unlikely to fit the Chalk Streams UK BAP even though they are on similar soft calcareous substrates, because they lack the flint component which provides chalk streams with gravel beds. The Magnesian Limestone becks will tend to have silty or sandy substrates, but should be recognised where they have identified specialist flora/fauna. Potential sites should also be assessed against guidelines for fens, springs and flushes.

Table 12 Flowing water vascular plants

<u>Scientific name</u>	<u>Common name</u>	<u>Calcareous stream species</u>
<i>Alisma lanceolatum</i>	narrow-leaved water plantain	
<i>Alisma plantago-aquatica</i>	water plantain	
<i>Apium nodiflorum</i>	fool's water-cress	
<i>Berula erecta</i>	lesser water-parsnip	*

<i>Butomus umbellatus</i>	flowering rush	
<i>Callitriche</i> spp	any water-starwort	*
<i>Carex acutiformis</i>	lesser pond sedge	
<i>Carex paniculata</i>	great tussock sedge	*
<i>Carex riparia</i>	greater pond sedge	
<i>Ceratophyllum demersum</i>	rigid hornwort	
Charophytes	any stonewort species	
<i>Eupatoria cannabinum</i>	hemp agrimony	
<i>Glyceria notata</i>	plicate sweet-grass	*
<i>Groenlandia densa</i>	opposite-leaved pondweed	*
<i>Hippuris vulgaris</i>	mare's-tail	*
<i>Hottonia palustris</i>	water violet	
<i>Iris pseudacorus</i>	yellow flag	
<i>Lythrum salicaria</i>	purple loosestrife	
<i>Mentha aquatica</i>	water mint	
<i>Myosotis scorpioides</i>	water forget-me-not	
<i>Myosotis stolonifera</i>	pale forget-me-not	
<i>Myriophyllum alterniflorum</i>	alternate water-milfoil	
<i>Myriophyllum spicatum</i>	spiked water-milfoil	
<i>Nuphar lutea</i>	yellow water lily	
<i>Nymphaea alba</i>	white water lily	
<i>Oenanthe fluviatilis</i>	river water dropwort	
<i>Phragmites australis</i>	common reed	
<i>Potamogeton crispus</i>	curled pondweed	
<i>Potamogeton friesii</i>	flat-stalked pondweed	
<i>Potamogeton natans</i>	broad-leaved pondweed	
<i>Potamogeton pectinatus</i>	fennel pondweed	
<i>Potamogeton perfoliatus</i>	perfoliate pondweed	
<i>Potamogeton x suecicus</i> ⁸⁵	hybrid pondweed	
<i>Ranunculus fluitans</i>	river water crowfoot	*
<i>Ranunculus penicillatus</i>	stream water-crowfoot	*
<i>Ranunculus</i> spp. (aquatic)	other water-crowfoot species	*
<i>Rorippa amphibia</i>	great yellow-cress	
<i>Rorippa nasturtium-aquaticum</i>	water-cress	*
<i>Rumex hydrolapathum</i>	water dock	
<i>Sagittaria sagittifolia</i>	arrowhead	
<i>Schoenoplectus lacustris</i>	bulrush	
<i>Schoenoplectus tabernaemontani</i>	grey club-rush	
<i>Sparganium emersum</i>	unbranched bur-reed	
<i>Veronica anagallis-aquatica</i>	blue water speedwell	*

2.7 INLAND ROCK OUTCROP AND SCREE HABITATS

The UK Biodiversity Action Plan for Inland rock outcrop and scree habitats lists a number of important features which are characteristic of this habitat. Some Inland cliff and scree habitats are listed in Annex 1 of the Habitats Directive. These are described in more detail in "Second report by the UK under Article 17 on the implementation of the Habitats

⁸⁵ Added 10/01/2023

Directive from Jan 2001 to Dec 2006”, Peterborough JNCC 2007. This appear to indicate that the distribution of all of the listed Annex 1 habitats is further north and west than West Yorkshire and generally at higher elevations.

The UK BAP does give some more general information on the types of features considered to be important which include:

- 1) restricted access to grazing animals
- 2) chasmophytic (rock crevice) vegetation usually dominated by ferns, small herbs, bryophytes and lichens.
- 3) open rock surfaces rich in bryophytes and or lichens
- 4) notable invertebrate communities (beetle, diptera and spiders)
- 5) notable birds for example raven, ring ouzel and peregrine falcon
- 6) natural cliffs and older quarries are generally likely to have higher botanical and invertebrate value.
- 7) siliceous (Coal Measures sandstone and shale) cliffs in tend to be more common than calcareous cliffs (Magnesian Limestone).

2.7.1 Selection Criteria and Attributes

Selection criteria and attributes for inland cliff and scree habitats Local Wildlife Sites

CRITERION	ATTRIBUTE
Size or extent	Height of cliff
Rare or exceptional features	The presence of nationally rare or declining species; presence of regionally important species; presence of locally rare or declining species or species/communities of restricted distribution, which have a population stronghold in West Yorkshire. The presence of a rare habitat type at international to local level.
Diversity	The diversity plant and animal species.
Naturalness	The presence of features associated with natural cliff and scree slopes. Well developed lichen flora. Lack of disturbance from recent quarrying activity. Evidence of natural processes eg river cutting, glaciation, frost shattering. Absence of domestic livestock.

2.7.2 General application of inland cliff and scree habitat guidelines

Consideration should be given to the surrounding land uses and the impact this might have on the quality of individual sites. It is considered that lower cliffs will generally be more at risk from the influences of man (agriculture in particular) and grazing live stock

and that these are less likely to support uncommon species and communities or that they might be better considered within other criteria.

Boundaries should be set in a manner which includes both the cliff and other surrounding habitat which is considered necessary to maintaining the special interest of the cliff environment. So for example an area of woodland which maintains a damp, shaded environment around a cliff contributing to a rich fern community would be included within the site. Some of the clough woodlands in the Pennines are of this nature. The opposite may also be true if lichen flora requires an open sunny aspect and land needs to be included within the site to prevent tree encroachment.

Active quarries are not generally considered to be appropriate for designation, as features of interest may be more transient in nature as mineral working and restoration proceed. Care should be taken if a site has designated geological interest, where management may require the removal of flora or faunal habitats. This does not automatically mean geological and biological designations are incompatible.

2.7.3 Inland cliff and scree guidelines

Guideline

Ics1 Any natural or naturalised cliff in the Magnesian Limestone that is over 5m tall and supports at least 1 notable species.

Application

This guideline is expected to apply to features such as river cut cliffs similar to those at Boston Spa. The cliff does not need to be sheer from top to bottom, however it is expected that the rock will generally be exposed for much of the height. Notable species should not be of a transient nature and should generally have been recorded over a number of years. Quarries and cuttings which have significant cliffs which have been abandoned for at least 25 years and been allowed to naturally colonise may also be considered.

Rationale

Calcareous cliffs are a rare feature of West Yorkshire. Lack of access to grazing animals and poor soils create a number of niches which attract specialist flora and fauna.

Guideline

Ics2 Any sandstone and/or shale cliffs over 5m tall, which support any of the following:

- 1) A regionally diverse lichen, bryophyte or fern community; or
- 2) A regionally diverse invertebrate community.

Application

This guideline can be applied to natural cliffs or quarries and cuttings which have naturalised. The latter will generally not have been worked for 25 years or more. Diverse plant and invertebrate communities will need to be recognised by specialists in the particular field or national recording schemes.

Rationale

Siliceous cliffs in West Yorkshire especially those in the uplands of the Pennines are known to support a diverse range of ferns and lower plants.

2.8 HABITAT SELECTION GUIDELINES FOR UPLAND MOORLAND HABITATS

This habitat typically comprises the unenclosed ground lying above the 'moor wall' (usually at 250-300 metres above sea level). It must be remembered that the moor wall is not a fixed line and has moved both up and down the contour with changes in agricultural economics. The vegetation is characterised by dwarf shrubs, in particular heather, and the typical land uses are grouse moor and extensive sheep grazing. In West Yorkshire sandstone quarrying has also been a significant influence in some areas with quarry margins, restoration or abandonment often leading to upland heath communities persisting in lower lying areas as islands in a more intensively farmed landscape. Two major habitat types dominate upland moorland: upland heath and blanket bog. Other habitat types also occur, including upland acid grassland, scrub, bracken beds, springs, flushes and streams and inland cliff and scree slopes. Some of these are covered by other selection guidelines.

In areas of higher rainfall and/or on gently sloping ground, blanket bog communities have developed on an accumulated peat layer greater than 50cm in depth. Blanket bog supports dwarf shrubs such as cross-leaved heath, but is characterised by the presence of cotton grasses, *Sphagnum* mosses and bog pools.

In areas of lower rainfall and/or more steeply sloping ground, blanket bog gives way to drier upland heath, which is dominated by dwarf shrubs including ling heather, bell heather and bilberry. Upland heath develops on peaty podsols or on shallow peat deposits that are less than 50cm in depth. Upland heath often occurs in a mosaic with acid grassland, especially around the lower margins of the moorland where relatively high grazing pressure has led to the loss of dwarf shrub communities.

There are UK Biodiversity Action Plans for both Upland Heath and Blanket Bogs. These plans indicate a large proportion of the European Community resource is found within the UK. Upland heath is almost entirely confined to the western seaboard of Europe, and the UK has an important role in the conservation of this internationally rare habitat.

In West Yorkshire the majority of the blanket bog and a large proportion of the upland heath has already been designated as being of European importance under the South Pennine Moors Special Area of Conservation and Special Protection Area, the latter being for important populations of upland breeding birds. These cover an area of 18,260ha of land with a further 46,723ha falling into surrounding districts. Whilst this is a large area already given higher levels of national and international designation, there are additional patches of heathland in particular which are of local importance because they are generally some of the least agriculturally improved areas. They can provide stepping stones for flora and fauna between other designated areas of land; additional territories for breeding birds which bolster populations with the Special Protection Area; and more accessible sites for people to experience upland wildlife close to centres of population.

2.8.1 Selection Criteria and Attributes

CRITERION	ATTRIBUTE
Size or extent	These habitats tend to be of higher value when more extensive in area or where they provide extensions to other nationally designated sites.
Rare or exceptional features	The presence of nationally rare or declining species; presence of regionally important species; presence of locally rare or declining species or species/communities of restricted distribution, which have a population stronghold in West Yorkshire. Examples would include breeding sites for upland birds listed in the South Pennine Moors SPA or SSSI citation. The presence of a rare habitat type at international to local level. The presence of rare mire, bog, flush and heath plant communities.
Diversity	The diversity of characteristic species. Diversity of habitat and vegetation structure. For example senile, unmanaged heather
Connectivity within the landscape	Stepping stone sites which contribute towards links between blocks of upland habitat on higher fingers of land.
Naturalness	The diversity of dwarf shrub species. The proportion of moor covered by mature or over-mature heather. The occurrence of woodland existing or re-establishing. The extent of drainage grips. The occurrence of natural wetland features such as springs and flushes. The occurrence of lichen and bryophyte assemblages beneath the dwarf shrub canopy. The absence of industrial artefacts, such as coal-mine or sandstone quarry spoil heaps.

2.8.2 General application of Upland Moorland Guidelines

The following guideline should be applied to moorland habitats these will generally be on unenclosed land above the 'moor wall' (250-300 metres). No definitive minimum size can be set; though in all likelihood small areas of upland heath would not be appropriate, as they are unlikely to support the ecosystems that make upland habitats 'special'. A guideline threshold of 50 ha has been provided, but consideration should be given to the

inclusion of smaller areas that form coherent topographic units. Consequently, the guideline should be applied to the quality of habitats, within the context of an identifiable block of moorland. In many cases, it may make sense to lump adjacent moorland blocks together, because it is the extensive nature of open moorland that makes upland habitats 'special'.

When assessing potential moorland Local Wildlife Sites, as well as considering the extent and geographical and topographical situation of the moorland block, consideration should be given to the quality of the moorland habitats over the majority of the site. Areas supporting significant cover of habitats and species characteristic of ecological degradation should not be selected. Equally areas showing a range of hydrological and topographic features which result in a range of less common habitats, particularly flushes, seepages, wet heath or blanket bog or link to other habitats such as cliff faces or acid woodland which qualify under other criteria should be selected.

2.8.3 Upland Moorland Selection Guidelines

Upland moorland sites that meet the following guideline will be eligible for designation as a Local Wildlife Site.

Guideline

Mo1 Large areas of dry heath, wet heath or blanket bog habitat (typically represented by NVC type H8, H9, H10, H12, H18, M15, M16, M17, M18, M19, M20, M25), which either individually or in combination normally exceed 10 ha in size and form a coherent topographical unit.

Application

This guideline should be applied to large sites (normally greater than 10 ha) that meet the quality guidelines⁸⁶ set out in Table 13. To qualify a site must meet the essential quality guidelines and one of the desirable quality guidelines

Rationale

This guideline seeks to identify large areas of upland moorland habitat which form coherent topographical features and are not adversely affected by poor burning practices or over grazing. The NVC communities listed in the guideline are those that represent high quality moorland habitat.

Table 13 Upland habitat quality guidelines

Habitat	Essential Quality Guide	Desirable quality guide
Dry heath	Minimum of 50% dwarf shrub cover.	A maximum of 20% of the site showing signs of current heavy grazing.
	At least 2 species of dwarf shrub should be widely distributed.	All age classes of <i>Calluna</i> present with at least 10% in the mature/degenerate age class.
		Bryophytes (excluding <i>Polytrichum spp.</i> and <i>Campylopus spp.</i>) and/or

⁸⁶ Adapted from English Nature SSSI Condition Assessment Tables for Upland heath.

		<i>Cladonia spp.</i> lichens should be at least occasional.
Wet heath	Minimum 10% cover of species other than dwarf shrubs.	A maximum of 20% of the site showing signs of current heavy grazing.
	Total cover of graminoids should not exceed 50%.	All age classes of <i>Calluna</i> present with at least 10% in the late mature/degenerate age class.
	At least 2 species of dwarf shrub should be widely distributed.	Bryophytes (excluding <i>Polytrichum spp.</i> and <i>Campylopus spp.</i>) and/or <i>Cladonia spp.</i> Lichens should be at least occasional.
Blanket Bog	Minimum 20% dwarf shrub cover (except where <i>Sphagnum</i> abundant and forming lawns).	Little bare ground or ground cover with <i>Racomitrium lanuginosum</i> , <i>Polytrichum spp.</i> <i>Campylopus spp.</i> Crust forming lichens or algal mats.
	At least 2 species of dwarf shrub should be widely distributed.	No erosion other than in localised instances and no current peat abstraction.
	Total cover of graminoids should not exceed 60% unless <i>Sphagnum spp.</i> are abundant/co-dominant and forming lawns below the grassland (i.e. in waterlogged conditions).	A maximum of 20% of the site showing signs of current heavy grazing.
	Bryophytes (excluding <i>Polytrichum spp.</i> , <i>Campylopus spp.</i> And <i>Racomitrium lanuginosum</i> on bare ground) should be at frequent and must include <i>Sphagnum spp.</i>	

2.9 HABITATS ON ARTIFICIAL SUBSTRATES

These guidelines relate to specific habitats created as a result of past human industrial activity followed by natural colonisation of plants and animals. Post-industrial land can support a wide variety of habitats and species, which can be of significant nature conservation value. These habitats support assemblages characteristic of the conditions

created by the artificial origin of the site. They are usually associated with post-industrial sites on which a variety of artificial substrates have been deposited or naturally occurring material disturbed.

Plant communities of post-industrial habitats can be highly susceptible to succession and it is often the early stages of succession that are of highest ecological value. Grassland, scrub and secondary woodland communities, however, also make a valuable contribution to the importance of post-industrial habitats. Other habitat guidelines may be more appropriate than this section for a site, which is dominated by habitats that closely resemble natural and semi-natural plant and animal communities.

In the early stages of natural colonisation of post-industrial sites ephemeral or transitory species and communities are favoured which can include many uncommon species of invertebrates, such as Hymenoptera (bees and wasps) and carabid beetles. Later stages of succession, however, can also be important for rare and threatened species.

Many post-industrial sites support a wide range of edaphic conditions, from exposed natural substrates to deposited artificial material. These substrata can vary in nutrients and chemical reaction. They can also support a wide spectrum of hydrological conditions from open water to dry ground. Consequently, post-industrial sites can be particularly rich in species reflecting the complex mixture of habitat type, soils, hydrology and vegetation structure.

Colliery spoil heaps

Colliery spoil heaps are wide spread within the West Yorkshire following several centuries of coal extraction. Spoil heaps vary considerably in structure, hydrology and substrates but can be relatively hostile environments for the majority of plants. As a consequence they can have interesting and unusual species which are capable of adapting to these conditions. The pH of spoil can be highly acidic (pH3-5) although in many cases is close to neutral. In the last 30 or 40 years efforts have generally been made to “restore” and “reclaim” spoil heaps to a “beneficial afteruse” usually low quality agricultural land, amenity (including woodland planting) and built development. These generally require the blanketing of spoil in layers of soil or soil forming materials, liming, fertilising and drainage. This greening up process, has frequently lead to sites dominated by ubiquitous species poor, low quality habitats. This has been at the expense of many ecologically diverse spoil heaps throughout West Yorkshire.

First to colonise bare spoil are usually mosses and lichens. The species are often more commonly associated with habitats such as lowland heath, woodland and semi-aquatic habitats. These are generally joined by annual weed species taking advantage, where conditions permit, of open ground and then by tolerant perennials including a number of orchid species (common spotted *Dactylorhiza fushsii*, southern marsh *Dactylorhiza praetermissa*, early marsh *Dactylorhiza incanata*, hybrid *Dactylorhiza x grandis*, pyramidal *Anacamptis pyramidalis* and bee *Ophrys apifera*). Trefoils (*Trifolium* sp. and *Lotus corniculatus*) vetches and vetchlings which are capable of nitrogen fixing are often frequent colonisers. These in turn attract faunal species such as dingy skipper butterfly, Hymenoptera and Coleoptera. Bare ground can be used by breeding birds such as little ringed plover.

When sites are left relatively undisturbed higher order plants including trees start to slowly colonise. Wetlands sometimes form in depressions and a range of new opportunities are created in complex mosaics of habitats, suitable for amphibians, reptiles and birds as well as invertebrates and plants. High salinity, often associated with seepages or mine water can have saltmarsh type communities of plants and invertebrates and example of where is found in the Mickletown Ings SSSI.

Pulverised fuel ash lagoons

Pulverised fuel ash (PFA) is a waste material from coal burning power stations. PFA is used in part by the construction industry, but the rest is either deposited in settlement lagoons or mounds near to the power stations. With time these can develop interesting flora and fauna for example Half Moon in Wakefield which has developed a mixture of coarse grassland and scrub which is relatively species rich and supports common spotted, southern marsh, hybrid and early marsh orchids.

Studies of PFA across England indicate consistencies in the developing vegetation, plant communities and structure.⁸⁷ Shaw states that on dry PFA that is allowed to naturally colonise, there is evidence of succession starting with pioneer & ruderal plant communities. After 10-15 years a willow – birch dominated scrub develops with orchids being one or more of the dominant forb species and at 20 – 25 years a willow-birch woodland develops joined by seedlings of oak and hawthorn. It is thought that the oak and hawthorn may be important factors for the climax vegetation.

The colonising nature conservation interests are often also important for their diverse avifauna and invertebrates; rare species of flora and fauna have been recorded at various sites in the country, although it is not known if there are such records held for the PFA sites in West Yorkshire. One of the interesting and distinctive features of PFA is the colonisation and hybridisation of orchid species often resulting in large populations at a given site.

Railway cinder and sidingsbeds

Vacant post-industrial land is scattered throughout the main urban centres of the county and is frequently associated with railway corridors for example at Normanton in Wakefield District which once had very extensive railway sidings. A common vegetation community of railway cinder beds is that of rat's tail fescue (*Vulpia myuros*), squirrel-tail fescue (*Vulpia bromoides*) and wild mignonette (*Reseda lutea*). This community appears to be specifically restricted to the track beds of active and disused railway lines and sidings. It typically develops on the hot, dry cinder beds of the tracks, which are low in organic content, free draining and often subject to summer parching. A uniform fine sward of rat's tail fescue with squirrel-tail fescue, tall herbs and a wide range of common or locally rare ruderal plants dominate the vegetation. Cinder beds often support this community as part of a mosaic comprising open bare ground, birch, buddleia and hawthorn scrub, tall herb communities and coarse grassland.

⁸⁷ Shaw, P J A. (1992). A preliminary study of successional changes in vegetation and soil development on unamended fly ash (PFA) in southern England. *In*: Journal of Applied Ecology. (1992).

2.9.1 Selection Criteria and Attributes

Selection criteria and attributes for artificial habitat Local Wildlife Sites

CRITERION	ATTRIBUTE
Size or extent	These habitats tend to be of higher value when more extensive in area.
Rare or exceptional features	The presence of locally or nationally rare, scarce or declining plant or animal species (or hybrids). The presence of species/communities of restricted distribution.
Diversity	The presence of <ul style="list-style-type: none"> • high species diversity • high structural diversity • high habitat diversity • varied topography, substrate type and hydrology.
Connectivity within the landscape	The location or proximity of site in relation to other recognised site/s of interest either as similar habitat or habitat mosaic. The location lies within identifiable wildlife corridor.

2.9.2 General application of Artificial Habitat Guidelines

These guidelines should be applied to sites supporting habitats of artificial origin, which do not closely resemble natural or semi-natural habitat types. Those habitats that do closely resemble their natural and semi-natural counterparts should generally be assessed against the appropriate guidelines for those particular habitats or as mosaics of habitats for example colliery reclamation sites restored to broad-leaved woodland and species rich grassland mixes. In certain instances, however, these semi-natural habitats may be incorporated within a site that qualifies under this section. This is where they contribute to the overall ecological value and enhance the value of the site for its specialist species. For example the vegetation may aid the life cycle of invertebrate species groups for which a site may also be notable (such as provision of a necessary food source or egg laying habitat, or aid pupation). Where there is some doubt, the habitat should be examined under both the artificial habitat guidelines and the other habitat selection guidelines.

Grassland and other communities occurring on natural substrates exposed by man in, for example, railway cuttings or disused quarries, would normally be assessed using other selection guidelines where appropriate.

Industrial processes often result in the formation of large water bodies. Most of these should be assessed under the standing water selection guidelines. There may be some reasons associated with an industrial process, which produce exceptional hydrological and/or edaphic conditions which may be considered under these guidelines.

2.9.3 Selection Criteria for Artificial Substrates

Guideline

Ar1 A former coal mine spoil disposal or coke works site of at least 0.25ha that scores 10 or more from species listed in Ar1 of Table 14

Application

This guideline should be applied to colliery spoil heaps or habitats with similar communities. The sites selected will generally have significant areas of colliery waste with minimal depths of subsoil and topsoil. Evidence of natural regeneration and succession should generally be present. Areas which qualify under this criteria may form part of larger Local Wildlife Sites which qualify under other selection criteria.

Rationale

These post-industrial sites contain characteristic communities of plants and animals (particularly invertebrates) which have been widespread throughout the coal field, but are becoming increasingly scarce as a result of wide-spread land reclamation and restoration schemes.

Guideline

Ar2 Railway cinder beds of 0.25ha or more in size scoring 10 or more from the species listed in column Ar2, Table 14

Application

This guideline should be applied to former or disused railway cinder beds only. This may be in combination with secondary semi-natural habitats such as woodland (often equating to W16), scrub and grassland. These habitats add to the overall nature conservation value of the site and represent the natural process of succession in this man-made environment.

Rationale

Railway cinder beds support distinctive communities due to low organic nutrient levels and physical conditions. These sites are becoming increasingly scarce with the decline in steam locomotives, the railways and through alternative uses of sites particularly to built development,

Guideline

Ar3 A site of former PFA settlement lagoon or tip that supports over 100 flowering spikes of orchid species or hybrid orchids or a score of 12 or more from the species listed in column 3 in Table 14

Application

This guideline should be applied to naturally colonised disused PFA settlement lagoons and tips.

Rationale

As soon as high levels of boron and elements in the upper surfaces have decreased, PFA settlement lagoons can support unique grassland communities that are frequently species-rich. A particular feature of such sites is the presence of dense stands of various orchid species. If two or more species of *Dactylorrhiza* orchid are present they often readily hybridise to form hybrid swarms.

Guideline

Ar4 Any post industrial site supporting notable faunal assemblages of invertebrates.

Application

This guideline will need to be used in consultation with an invertebrate specialists. It should include all sites with a good diversity of typical species and sites with a moderate diversity, but which include records which indicate that one or more nationally notable species regularly use the site. The citation should include a definition of the method used in assessing the quality of the site.

Rationale

These site are known to support a diverse range of invertebrate species and in some cases rare or uncommon species.

Table 14 Vascular plants characteristic of post industrial wastes

Scientific name	Common name	Ar1	Ar2	Ar3
<i>Agrostis capillaris</i>	common bent	*	*	
<i>Aira caryophyllea</i>	silver hair-grass		*	
<i>Aira praecox</i>	early hair-grass	*		
<i>Anacamptis pyramidalis</i>	pyramidal orchid			*
<i>Anagallis arvensis</i>	scarlet pimpernel	*		
<i>Anthyllis vulneraria</i>	kidney vetch			*
<i>Arenaria serpyllifolia</i>	thyme-leaved sandwort		*	
<i>Artemisia absinthium</i>	wormwood		*	
<i>Blackstonia perfoliata</i>	yellow wort	*		*
<i>Bryum argenteum</i>	a moss		*	
<i>Carex arenaria</i>	sand sedge	*		
<i>Catapodium rigidum</i>	Fern-grass		*	
<i>Caluna vulgaris</i>	heather	*		
<i>Centaurea nigra</i>	common knapweed			*
<i>Centaureum erythraea</i>	common centaury	*		*
<i>Cotula coronopifolia</i>	golden buttons	*		
<i>Crepis vesicaria</i>	beaked hawk's-beard			*
<i>Daucus carota</i>	wild carrot	*		

<i>Dactylorhiza</i> spp.	orchid species	*		*
<i>Erigeron acer</i>	blue fleabane		*	*
<i>Erodium cicutarium</i> agg.	common stork's-bill	*		
<i>Euphorbia helioscopia</i>	sun spurge	*		
<i>Festuca rubra</i>	red fescue			*
<i>Filago vulgaris</i>	common cudweed			*
<i>Hieracium</i> spp.	hawkweed species	*	*	*
<i>Hypericum humifusum</i>	trailing St. John's-wort	*		
<i>Hypericum perforatum</i>	perforate St. John's-wort	*	*	
<i>Hypochaeris radicata</i>	common cat's-ear			*
<i>Juncus gerardii</i>	saltmarsh rush	*		
<i>Lathyrus pratensis</i>	meadow vetchling			*
<i>Leontodon hispidus</i>	rough hawkbit			*
<i>Leucanthemum vulgare</i>	ox-eye daisy	*		*
<i>Linaria vulgaris</i>	common toadflax	*	*	
<i>Linum catharticum</i>	fairy flax	*		*
<i>Listera ovata</i>	common twayblade			*
<i>Lotus corniculatus</i>	bird's-foot trefoil	*		*
<i>Melilotus albus</i>	white melilot	*		
<i>Melilot altissimus</i>	tall melilot	*		
<i>Myosotis discolor</i>	changing forget-me-not	*		
<i>Myosotis ramosissima</i>	early forget-me-not	*		
<i>Ophrys apifera</i>	bee orchid	*		*
<i>Ornithopus perpusillus</i>	bird's-foot	*		
<i>Pilosella officinarum</i>	mouse-ear hawkweed	*	*	*
<i>Poa compressa</i>	flattened meadow-grass		*	
<i>Polytrichum</i> spp.	mosses		*	
<i>Potentilla erecta</i>	tormentil	*		
<i>Reseda lutea</i>	wild mignonette	*	*	
<i>Reseda luteola</i>	weld		*	*
<i>Rhinanthus minor</i>	yellow rattle	*		*
<i>Rumex acetosella</i>	sheeps sorrel	*	*	
<i>Sagina procumbens</i>	pearlwort		*	
<i>Schoenoplectus tabernaemontani</i>	grey club-rush	*		
<i>Silene uniflora</i>	sea campion	*		
<i>Spergularia rubra</i>	sand spurrey	*		
<i>Verbascum thapsus</i>	great mullein		*	
<i>Vicia cracca</i>	tufted vetch			*
<i>Vicia sepium</i>	bush vetch			*

<i>Vulpia bromoides</i>	squirrel-tail fescue		*	
<i>Vulpia myorus</i>	rat's-tail fescue	*	*	

2.10 MIXED HABITAT AND STRUCTURAL MOSAICS

Throughout the countryside and in urban areas, many habitats occur as mosaics and contain structural variation in the vegetation. Sites may comprise habitats that are individually or collectively of conservation value, but do not necessarily satisfy specific habitat selection guidelines. Sites may also support excellent and or highly varied structure between different habitats or within the same habitat that provides a range of niches valuable for invertebrate groups. These sites can make an important contribution to the local biodiversity value of an area. These guidelines aim to address:

- (a) sites that may just fail to meet the thresholds set on the basis of their individual habitat components, but as a collection of habitats are important for their botanical and/or invertebrate value,
- (b) sites that support varied macro-habitats and provide more structural variation for invertebrates than individual habitats in isolation,
- (c) sites that support structurally diverse micro-habitat mosaics within various habitat types.

Semi-natural habitat mosaic sites are usually on abandoned or less intensively managed agricultural or industrial land, although the grounds of large houses or commercial properties may also be of interest. Mosaic will often comprise habitats representative of different stages of broad succession of vegetation from bare ground or open water to marsh or woodland. Abandoned or unmanaged areas of quarries are often a good example of these types of circumstances, as they often support grassland and bare ground communities maintained by grazing rabbits and other herbivores, secondary scrub and woodland, and in low lying areas, marsh or open water. In addition, the former quarry face may provide habitats on cliffs and ledges for bats, plants, and nesting sites for birds.

Some species of fauna, particularly invertebrates, are dependent on different parts of vegetation mosaics and structure at different stages of their life cycles or for daily feeding or cover. Such variation for invertebrates is important to their survival. Structural heterogeneity can be considered on different scales.⁸⁸ The more complex the vegetation structure, the greater the niche diversity and, therefore, the greater the number of insects likely to be present.⁸⁹

Invertebrate ecologists are aware that if a site supports varied structural features then it is likely to support a more diverse invertebrate fauna than a site with homogeneous vegetation. A rough grassland supporting tussocky grasses, bare ground, scrub and

⁸⁸ Hammond, M. (2000). The importance of habitat structure in assessing site quality for nature conservation. Unpub paper prepared for North Yorkshire SINC Panel. Section 2.10 includes quotes from this work with permission from the author.

⁸⁹ Speight, MR, Hunter MD & Watt, AD. (1999). Ecology of insects: concepts and applications. Blackwell Science Oxford.

varied sward height is likely to be more diverse for invertebrates than a managed grassland with an even sward height. At a smaller scale, spiders, for example, use specific features of vegetation for web spinning, construction of egg cocoons, hunting and aerial dispersal. It is the combination of niches and structure within a localised area that is important for invertebrates, as opposed to large uniform habitat blocks. This variation can be equally or more important than the juxtaposition of different habitats within a site.

Disturbance from natural phenomena and human activities can be beneficial to the invertebrate diversity of these sites, particularly where the impact is relatively localised and improve structural diversity. Examples might include mole hill and rabbit burrows which create areas of bare ground for basking butterflies or tyre tracks and trampling from recreational use. Where these occur over more extensive areas they tend to lead to a loss of structural diversity and lower ecological value. Some activities such as frequent motorcycle disturbance can have other deleterious impacts including disturbance to birds and mammals and the value of sites for communing with nature and wildlife education.

Mosaic habitats are often some of the best sites for wildlife recreation and education. They generally offer a relatively diverse range of habitats in close proximity with plenty of opportunities for exploration and discovery. The need for a degree of disturbance to maintain this structural diversity lead to them being relatively robust sites which can generally cope with more people pressure.

2.10.1 Selection Criteria and Attributes

CRITERION	ATTRIBUTE
Size or extent	Size needs to be judged against other interest within the site, for example an extensive site with a range of habitat and high levels of public access will generally need to have a large size threshold. A site with complex small structures supporting a high diversity or notable assemblage of invertebrates could be much smaller. Education sites such as high quality wildlife gardens can also be relatively small if well planned and maintained.
Rare or exceptional features	The presence of nationally rare or declining species; presence of regionally important species; presence of locally rare or declining plant species or species/communities of restricted distribution, which have a population stronghold in West Yorkshire.
Diversity	The diversity of substrate and vegetation structures likely to result in diverse faunal assemblages, particularly invertebrates.
Connectivity within the landscape	The proximity to and connections with other habitats contributing to wildlife corridors.

2.10.2 Habitat Mosaic Selection Guidelines

Any site which meets one or more of the following guidelines will be eligible for Local Wildlife Site selection.

Guideline

Mh1

Sites of 0.5ha or more in size that support a combination of

- **at least two individual habitats within 80%; or**
- **at least three individual habitats within 70%; or**
- **at least four individual habitats within 60%**
- **at least five individual habitats at least one within 80%, one within 70% one within 60% and two within 50%**⁹⁰

of size and or species diversity thresholds used in other habitat selection guidelines.

Application

This guideline should be applied to any area supporting a mosaic of semi-natural vegetation. The size and species diversity thresholds should not be flexed for the same habitat at the same time, for example a grassland of 0.23ha ie below the 0.25ha minimum size threshold could not be considered acceptable if it only supported 7 out of 8 indicator species. It is acceptable to for example, flex the size threshold for one habitat and the species diversity threshold for a different habitat.⁹¹

Rationale

Typically, mixed habitat sites will support different stages in vegetation succession. Often the individual habitat types that are part of the mosaic do not qualify as Local Wildlife Sites in their own right either because they are too small, or because they do not support a sufficient number of indicator or characteristic species. In combination, however, these habitat types can support a diversity of habitats and species that make a significant contribution to local biodiversity and nature conservation objectives. Such sites may also provide additional stepping stones and corridors for wildlife within the landscape.

Guideline

Mh2

Sites of 5ha or more in size that support a mosaic of the semi-natural habitats listed in Table 15 that collectively have a habitat diversity score of 12 or more.⁹²

Application

⁹⁰ Added 21/01/2016

⁹¹ Added 12/12/2019

⁹² Amended 21/01/2016 to remove references to value for appreciation of nature and significant contribution to biodiversity.

This guideline should be applied to any area supporting semi-natural habitats. Recently created habitats within the last 15 years will not normally be considered.⁹³

Rationale

The combination of different habitat types in close proximity to each other and the gradation from one habitat to another often provides a much higher diversity of niches for a wealth of plants and animals than other sites that may be dominated by one particular habitat. These sites are particularly valuable for species that utilise more than one habitat type throughout the day and night for feeding, roosting and protection. The juxtaposition of some of these habitats can also be important for the survival of particular animal species which require two or more habitats at different times during their life cycle, such as amphibians and a range of invertebrates. These habitat mosaic sites are often important reservoirs of biodiversity, particularly in areas of the county where there is intensive land-use and/or a lack of sites of Local Wildlife Site quality for individual habitat types.

Table 15 Habitat mosaics

<u>Habitat</u>	<u>Score</u>
Unimproved neutral grassland (MG5, MG4, MG8)	4 points
Unimproved calcareous grassland	4 points
Unimproved lowland dry acid grassland	4 points
Ancient semi-natural woodland	4 points
Wet heath or bog	4 points
Rare scrub communities ⁹⁴	4 points
Dry heath	3 points
Uncommon scrub and pioneer woodland communities ⁹⁵	3 points
Tall coarse grassland and scattered scrub mosaic	2 points
Scrub communities of more than 1 species	2 points
Open water/and swamp (running or standing)	2 points
Marsh or fen (species-rich)	2 points
Heath/acid grassland mosaic	2 points
Secondary semi-natural woodland	2 points
Cliffs	2 points
Marsh or fen (species-poor)	1 point
Ruderal/bare ground communities	1 point
Single species dominated scrub	1 point
Inundation communities	1 point
Other habitat types covered by these guidelines	1 point
West Yorkshire Wildlife Habitat Network ⁹⁶	2 points

Format footnotes ¹ Kirby, P. 1992. Habitat Management for Invertebrates: A practical handbook. Joint Nature Conservation Committee. Table 15 shows some of the features identified as important for invertebrates within this publication.

⁹³ Added 21/01/2016

⁹⁴ To be included where they are too small or fragmented to merit Local Wildlife Site status as individual features i.e. upland willow scrub on calcareous substrates with *Salix phylicifolia*, *S. myrsinifolia* or related hybrids; species-rich thorn scrub; willow scrub of exposed riverine sediments

⁹⁵ i.e. aspen stands, eared willow thickets on upland fringes, burnet rose underscrub, species-rich scrub-grassland transitions ('saum')

⁹⁶ Added 21/01/2016

Guideline

Mh3

- **Sites of 0.5ha or more in size that support features indicating high structural diversity within habitat types as shown in Table 16 and make a significant contribution to the local biodiversity value of the Natural Area in which they are situation.**

Application

This guideline should be applied to any area supporting a varied habitat structure, indicative of important invertebrate habitat. Reference should be made to relevant UK and local Biodiversity Action Plans to identify whether the site makes an important contribution to the Natural Area. These sites will be identified in conjunction with an experienced invertebrate ecologist.

Rationale

Varied vegetation structure is important to invertebrates in every aspect and at every scale⁹⁷. This is often not recognised as a valuable component of the nature conservation resource. Large, complex and varied sites are likely to support a significant invertebrate fauna, and as such are valuable as vegetation and invertebrate assemblages.

Table 16 Features of structural importance for invertebrates

Dead wood (wet and shady situations)	Scattered scrub
Dead wood (dry and open situations)	Grass tussocks
Old coppice stools	South facing slopes
Woodland rides	Steep slopes on banks
Pollards	Hummocky ground in old disused quarries
Sap runs on trees	Earthworks
River shingle	Coarse tussocky grassland
Loose hard substrates (e.g. rubble, brick, stone)	Varied sward heights from short open turf to bare ground or mud
Springs, seepages or pools	
Temporary pools	Seasonally damp/wet areas
Ditches	Water margins (marginal mud, silt or sand)
Evidence of ruts & hoofprints (with continuity over several years)	

2.11 VALUE FOR THE APPRECIATION OF NATURE AND LEARNING

The Defra Local Sites guidance (2006) indicate that where a site has community value for the appreciation of nature or value for learning, this may be used as part of the

⁹⁷ Kirby, P. 1992. Habitat Management for Invertebrates: A practical handbook. Joint Nature Conservation Committee. Table 32 shows some of the features identified as important for invertebrates within this publication.

justification for site designation. The West Yorkshire Local Sites Partnership consider that a site must have significant nature conservation value to be considered of sufficient merit to qualify as a Local Wildlife Site under this guideline and that the site must have had regular use by the general public, wildlife groups or educational institutions to justify designation. Local Wildlife Site designation does not bring with it any rights of public access, so sites qualifying under this section must either have extensive public access, which may be along a network of footpaths, or demonstrate that access agreements are in place with specific wildlife groups who's membership is open to the wider public. Where schools, colleges or children's wildlife clubs are involved it is acceptable for sites used only by these groups to have restrictions to full community access on the grounds of child welfare and safety. For example it would be acceptable to designate a high quality school wildlife garden which meets the habitat species diversity thresholds under this guideline, even though access is limited to school pupils and staff.

Guideline

Vanl1

Any site which meets 80% or more of the species or habitat⁹⁸ diversity scores in any of the habitat selection guidelines, which has a significant value for the appreciation of nature and learning, and which is managed for nature conservation.

Application

The criteria should be applied to sites which have high nature conservation value and are managed, to maintain and improve biodiversity. Public access to the site must generally be maintained, which may be through public rights of way or agreement with the landowner. Public access does not require open access and can be linked to clubs and societies provided that membership is open to the public examples might include "friends of" groups or Wildlife Watch groups. Exceptions to this may be made for reasons of child welfare and safety. This guideline should not be used in combination with other guidelines which reduce the qualifying scores based on proximity to other sites (Gr5, Wd6, Fe6 and Sw5).

Rationale

Local Wildlife Sites have a valuable role to play in providing opportunities for communities to observe and learn about wildlife and contribute to recording, habitat maintenance and enhancement. This has both short and long term benefits for nature conservation by improving understanding and support for wildlife.

See also Guideline Mh2 Mosaic Habitats which are important for the appreciation of nature and learning, based on a habitat diversity score.

Guideline

Vanl2

Any site designated as a statutory Local Nature Reserve (LNR).

Application

⁹⁸ "or habitat" added 21/01/2016

This guideline is intended to avoid a disparity between statutory and non-statutory locally designated sites. In this respect all of the LNR should be included within the Local Wildlife Site boundary, however it is possible for the Local Wildlife Site to extend beyond the LNR boundary. The Council must have an interest in the land for the LNR but not for a Local Wildlife Site, and the wildlife interest may stretch beyond the LNR boundary.

Rationale

Local Nature Reserves have been selected for their value for biodiversity and education, as such they have similar objectives to Local Wildlife Sites and should all be designated.

2.12 LOWLAND HEATH

Lowland heath includes any areas of semi-natural vegetation in which dwarf shrubs, particularly heather are prominent. It is a habitat of international importance and a UK “habitat considered to be of principal importance” under the S41 of the Natural Environment and Rural Communities Act 2006. In West Yorkshire it is generally found below 250m AOD on acid soils with low nutrient status. This habitat tends to be found in small isolated areas to the east on exposures Coal Measures sandstones, as relics of a once much more widespread habitat now largely lost to agricultural improvement and urbanisation. The free draining soils tend to be drought prone in the dry summer weather and can form attractive mosaics of heath and acid grassland. Colliery spoil heaps, particularly from historical shallow working, can mimic conditions from natural exposures and provide valuable refuges for this habitat.

Lowland heath plant communities in West Yorkshire are likely to be H9 (*Calluna vulgaris* - *Deschampsia flexuosa* heath) with possible areas of H8 (*Calluna vulgaris* - *Ulex gallii* heath), H10 (*Calluna vulgaris* - *Erica cinerea* heath), H12 (*Calluna vulgaris* - *Vaccinium myrtillus* heath) and H18 (*Vaccinium myrtillus* - *Dechampsia flexuosa* heath) moving towards the upland fringes. Wet heath communities may also be present within the mosaic such as M16 (*Erica tetralix* - *Sphagnum compactum* mire) or M25 (*Molinia caerulea* - *Potentilla erecta* mire) making up minor components where drainage is impeded. Examples of typical dwarf shrubs are heather *Calluna vulgaris*, western gorse *Ulex galli*, bell heather *Erica cinerea* and/or bilberry *Vaccinium myrtillus*.

The value of heathland sites can be significant for other groups such as invertebrates, reptiles, birds and amphibians. These should be generally covered under the species criteria.

2.12.1 Selection Criteria and Attributes

CRITERION	ATTRIBUTE
Size or extent	Area of site. Assumes that the appropriate vegetation communities are present across at least 50% of the site. Naturalness Presence, cover and variety of semi-natural communities and species that correspond to long established heathland habitat.

2.12.2 Lowland Heath Selection Guidelines

Guideline⁹⁹

He1

The site covers an area of at least 0.5ha in which the vegetation is dominated by assemblages of at least 25% dwarf shrub cover, with at least 2 of these species widely distributed across the site.

Application

These guidelines should be applied to heathland sites normally below 250m in West Yorkshire outside of the Southern Pennines and Dark Peak Character Areas

Rationale

The occurrence of these vegetation types is generally very low outside of the Southern Pennines and even small examples are likely to be of interest. They often occur as part of a habitat mosaic with acid grassland and woodland communities.

3 Species Selection Guidelines

3.1 VASCULAR PLANTS

Application (all guidelines)

Vascular plants include flowering plants (angiosperms) and ferns (pteridophytes). Assemblages of vascular plants have been used to describe and assess the quality of habitats in part A of this report. As a consequence, this section only considers the presence of rare species for site selection. The guidelines relate to naturally occurring, native species.

Guideline

VP1

Any site that supports a population of a plant listed in Schedule 8 and is fully protected under of the Wildlife and Countryside Act 1981 (as amended) and/or is listed in the most recent version of the British Red Data Book or is listed as Nationally Rare .

Application

This guideline should be applied to any site with a population of these species. Where the species concerned occurs as a short term casual, the site should not normally be designated. Sites where there has been a recent, deliberate re-introduction, excluding species recovery programmes, should also not normally be included. The guideline will only be applied to those listed on Schedule 8, which are given full protection (i.e. Section 13(i) of the Act). Consequently, a species such as bluebell (*Hyacinthoides non-scripta*) is not included as it is only afforded protection under Section 13(2). The Threatened Plants Database managed by the Botanical Society for the British Isles is currently the latest version of the British Red Data Book.

⁹⁹ Lowland Heath criteria added 21/01/2016

Rationale

These species are the rarest and/or most threatened with extinction in the British Isles. Consequently, the protection, maintenance and enhancement of the populations of these species in West Yorkshire are vital for sustaining biological diversity throughout the British Isles and Western Europe. Nationally Rare plants are those which occur on 15 or less 10km squares within Britain

Guideline

VP2 Any site supporting a population of a species native to West Yorkshire that is identified as being nationally scarce.¹⁰⁰.

Application

This guideline should be applied to any site with a population of these species. Where the species concerned occurs as a short term casual, the site should not normally be designated. Sites where there has been a recent deliberate re-introduction, excluding species recovery programmes, should also not be included.

Rationale

The species in the above categories are nationally scarce, occurring in more than 16 but less than 100 10km squares in Britain, and there is a national responsibility for their conservation.

Guideline

VP3 Any site that supports a population of a county rare species.

Application

This guideline should be applied where sites support a population of a species identified as a county rare plant species using the method proposed by Perring and Farrell (1996).¹⁰¹ This should (when the information becomes available) be applied at the West Yorkshire¹⁰² level and will exclude populations which are the result of recent deliberate introductions (which do not form part of a species recovery programme) or localities where a species occurs as a short-term casual.

Rationale

These plant species are the rarest and/or most threatened species in West Yorkshire and their protection, maintenance and enhancement are vital to sustaining biological diversity throughout the county. To be considered locally rare they are considered to occur on 3 or less sites within West Yorkshire.

¹⁰⁰ Stewart *et al* (1994). Scarce Plants in Britain. JNCC.

¹⁰¹ Perring, F.H. and Farrell, L. (1996). Guidelines for the preparation of county rare plant registers. *BSBI News* 71

¹⁰² Amended 21/01/2016

Guideline

VP4 Any site regularly supporting a population of a locally scarce vascular plant in West Yorkshire, which is at risk of becoming rare because of a recent decline in its distribution or population.

Application

Sites supporting species that are threatened or considered vulnerable in the county should be included under this guideline. Only sites making a significant contribution to the distribution or population of the species should be selected. This guideline should only be applied where there is sufficient local, regional or national data to determine the threat to the species. It should not be used where the reason for the decline indicates that site designation will not significantly influence the decline for example climate change. These plants will generally be locally scarce ie occur on 10 or less sites within the vice-county and be declining.

Rationale

A variety of factors can cause a sudden or gradual decline in the population of a species. These species are at risk of becoming endangered or even extinct in the County, and measures to prevent this occurring are required. This is one of the criteria used in determining whether a species should be included on a County Rare Plants Register.

3.2 NON-VASCULAR PLANTS

Application (all guidelines)

Non-vascular plants include lichens, bryophytes (mosses and liverworts) and algae. Information on the distribution of these species is not as well recorded as vascular plants. In general, assemblages of these species have not been used to assess habitat quality. Consequently, these guidelines are based on the presence of rare species and, where appropriate species assemblages.

Non-vascular plants require specialist survey skills and the presence of rare species should not be confirmed unless the record has been provided by a suitably qualified person.

Non-vascular plants can have very restricted distributions, which can sometimes mean that a species is located on a single tree, stone, rock face, building or area of bare ground. Where this is the case, further surveys should be undertaken to determine if the species is more widely spread in the immediate vicinity of the record and so help inform the identification of the boundaries of the Local Wildlife Site. If further information is not available or the species concerned is very restricted, the boundary should be drawn to include other similar habitats within the immediate locality. The boundary should also take account of features which may either be contributing, or potentially contribute, to the niche and long term survival of the species for example associated woodland which contributes to shade and humidity.

Non-vascular plants will colonise a range of natural and man-made substrates. Houses, agricultural and industrial buildings, whether in use or not, will not be eligible for selection.

3.2.1 Lichens

Guideline

L1 Any site that supports a population of a lichen species listed on Schedule 8 and fully protected under the Wildlife and Countryside Act 1981 (as amended) and/or is listed in the most recent version of the British Red Data Book and species which are considered to be nationally rare..

Application

All sites for lichens in the above categories should be included. Only species afforded full protection under Section 13 (i) should be included.

Rationale

Species listed in the British Red Data Books are the rarest and most vulnerable species in the British Isles, many of which are threatened with local or national extinction. The protection, maintenance and enhancement of these sites are vital for the maintenance of biological diversity throughout the British Isles and Western Europe. Nationally rare species occur within 15 or less sites in Britain.

Guideline

L2 Any site that supports a population of a nationally scarce lichen species.

Application

All sites for lichens in the above categories should be included.

Rationale

The species in the above categories are nationally scarce, occurring in more than 16, but less than 100 10km squares in Britain, and there is a national responsibility for their conservation.

Guideline

L3 Any site that supports a population of a lichen species rare in West Yorkshire.

Application

This guideline should be applied where sites support a population of a species identified as a county rare plant species. There is a deficiency in data across West Yorkshire either in terms of survey coverage or recent survey information. There may be good historical records for parts of West Yorkshire, but some may have become locally extinct due to airborne pollution. With improving air quality some of these species are or may in future re-colonise the County. As a consequence, county rare species should be identified through consultation with experts and local recorders, using up to date survey data.

Rationale

These lichen species are the rarest and/or most threatened species in West Yorkshire and their protection, maintenance and enhancement are important to sustaining biological diversity in the county.

Guideline

L4

Any site with a New Index of Ecological Continuity score of 11 or more.

Application

This index should only be used in selecting ancient woodland and parkland sites. The index should be calculated using the methodology outlined in Hodgetts (1992)¹⁰³.

Rationale

Lichens can be reliable measures of ecological continuity in woodland and parkland sites and the Index of Ecological Continuity has been developed to assess assemblages of lichens associated with ancient sites. These assemblages can only develop over a long period of time in sites that have suffered little disturbance and have a long history of woodland cover. As such they represent some of the most natural lichen communities remaining in Britain.

Guideline

L5

Any site that regularly supports a population of a lichen in West Yorkshire, which is at risk of becoming rare because of a recent decline in its distribution or population.

Application

Sites supporting species that are threatened or considered vulnerable in the county should be included under this guideline. Only sites making a significant contribution to the distribution or population of the species should be selected. This guideline should only be applied where there is sufficient local, regional or national data to determine the threat to the species. It should not be used where the reason for the decline indicates that site designation will not significantly influence the decline for example climate change or high background levels of airborne pollution.

Rationale

A variety of factors can cause a sudden or gradual decline in the population of a species. These species are at risk of becoming endangered or even extinct in the County and measures to prevent this occurring are required.

3.2.2 Mosses and Liverworts (Bryophytes)

Guideline

ML1

Any site that supports a population of a moss or liverwort species listed in Schedule 8 and fully protected under the Wildlife and Countryside Act

¹⁰³ Hodgetts N.G. (1992). Guidelines for the selection of Sites of Special Scientific Interest: non-vascular plants. JNCC

1981 (as amended) and/or is listed in the most recent version of the British Red Data Book.

Application

All sites for mosses and liverworts in the above categories should be included. Species not provided protection under Section 13(i) of the Act should not be included.

Rationale

These species are rare and/or threatened with extinction in Britain. Consequently, there is an obligation to maintain and enhance these sites in order to sustain biological diversity throughout the British Isles and Western Europe.

Guideline

ML2 Any site that supports a population of a nationally scarce moss or liverwort species.

Application

This guideline should be applied to all sites supporting nationally scarce mosses and liverworts (Hodgetts, 1992)¹⁰⁴

Rationale

These species have been recorded from between 16 and 100 10km grid squares in Britain. They are, therefore, scarce nationally and merit protection throughout their range.

Guideline

ML3 Any site that supports a population of a rare West Yorkshire moss or liverwort species.

Application

This guideline should be applied where sites support a population of a species identified as a county rare plant species using the method proposed by Perring and Farrell (1996). This should (when the information becomes available) be applied at the vice-county level and will exclude populations which are the result of recent deliberate introductions (which do not form part of a species recovery programme) or localities where a species occurs as a short-term casual. Species considered rare in one vice-county, but common in another in West Yorkshire, will only be eligible for designation within the vice-county in which it is considered rare.

Rationale

These bryophyte species are the rarest and/or most threatened species in West Yorkshire and their protection, maintenance and enhancement are important to sustaining biological diversity in the county.

Guideline

¹⁰⁴ Hodgetts N.G. (1992). Guidelines for the selection of sites of special scientific interest: non-vascular plants. JNCC

ML4 Any site that regularly supports a population of a moss or liverwort in West Yorkshire, which is at risk of becoming rare because of a recent decline in its distribution or population.

Application

Sites supporting species that are threatened or considered vulnerable in the county should be included under this guideline. Only sites making a significant contribution to the distribution or population of the species should be selected. This guideline should only be applied where there is sufficient local, regional or national data to determine the threat to the species. It should not be used where the reason for the decline indicates that site designation will not significantly influence the decline for example climate change.

Rationale

A variety of factors can cause a sudden or gradual decline in the population of a species. These species are at risk of becoming endangered or even extinct in the County, and measures to prevent this occurring are required.

3.2.3 Stoneworts (Algae)

Guideline

S1 Any site that supports a population of a species or taxa that is nationally rare or scarce or is considered to be rare in West Yorkshire.

Application

This guideline should be applied to any site with a population of these species. Where the species concerned occurs as a short term casual, the site should not normally be designated. Sites where there has been a recent, deliberate re-introduction, excluding species recovery programmes, should also not normally be included.

Rationale

These species are the rarest and/or most threatened with extinction in the British Isles. Consequently, the protection, maintenance and enhancement of the populations of these species in West Yorkshire are important for sustaining biological diversity throughout the British Isles and Western Europe.

3.2.4 Fungi

Application (all guidelines)

This section includes guidance on the selection of sites for nationally rare and scarce fungal populations as well as species considered to be rare in a West Yorkshire context.

An additional guideline has been included for grasslands which support a significant range of species from the Clavariaceae (fairyclubs), Hygrocybe (waxcap), Entolomataceae (pink gills), Geoglossaceae (earth tongues) and Dermoloma (Crazed caps), including Camarophyllopsis and Porpoloma families. Collectively these are referred to as CHEGD or waxcap grasslands.

CHEGD grasslands have evolved in the British Isles in response to the Atlantic influence. They are in rapid decline as a result of agricultural 'improvement' and development pressure. Some of the grasslands are likely to be of international or national importance.

CHEGD grasslands are associated with undisturbed, ancient, semi-natural grassland which can either be well grazed by domestic livestock or frequently mown by humans. The grasslands will have not received any fertilizer, either organic or inorganic, as the fungi are very sensitive to nitrogen and phosphate and are unlikely to have been limed. Steep slopes, rock outcrops and boulders, ant hills, high moss cover, heath bedstraw and other unimproved grassland plant species can be useful indicators of likely high value sites.

The CHEGD thresholds assume multiple (3 or more) survey visits identifying fruiting bodies (sporomes). DNA analysis of CHEGD hyphae within soils has not been used to set thresholds.

Guideline

Fu1 Any site that supports a population of a fungus listed in Schedule 8 and fully protected under the Wildlife and Countryside Act 1981 (as amended), or is in the most recent relevant Red Data List of Threatened British Fungi, or International Union for Conservation of Nature (IUCN) list of globally vulnerable (VU), endangered (EN) or critically endangered (CR) species.¹⁰⁵

Application

This guideline should be applied to any site with a population of these species. Where the species concerned occurs as a short term casual, the site should not normally be designated. Sites where there has been a recent, deliberate re-introduction, excluding species recovery programmes, should also not normally be included. Species not afforded protection under Section 13(i) of the Act should be excluded from this guideline.

Rationale

These species are the rarest and/or most threatened with extinction in the British Isles. Consequently, the protection, maintenance and enhancement of the populations of these species in West Yorkshire are vital for sustaining biological diversity throughout the British Isles and Western Europe.

Guideline

Fu2 Any site that supports a population of a nationally scarce fungus.

Application

This guideline should be applied to any site with a population of these species. Where the species concerned occurs as a short term casual, the site should not normally be designated. Sites where there has been a recent, deliberate re-introduction, excluding species recovery programmes, should also not be included.

Rationale

¹⁰⁵ Fu1 amended 24/03/2022

The species in the above categories are nationally scarce, occurring in more than 16 but less than 100 10km squares in Britain, and there is a national responsibility for their conservation.

Guideline

Fu3 Any site that supports a population of a fungus considered rare in West Yorkshire.

Application

This guideline should be applied where sites support a population of a species identified as a county rare plant species. Fungi of cultivated plants and crops should not normally be included.

Rationale

These plant species are the rarest and/or most threatened species in West Yorkshire and their protection, maintenance and enhancement are important to sustaining biological diversity in the county.

Guideline

Fu4 Any site that supports an assemblage of CHEGD species greater than or equal to the threshold set for each individual family as set out in Table 17.¹⁰⁶

Application

This guideline should be applied where a site supports an assemblage of fungi meeting one or more of the species thresholds in table 17 for any of the CHEGD families. Sub-species should not be counted separately. Boundary setting should use the distribution of fruiting bodies combined with the extent of similar habitat available to the mycelia of the fungal assemblage within the management unit.¹⁰⁷

Rationale

These fungi are indicators of nutrient poor, undisturbed, unimproved grassland. Great Britain has a high proportion of CHEGD grasslands within Europe. The habitat is in rapid decline and is becoming increasingly rare. CHEGD species are often associated with other notable vascular plants and mosses.

Table 17 Waxcap grasslands (CHEGD) thresholds

Family	Nationally important threshold (species)	Locally important threshold (species)
Clavariaceae (Fairy clubs)	7	4
Hygrocybe (Waxcaps)	19	10
Entolomataceae (Pink gills)	15	8
Geoglossaceae (Earth tongues)	5	3
Dermoloma (Crazed caps), including Camarophyllopsis and Porpoloma	3	2

¹⁰⁶ Fu4 and Fu5 added 14/12/2017
¹⁰⁷ Application amended 24/03/2022

Guideline

Fu5

Areas of unimproved grassland, which adjoin or lies within 500m of an existing grassland management unit of a Local Site or Site of Special Scientific Interest which meets criteria in Fu4 and have a score within 20% of the local thresholds listed in Table 17).

Application

The thresholds for this criterion will be taken to be 80% of the local threshold in Table 17 rounded up to the nearest whole number.

Rationale

CHEGD grasslands are rare due to the combination of minimal fertiliser input and regular cutting or grazing. Fruiting bodies are not always visible but it is reasonable to assume that spores from nearby grasslands either have, or will, transfer to proximal sites with similar management regimes. This guideline enables groupings of grassland of similar quality and management to be included in a Local Site where some components of the group individually do not quite meet the full thresholds of Local Site selection.

3.3 MAMMALS

Application (all mammal guidelines)

The evidence of the presence of a mammal species will be based on field signs and sightings. These guidelines should only be used where site designation is expected to make a contribution to the conservation of the local population of the species. Where major threats to the species come from factors which can not be controlled or influenced by site designation, then alternative solutions to the conservation of the species should be sought. Examples might include brown hare and hunting with dogs/crop protection. Species which are widely distributed may add value to a site designated for other reasons (for example badger setts in semi-natural broad leaved woodland), but the success of the wider population is not linked closely enough to an identifiable site to warrant designation on species grounds alone.

3.3.1 Bats

Guideline

M1(a)

Any hibernation site that regularly supports 10 or more individuals of any species of bat.

Guideline

M1(b)

Any site that regularly supports roosts of 3 or more species of bat, with at least 5 individuals of each species.

Guideline

M1(c) Any breeding roost site that regularly supports a significant population of a bat species (see Table 17).

Application (all bat selection guidelines)

These guidelines will **not** be applied to domestic dwellings or employment premises. Other artificial structures for example, mine shafts, tunnels, bridges, quarries, historic monuments (except those that are also domestic dwellings) and churches as well as natural structures may be considered for designation. Tree roosts with a long history of occupation should not generally be taken in isolation and sites should consider including other stands of trees within the locality where they might provide additional or replacement roosting opportunities to maintain the population in the longer term.

A site should usually include a maternity roost, hibernaculum or swarming site for mating, as these are places where bats aggregate and are likely to be more important to bat populations if they are lost. The site should include features in the immediate surroundings which contribute to the quality of the habitat for bats, but not extensive areas of feeding habitat, unless the species is listed under Annex II of the Habitats Directive (Barbastelle, Bechstein's or Horseshoe bats), none of which have been recorded recently in West Yorkshire.

The guidelines are intended to identify and protect the most important regularly used sites. It is not intended to cover sites that support low numbers of bats and/or roost sites which are intermittently used.

"Regularly supports" will require evidence from 3 maternity roost visits in the last 10 years. This will be reduced to 1 visit in the last 10 years for hibernacula due to the higher risk associated with disturbance to bats¹⁰⁸.

Rationale (all bat selection guidelines)

All species of British bat are protected under Section 9 of the Wildlife and Countryside Act 1981 (as amended) and Regulation 39 of The Conservation (Natural Habitats, &c.) Regulations. This protection is provided because all species of bat have declined significantly throughout the UK in the last 50 years. This decline has been brought about by a variety of factors, including reduction in habitat and subsequent habitat fragmentation, destruction of roost sites, either directly or through chemical treatment of roof timbers, and a reduction in insect food supplies arising from reduced habitat and extensive use of pesticides. The legislation is generally considered to offer the most effective way to protect bats in domestic houses and employment premises. Designating other bat habitat used by significant numbers or a diverse range of bat species helps to raise the profile of these important sites.

Bats have a low reproductive rate and consequently, breeding success is vital to the survival of populations. When there is a loss through the destruction of a breeding colony, the recovery rate is slow. Breeding success is affected by a variety of factors including the quality of roost site, weather conditions, food availability and disturbance of the roost site. Bats are very selective in their choice of breeding roosts and good quality roosts are utilised regularly over a long period of time. Such roost sites often provide a

¹⁰⁸ Added 09/05/2013

variety of environmental conditions, which the bats are able to utilise depending on the prevailing weather conditions. These roosts also are often close to, or well connected by flyways to, good feeding habitat. Feeding areas close to roosts are particularly important as it means the female adult bats can readily return to the roost on a regular basis during the night to suckle their dependent young.

Hibernation roosts are also important for the survival of a bat population and sites that provide suitable habitat for a variety of species of bat or large numbers of bats are particularly valuable. Hibernating bats require constant, undisturbed, cold but moist environments for hibernation, which will reduce the need for activity during the winter and minimise the use of stored fat reserves. Like breeding roosts, some hibernation sites have been used regularly over many years.

Table 18 Numbers of bats that indicate a significant breeding roost in West Yorkshire

Bat species		Significant roost
Pipistrellus pipistrellus	Common pipistrelle	100 or more animals
Pipistrellus pygmaeus	Soprano pipistrelle	100 or more animals
Pipistrelle nathusii	Nathusius' pipistrelle	1 or more
Plecotus auritus	Brown long-eared	20 or more
Nyctalus noctula	Noctule	20 or more
Nyctalus leisleri	Leisler's	20 or more
Myotis daubentoni	Daubenton's	20 or more
Myotis nattereri	Natterer's	20 or more
Myotis mystacinus	Whiskered	20 or more
Myotis brandti	Brandt's	20 or more
Other bat species		1 or more

3.3.2 Other mammals

Within West Yorkshire there are records of a number of notable mammal species some of which have suffered severe declines and probably local extinction. In this latter category are species listed in Table 19

Table 19 Species thought to be extinct in West Yorkshire

Species	Date of last record
Red squirrel	1990
Dormouse	1940s
Polecat	1965
Pine marten	1979

Proving that a species is extinct is extremely difficult, especially with species which are naturally present at low densities. All of the above species were recorded in West Yorkshire in the latter half of the 20th century. Polecat has been recorded as moving north and eastwards towards West Yorkshire in recent years, however polecat ferrets, a hybrid from the interbreeding in captivity of polecats and ferrets, are regularly found within Yorkshire which makes many records of native polecats unreliable.

Site based protection should be considered if extant or reintroduced populations of any of these species are discovered and populations can be linked to defined sites.

Guideline

M2

Any site which supports a population of a species listed in Table 19¹⁰⁹

Application

Sites should only be designated where a population has been identified by evidence accepted by a recognised mammal expert. Surveys to establish the extent of the population and suitable habitat will also be required.

Rationale

These species are all legally protected under the Wildlife and Countryside Act 1981 (as amended) and are considered likely to be extinct. Any population including reintroductions carried out under a Species Recovery Programme are considered to be valuable.

Otter

Otter, a species protected under the Conservation (Natural Habitats & c.) Regulation 1994 (as amended), is currently widely distributed across rivers and canals in lowland West Yorkshire, notable on the River Wharfe, River Aire and River Calder. Further west records become more scarce. This may be related to the extent of a recovering population spreading from the east, pollution impacting on habitat quality and food or persecution. Otters have extensive territories and their presence alone is not considered to warrant site designation, however natal/breeding holts within a block of habitat are far less common and should be designated where reliable supporting evidence is available.

Guideline

M3

Any site supporting a breeding holt for otter.

Application

Otters tend to be very secretive when breeding, so natal holts may be very difficult to locate. Juvenile otters can be identified by smaller footprints, usually in combination with those of an adult. The presence of habitat likely to contain a natal holt, identified by an experienced otter ecologist, backed by supporting evidence will be sufficient for site designation.

Rationale

Otters and the places which they use for shelter or protection are protected under European and UK legislation. Otters require secluded habitat for breeding and such sites warrant protection.

Other notable mammals

¹⁰⁹ Error corrected 21/03/2019 from Table 18 to 19

The following table includes a number of mammals species which are either legally protected or listed on the UK Biodiversity Action Plan as declining. Sites for these species should only be designated in significant blocks of habitat where it is likely to contribute to the maintenance of a core population within the Natural Area.

Table 20 Other notable mammals

Species	Habitat	Status
Water vole	Ditch and stream systems, wetlands, upland moorland	W & CA 1981, UK BAP
Mountain hare	Upland moorland	UK BAP
Water shrew	Stream systems	WYBAP
Harvest mouse	Fen, hedgerow networks	UK BAP

Guideline

M4 **Habitat contributing to the maintenance of a core population of one of the species listed in Table 20 within a Natural Area of West Yorkshire.**

Application

A core population will generally be one where recent historical records collected over a minimum of 3 of the last 10 years demonstrate that the quality and extent of habitat is likely to be sufficient to maintain a viable population of the species. Designation should be aimed at raising the profile of management for the species concerned, where doing so could be reasonably expected to make a difference to sustaining the population. Particular care will be needed for water vole where mink predation can result in populations being devastated over a short period of time when habitat is sub-optimal or limited in extent.

Core populations should be defined on a Natural Area basis as the distribution of these species varies considerably from east to west.

Rationale

These species are thought to be declining. Designating core habitat will contribute towards maintaining populations and species distribution within West Yorkshire and highlight the needs of the species in site management decisions.

3.4 BIRDS

Application (all bird guidelines)

The presence of breeding birds will be determined by field evidence including: sightings of the species in the same site throughout the bird breeding season, territorial singing male, pairs of birds, nest building activity, nests with eggs or chicks, birds carrying nesting material or faecal sacs.

Eligible sites will exclude domestic, agricultural and buildings used for employment whether or not they are in use.

When determining the boundaries of a Local Wildlife Site consideration should be given to breeding, feeding and roosting sites.

For the purposes of these guidelines, 'regularly' will be judged by the species being recorded in at least 4 of the most recent 10 years for which data are available.

Guideline

B1

Any site which regularly supports more than 0.5% of the total British breeding population of any native bird species.

Application

This guideline is likely to be used primarily in relation to colonial species.

Rationale

The threshold for the selection of nationally important sites (i.e. SSSIs) is 1% of the total population. Consequently, the threshold of 0.5% reflects county and even regionally important sites for breeding birds.

Guideline

B2

Any site which regularly supports more than 0.5% of the total British non-breeding population of any native bird species.

Application

Whilst this guideline is likely to be mainly applied to wintering populations, it can also be applied to other non-breeding aggregations of birds such as pre and post breeding, non-breeding summer, moulting and passage sites. Cropland will not normally be designated as changes in arable cropping patterns and treatments can be expected to be a major influence on the areas used by the birds.

Rationale

The threshold for the selection of nationally important sites (i.e. SSSIs) is 1% of the total population. Consequently, the threshold of 0.5% reflects county and even regionally important sites for non-breeding birds.

Guideline

B3

Any site that regularly supports a significant population of a species on the 'Red List' included in 'Birds of Conservation Concern'.

Application

This guideline will be applied only to those species which have been listed in the latest two editions of the Red Lists. Sites that regularly support a significant proportion of the population of West Yorkshire should be considered for designation. The guidelines should not be applied to houses or agricultural or buildings used for employment. The definition of "significant" will vary from species to species. Sites proposed for selection under this criterion should provide an explanation for why the population is considered to be significant. This will usually need to be arrived at in consultation with local ornithologists.

This guideline should only be used where site designation is expected to make a contribution to the conservation of the local population of the species within the Natural Area. Where major threats to the species come from factors which can not be controlled or influenced by site designation, then alternative solutions to the conservation of the species should be sought. This is particularly relevant to widely dispersed species where numbers are high, but have shown rapid decline such as the skylark.

Rationale

These are the rarest and/or most threatened birds in the UK and there is a national responsibility for their conservation. The Red List is up dated every 5 years, with some species being added and others removed. Where the Local Wildlife Sites system has contributed to the recovery of a species, it is considered appropriate to retain the site designation until it is apparent that the species recovery has been maintained.

Guideline

B4 Any site which regularly supports a breeding population of an uncommon breeding bird in West Yorkshire.

Application

This guideline will be applied to species with fewer than 20 breeding pairs in West Yorkshire or to species with fewer than 50 breeding pairs but are restricted to ten or less sites.

Rationale

These bird species are uncommon in West Yorkshire and merit protection.

Guideline

B5 Any site which regularly supports a good assemblage of breeding bird species, characteristic of the habitat(s) in which they are recorded.

Application

This guideline will be applied using the Table 21 . The list of birds and the scores given to them are taken from Guidelines for the Selection of Biological Sites of Special Scientific Interest (JNCC, 1998) modified to reflect changes in breeding numbers using Birds in England (A Brown and P Grice) . The selection thresholds have, however, been revised to reflect assemblages of significance in West Yorkshire.

Rationale

This guideline will identify rich-assemblages of bird species for the habitats in which they are recorded. The scores provided for individual species are inversely related to the number of breeding pair in Britain:

Breeding pairs in Britain	Score
>1,000,000	not included - ubiquitous
1,000,000 - 100,000	1
100,000 - 10,000	2
10,000 - 1,000	3
1,000 - 100	4

100 - 10
1 - 10

5
6

Table 21 Breeding Bird Assemblages for Habitats

Lowland damp grassland			
Mute swan	3	Snipe	3
Shelduck	3	Black-tailed godwit	5
Gadwall	4	Curlew	2
Teal	4	Redshank	3
Pintail	6	Cuckoo	3
Garganey	5	Short-eared owl	4
Shoveler	4	Yellow wagtail	2
Marsh harrier	4	Whinchat	3
Quail	5	Grasshopper warbler	3
Corncrake	6	Sedge warbler	1
Lapwing	2	Reed bunting	1
Selection threshold value: 11			
Lowland fen without open water			
Little grebe	3	Snipe	3
Bittern	5	Cuckoo	3
Gadwall	4	Whinchat	3
Teal	4	Cetti's warbler	4
Garganey	5	Grasshopper warbler	3
Shoveler	4	Savi's warbler	6
Pochard	4	Sedge warbler	1
Marsh harrier	4	Reed warbler	2
Montagu's harrier	6	Marsh warbler	6
Spotted crane	5	Bearded tit	4
Water rail	3	Reed bunting	1
Selection threshold value: 11			
Lowland open waters and their margins			
Little grebe	3	Avocet	4
Great crested grebe	3	Little ringed plover	3
Black-necked grebe	6	Ringed plover	3
Bittern	5	Snipe	3
Grey heron	3	Redshank	3
Mute swan	3	Common tern	3
Shelduck	3	Black tern	6
Gadwall	3	Cuckoo	3
Teal	4	Kingfisher	3
Pintail	6	Yellow wagtail	2
Garganey	5	Grey wagtail	3
Shoveler	4	Cetti's warbler	4
Pochard	4	Grasshopper warbler	3
Tufted duck	3	Savi's warbler	6
Red-breasted merganser	4	Sedge warbler	1
Marsh harrier	4	Reed warbler	2
Montagu's harrier	6	Marsh warbler	6
Spotted crane	5	Bearded tit	4
Water rail	3	Reed bunting	1
Selection threshold value: 15			

Upland waters and their margins			
Little grebe	3	Oystercatcher	3
Great crested grebe	3	Ringed plover	3
Black-necked grebe	5	Dunlin	4
Grey heron	3	Snipe	3
Greylag goose (non-feral)	2	Curlew	2
Wigeon	4	Redshank	3
Teal	4	Common sandpiper	3
Shoveler	4	Common tern	3
Tufted duck	3	Grey wagtail	3
Red-breasted merganser	4	Dipper	3
Goosander	3		
Selection threshold value: 15			
Upland moorland and grassland with water bodies			
Little grebe	3	Dunlin	4
Greylag goose (non-feral)	2	Snipe	3
Wigeon	4	Curlew	2
Teal	4	Redshank	3
Pintail	6	Common sandpiper	3
Red-breasted merganser	4	Short-eared owl	4
Goosander	3	Grey wagtail	3
Hen harrier	6	Dipper	3
Buzzard	2	Whinchat	3
Merlin	4	Stonechat	3
Peregrine	4	Wheatear	2
Red grouse	2	Ring ouzel	3
Black grouse	3	Raven	4
Golden plover	3	Twite	4
Selection threshold value: 15			
Upland moorland and grassland without water bodies			
Teal	4	Redshank	3
Hen harrier	4	Greenshank	3
Buzzard	2	Great skua	3
Merlin	4	Arctic skua	3
Peregrine	4		
Red grouse	2	Short-eared owl	3
Black grouse	3	Whinchat	3
Golden plover	3	Stonechat	3
Dunlin	4	Wheatear	2
Snipe	3	Ring ouzel	3
Whimbrel	4		
Curlew	2	Raven	4
		Twite	4
Selection threshold value: 15			
Woodland			
Grey heron	3	Chiffchaff	1
Honey buzzard	5	Goldcrest	1
Red kite	4	Firecrest	5
Goshawk	4	Spotted flycatcher	2
Sparrowhawk	2	Pied flycatcher	3

Buzzard	2	Long-tailed tit	1
Hobby	4	Marsh tit	2
Black grouse	3	Willow tit	2
Woodcock	3	Crested tit	4
Stock Dove	1	Coal tit	1
Cuckoo	3	Nuthatch	1
Tawny owl	2	Treecreeper	1
Long-eared owl	4	Golden oriole	5
Nightjar	3	Jay	1
Green woodpecker	2	Raven	4
Great spotted woodpecker	2	Tree sparrow	1
Lesser spotted woodpecker	3	Serim	6
Tree pipit	2	Greenfinch	1
Nightingale	3	Goldfinch	1
Redstart	1	Siskin	2
Song thrush	1	Lesser Redpoll	2
Mistle thrush	1	Scottish crossbill	4
Garden warbler	1	Common crossbill	4
Blackcap	1	Bullfinch	1
Wood warbler	3	Hawfinch	3
Selection threshold value: 22			
Scrub (excluding heath)			
Turtle dove	1	Whitethroat	1
Cuckoo	3	Lesser whitethroat	2
Long-eared owl	4	Garden warbler	1
Nightjar	3	Blackcap	1
Tree pipit	2		
Nightingale	3	Linnet	1
Whinchat	3		
Stonechat	3	Tree sparrow	1
Song thrush	1	Greenfinch	1
Mistle thrush	1	Goldfinch	1
Grasshopper warbler	3		
Selection threshold value: 10			
Lowland heath			
Montagu's harrier	6	Woodlark	3
Hobby	4	Tree pipit	2
Quail	5	Whinchat	3
		Stonechat	3
Snipe	3	Wheatear	2
Curlew	2	Grasshopper warbler	3
Redshank	3		
Cuckoo	3		
Long-eared owl	4	Linnet	1
Nightjar	3		
Selection threshold value: 10			

Guideline

B6

Any site regularly supporting a population of a breeding or wintering bird in West Yorkshire which is at risk of becoming rare because of a recent decline in its distribution or population.

Application

Sites supporting species threatened or considered vulnerable in the county should be included under this guideline. Only sites making a significant contribution to the distribution or population of the species should be selected. This guideline should only be applied where there is sufficient local, regional or national data to determine the threat to the species.

This guideline should not be used for species which have always been present in low numbers.

This guideline should only be used where site designation is expected to make a contribution to the conservation of the local population of the species within West Yorkshire. Where major threats to the species come from factors which can not be controlled or influenced by site designation, then alternative solutions to the conservation of the species should be sought.

Rationale

A variety of factors can cause a sudden or gradual decline in the population of a species. The Red List is a national indicator which may not adequately reflect the situation in West Yorkshire. These species are at risk of becoming endangered or even extinct in the County and measures to prevent this occurring are required.

Guideline

B7

Any water-body or grouping of water-bodies regularly supporting a significant range and number of overwintering or passage migrant wildfowl and/or wading birds in West Yorkshire.

Application

This guideline will be applied to sites regularly supporting assemblages and numbers of wintering wildfowl and/or waders considered of county significance that are not covered by other guidelines. A site under this guideline can include two or more physically separate water bodies so long as it can be shown that they are regularly used by the wintering assemblage, and that the protection of the two or more water bodies is necessary for its protection. Sites will generally be supported by data from Wetland Bird Surveys (WeBS), but consideration may also be given to sites recognised as being the most significant in West Yorkshire by established local bird group.

Rationale

Many water-bodies support valuable assemblages and numbers of wintering birds, but which would not qualify for Local Wildlife Site designation just on the population of one particular species under the other guidelines. These sites, however, are of value in the West Yorkshire context and should be afforded protection. The guideline allows for two or more water bodies to be included in a single Local Wildlife Site designation because wildfowl and waders will often move between sites within a discreet geographical area such as a river valley depending on food availability, levels of human disturbance, predation and roosting opportunities.

3.5 AMPHIBIANS AND REPTILES

There are nine species of native reptiles and amphibians known to be present in West Yorkshire:

Common name	Scientific name	Legal protection	UK BAP
Grass snake	<i>Natrix natrix</i>	UK (Part - kill injure)	Yes
Adder	<i>Vipera berus</i>	UK (Part - kill injure)	Yes
Common lizard	<i>Lacerta vivipara</i>	UK (Part - kill injure)	Yes
Slow worm	<i>Anguis fragilis</i>	UK (Part - kill injure)	Yes
Common frog	<i>Rana temporaria</i>		
Common toad	<i>Bufo bufo</i>		Yes
Great crested newt	<i>Triturus cristatus</i>	European, UK (full)	Yes
Smooth newt	<i>Triturus vulgaris</i>		
Palmate newt	<i>Triturus helveticus</i>		

It should be noted that palmate newt is the least common of the amphibians found in West Yorkshire and is therefore of high local conservation value.

Site boundaries should where possible include all key habitats for the species concerned including breeding (or suspected breeding for reptiles), feeding and hibernating habitats. Clusters of ponds in close proximity to each other with good connectivity should be considered within the same Local Wildlife Site boundary. Consideration should also be given to contribution to Mixed Habitat and Structural Mosaics criteria as these can offer good opportunities for reptiles and amphibians.

Alien species such as Alpine newt, will not be considered for site designation.

Guideline

AR1

Any site that regularly supports four or more species of amphibian or reptile native to West Yorkshire.

Application

Sites supporting four or more species of amphibians or reptiles that are known to be regularly breeding (amphibians) or possible breeding (reptiles).

Rationale

Records of reptiles are rare in West Yorkshire, and breeding records even more unusual. The presence of a reptile species at a site over a number of years can be used to indicate possible breeding. Amphibians are easier to record as they return to breeding ponds and should be recorded for a least 3 of the last 10 years.

Guideline

AR2

Any site supporting a good population of Great Crested Newt (*Triturus cristatus*)

Application

This is taken from Table 22 below and is ≥ 11 ¹¹⁰ adults or juveniles counted at night.

Rationale

The Great Crested Newt is protected by the Wildlife and Countryside Act 1981 and the Conservation (Natural Habitats etc.) Regulations. The protection reflects the fact that this species is vulnerable at a European level. Consequently good populations of this species should be protected

Guideline

AR3 Any site supporting an exceptional/large population of any amphibian.

Application

An exceptional/large population will be determined by reference to Table 22.

Rationale

All species of amphibian in the UK have declined in the last 50 years, largely as a result of habitat loss. Exceptional populations therefore should be protected.

Guideline

AR4 Any site which scores 5 or more for its breeding amphibian species assemblage.

Application

To determine the amphibian assemblage score reference should be made to Table 22 which has been taken from JNCC 1998¹¹¹. The scores have to be for breeding sites surveyed during the breeding season following the guidelines set out in English Nature (2001). Night time survey techniques should be used wherever possible¹¹².

Rationale

Six species of native amphibian are recorded from the UK. All of which have declined over the last 50 years, as a result, primarily of habitat loss. As well as number of species, the number of individual amphibians is also important in assessing the value of a site for amphibian species.

Table 22. Assessment of amphibian populations

		Low/Small	Good/Medium	Exceptional/Large
Species	Method	Population	Population	Population
		Score 1 point	Score 2 points	Score 3 points
Great Crested Newt	Seen or netted in day	<5	5-50	>50
	Counted at night	<11 ¹¹³	11-100	>100
Smooth newt	Netted in day	<10	10-100	>100
	Counted at night			

¹¹⁰ Amended 19/07/2012

¹¹¹ JNCC (1998) *Guidelines for selection of biological SSSIs*. HMSO as modified by the Great crested newt mitigation guidelines, English Nature (2001).

¹¹² Added 09/07/2012

¹¹³ Amended 19/07/2012

Palmate newt	Netted in day	<10	10-100	>100
	Counted at night			
Common toad	Estimated	<500	500 – 5,000	>5,000
	Counted	<100	100 – 1,000	>1,000
Common frog	Spawn clumps counted	<50	50-500	>500

Guideline

AR5

Any site where slow worm or adder is present and considered likely to be breeding.

Application

The area of importance should include all the known breeding, foraging and hibernating habitats.

Rationale

Adder and slow worm are considered to be rare in West Yorkshire, West Yorkshire Ecology has only 3 records of adder and 3 of slow-worm in the last 25 years. Adders are known to be faithful to their breeding sites, returning to the same location each year.

3.6 FISH

Consideration should be given to the relationship of sites identified under these guidelines and those identified under the Flowing Water criteria. Where possible the two should be linked, as the health of the fish population is closely linked to the quality of the habitat.

Guideline

F1

Any watercourse regularly supporting a native population of a species of fish listed in Annex 2 of the EC Habitats Directive where the site makes a significant contribution to the distribution of the species or the total population size in the county.

Application

This guideline should be applied to all watercourses that regularly support these species. The boundaries of the designated area should include those sections of the river important for the development of fry, migration and spawning.

Habitats Directive Annex 2 - Fish

Scientific name	Common name	Ouse (Yorkshire) Hydrometric Area (Ref: 27)
<i>Petromyzon marinus</i>	Sea lamprey	LI
<i>Lampetra planeri</i>	Brook lamprey	LI
<i>Lampetra fluviatilis</i>	River lamprey	LI
<i>Salmo salar</i>	Atlantic salmon	Lo

<i>Cottus gobio</i>	Bullhead	Lo
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LI – Native, found in both lentic and lotic habitats

Lo – Native, found mainly in lotic habitats

Rationale

These species are noted as of importance in the European context in the Conservation (Natural Habitats etc.) Regulations. Consequently, populations of these species should be protected especially where they are sparsely distributed or strong populations.

Guideline

F2

Any watercourse regularly supporting a native population of a species of a threatened or declining fish listed in Table 23 where the site makes a significant contribution to the distribution of the species or the total population size in the county.

Table 23 Threatened or declining fish in West Yorkshire

Scientific name	Common name	Ouse (Yorkshire) Hydrometric Area (Ref:27)	Threat
	Eel	LI	Declining, reasons unclear, perhaps overfishing
	Brown trout	LI	Declining, due to acidification and other factors
	Nine-spined stickleback	II	Declining, sporadic distribution, some stocks extinct

II – Native, found in both lentic and lotic habitats

Maitland, P S (2004). Evaluating the ecological and conservation status of freshwater fish communities in the United Kingdom. Scottish Natural Heritage Commission Report No 001 (ROAME No.F01AC6)

Application

This guideline should be applied only to watercourses that regularly support these species. The boundaries of the designated area should include these sections of the river important for the development of fry, migration and spawning.

Rationale

These species are recognised as declining on a UK scale (Maitland (2004), populations should be protected where they add significantly to the distribution of the species in any given locality or where there are strong populations.

3.7 INVERTEBRATES

Application (all invertebrate guidelines)

With the exception of white-clawed crayfish (*Austropotamobius pallipes*), these guidelines do not attempt to designate sites based on the presence of individual species, as the data available ascribing rarity values to species is frequently called into question.

For most invertebrate species and groups the emphasis should be placed on ensuring that surveying and management of sites designated under habitat criteria, identifies and protects important niches and features for notable invertebrate species and groups.

Some sites are of particular note for invertebrate assemblages and have been well recorded by experienced entomologists. These guidelines provide a mechanism for recognising the substantive nature conservation value of these assemblages, even where more conventional habitat classification fails. Site evaluation should be undertaken with the assistance of an appropriately experienced entomologist.

For the determination of site boundaries, account should be taken of the life cycles of the species for which a designation is made. Many species require very different habitats for their larval and adult stages and it is important for survival that there continues to be available the full range of different habitats from one year to the next.

Breeding status can be determined either by the presence of eggs, larvae or pupae or by repeated sightings of adults utilising suitable habitats and/or food plants.

Guideline

INV1

Any site that regularly support an assemblage of invertebrate species scoring 15 or more where:

- **Nationally rare, UK or EU protected species score 3 points.**
- **Nationally scarce or UK BAP species score 2 points.**
- **Locally notable species score 1 point.**

Application

Nationally rare indicates a species found in 15 or less 10km squares and nationally scarce between 16 and 100km 10km squares in Britain. These lists are periodically updated and can be found at www.JNCC.gov.uk. Some invertebrates are protected under Sch5 of the Wildlife and Countryside Act 1981 (as amended), this Schedule is updated approximately every 5 years. Species are also protected under Annex 2 of the EU Habitats Directive. Locally notable species need to be justified with reference to appropriately experienced entomologists. This guideline should take into account any reliable recent information on the status of the species on the above lists as some species have been found to be more widely distributed than previously recorded, others have suffered significant declines.

Rationale

This guideline protects assemblages of the rarest invertebrates in the UK.

Guideline

INV2

- **Any site that supports a population of white-clawed crayfish**

Application

Sites should be designated where survey work has demonstrated that white-clawed crayfish are present on a stretch of river, beck or canal or a pond, where recent survey records indicate a range of ages of individuals or berried females. Local populations known to be in significant decline due to introduced signal crayfish or crayfish plague should not be designated. Crayfish Ark sites should be designated as soon as evidence that populations have become established is available.

Rationale

White-clawed crayfish have suffered a severe decline in populations in West Yorkshire due to introduced alien signal crayfish which out compete them and linked problems with crayfish plague. Any existing sites for crayfish need to be conserved and habitat management designed to strengthen and protect vulnerable populations. Ark sites, which are off stream ponds used as refuges for white-clawed crayfish may offer the best chance of saving the species in West Yorkshire and once established should be given protection.

4 Amendments approved by Local Sites Partnership

Date of amendment	Reference	Change
19/07/2012	Section 1.12 Boundaries	Section 1.12 Determining Local Wildlife Site Boundaries The following additional paragraph at the end of the section was agreed: “For canals the Local Wildlife Site boundary will include all semi-natural habitat within 2m of standing water. Any linked habitat outside of the 2m zone needs to be tested against the relevant Local Site criteria for that habitat type.”
19/07/2012	AR2	Amphibians and reptiles Ar2 – Application “This is taken from Table 21 below and is ≥ 11 adult or juveniles counted at night.”
19/07/2012	AR4	Amphibians and reptiles Ar4 – Application Addition of final sentence - “Night time survey techniques should be used wherever possible. “
19/07/2012	Table 21	Amphibians and reptiles Change great crested newts counted at night low/small to < 11 and good/medium to 11-100. This brings the criteria into line with the great crested newt mitigation guidelines (2001), page 28.
18/10/2012	Table 5	<i>Chrysoperla oppositifolia</i> currently in bold and scoring two points in table 5 changed to put the species in plain text and for it to score only one point.

09/05/2013	Wd1 - application	Ancient semi-natural woodland on page 43 to be amended to say "Site may require reliable site survey".
09/05/2013	M1, application	Bats Insert "Regularly supports will require evidence from 3 maternity roost visits in the last 10 years. This will be reduced to 1 visit in the last 10 years for hibernacula due to the higher risk associated with disturbance to bats."
24/07/2015	Table 1	Species to be added to the neutral grassland list to reflect the transition between woodland and grassland on less improved sites. <i>Anemone nemorosa</i> - wood anemone <i>Hyacinthoides non-scripta</i> - bluebell
24/07/2015	Table 3	Additional species to add to the acid grassland list <i>Polygonum bistorta</i> - common bistort <i>Veronica officinalis</i> - heath speedwell <i>Dactylorhiza maculata</i> - heath spotted orchid <i>Linum catharticum</i> - fairy flax
24/07/2015	Table 5	Acid Woodland Additions to table 5 <i>Carex pilulifera</i> - pill sedge
21/01/2016	Gr3	Removed reference to acid grassland and recognised the gradation between neutral and calcareous grassland lists.
21/01/2016	Gr4	Regonised the gradation from acid to neutral grassland for both upland and lowland acid grassland.
21/01/2016	Table 1	Neutral grassland plants correction Common fleabane <i>Pulicaria dysenterica</i>
21/01/2016	Tables 1, 2 and 3	Grasslands change all <i>Euphrasia</i> references to <i>Euphrasia</i> agg. and score 2
21/01/2016	Table 2	Calcareous grassland species add Woolly Thistle <i>Cirsium eriophorum</i> Wild Strawberry <i>Fragaria vesca</i> Common Gromwell <i>Lithospermum officinale</i> Mouse-ear hawkweed <i>Pilosella officinarum</i> Sheep's-fescue <i>Festuca ovina</i>
21/01/2016	Table 4	Neutral to calcareous woodland add Bugle <i>Ajuga reptans</i> Cowslip <i>Primula veris</i>
21/01/2016	Table 7	Change Common marsh bedstraw from <i>Galium palustre</i> spp <i>palustre</i> to <i>Galium palustre</i>
21/01/2016	Table 9	Change Common marsh bedstraw from <i>Galium palustre</i> spp <i>palustre</i> to <i>Galium palustre</i>
21/01/2016	Vp3 Application	County rare vascular plant species - change the Application to refer to West Yorkshire not the Vice County.

21/01/2016	Mh1	Add the additional bullet point - “at least five individual habitats at least one within 80%, one within 70% one within 60% and two within 50%”.
21/01/2016	Mh2	Remove both of the bullet points currently in Mh2. Remove references in the table in 2.10.1 to Value for Appreciation of Nature. Under Mh2 remove references to “significant contribution to local biodiversity” and sentence linked to education and recreation. Increase the threshold for the habitat diversity score from Table15 to 12. Add “West Yorkshire Wildlife Habitat Network2 points” to the bottom of Table 15. Add the following to the Application, “Recently created habitats within the last 15 years will not normally be considered”.
21/01/2016	Mh3 Table 16	•Remove “tidal refuse”
21/01/2016	Van1	Add “Any site which meets 80% or more of the species or habitat diversity.....”
21/01/2016	He1	Add new lowland heath criteria.
15/09/2016	Table 3	Add <i>Jasione montana</i> scoring two
15/09/2016	Pk3	Revise Application paragraph and add minor changes to Rationale.
23/03/2017	Wd4	Ferns – add “(excluding bracken)”.
23/03/2017	Wd7	Change to “Hedgerow that is at least 30 metres in length and meets at least one of the following criteria; (a) 8 or more species of native trees and/or shrubs; (b) if it supports 6 or more native tree and/or shrubs species; and has a score of 5 or more for non-woody species listed in Tables 4, 5 and 6 (c) supports 3 or more veteran/over mature trees; (d) is an ancient woodland “ghost” hedge; (e) supports 6 or more species of native trees and/or shrubs and is shown on the 1st edition Ordnance Survey Maps (~1854).” Also change the 15 year minimum age to 20 years in the application.
14/12/2017	Tables 9 and 10	Replace individual <i>Callitriche</i> species with general “ <i>Callitriche</i> sp.”
14/12/2017	Table 17 CHEGD fungi added	A new Table 17 CHEGD fungi was added and all subsequent table numbers and associated text changed.

14/12/2017	Fu4 and Fu5	Waxcap (CHEGD) fungi criteria added.
14/12/2017	Table 4	Add <i>Poa nemoralis</i> , <i>Stellaria holostea</i> , <i>Fragaria vesca</i> and <i>Potentilla sterilis</i> .
14/12/2017	Table 5	Add <i>Stellaria holostea</i> and <i>Potentilla sterilis</i> .
14/12/2017	Table 6	Include both <i>Lysimachia nemorum</i> (yellow pimpernel) and <i>Lysimachia nummularia</i> (creeping-Jenny) to correct error.
13/12/2018	Table 2	Add: <i>Astragalus glycyphyllos</i> (wild liquorice), <i>Inula conyzae</i> (ploughman's-spikenard), <i>Thalictrum minus</i> (lesser meadow-rue) and <i>Thalictrum flavum</i> (common meadow-rue)
13/12/2018	Table 4	Add: <i>Campanula trachelium</i> (nettle-leaved bellflower), <i>Lathraea squamaria</i> (toothwort), <i>Pimpinella major</i> (greater burnet-saxifrage), <i>Viola odorata</i> (sweet violet) and <i>Viola hirta</i> (hairy violet)
13/12/2018	Table 5	Add: <i>Dryopteris affinis</i> (scaly male-fern)
13/12/2018	Table 6	Add: <i>Ajuga reptans</i> (Bugle), <i>Hyacinthoides non-scripta</i> (bluebell), <i>Luzula sylvatica</i> (great wood-rush) and <i>Sphagnum spp.</i>
13/12/2018	Table 11	Correct error <i>Rorippa palustris</i> (marsh yellow-cress) and <i>Rumex palustris</i> (marsh dock) should both be included within the list and be marked “ * ”
21/03/2019	M2	Error “Table 18” should read “Table 19”.
09/05/2019	Table 4	Add <i>Listera ovata</i> (common twayblade)
12/12/2019	1.9	Add paragraph allowing double designation of geological SSSIs and LWS but not biological SSSI and LWS.
12/12/2019	Tables 1, 2 and 3	Add <i>Carex laevigata</i> (smooth-stalked sedge)
12/12/2019	Tables 2 and 3	Add <i>Carex spicata</i> (spiked sedge)
12/12/2019	Table 6	Add <i>Epipactus helleborine</i> (broad-leaved helleborine)
12/12/2019	2.10.2	Clarify the application for Mh1 to not permit the flexing of thresholds for both size and species diversity for the same habitat type.
24/03/2022	Fu1	Add IUCN Red List.
24/03/2022	Fu4	Add CHEGD fungi boundary setting to Application
24/03/2022	1.9	Reverse decision and allow double designation of SSSIs as LWS.
10/01/2023	Table 4	Remove <i>Carex pendula</i> .
10/01/2023	Table 12	Add <i>Potamogeton x suecicus</i> (<i>P. filiformis</i> x <i>P. pectinatus</i>).

5 Glossary

Ancient Woodland - There can be some confusion about the terms used to describe woodland types. Relics of primeval woodland which have continuously occupied the same site since the original wildwood covered the British Isles at the end of the last ice age are referred to as primary woodland. Although these woodlands may have been managed for centuries they have never been clear-felled or replanted and support trees and shrubs native to the sites. Secondary woodlands are those that have formed on land which was cleared of trees at one time, although this may have occurred many hundreds of years ago. On the basis of its age woodland may be classified as ancient or recent. All ancient woodlands date back to medieval times or earlier (pre 1600 A.D in England). In general, recent woodlands are post medieval and although new woodland planting became increasingly common place during the 18th century the majority of woodland that existed in 1800 is believed to have been primary woodland.

All primary woodlands are ancient, whereas secondary woodlands may be ancient or recent. Ancient woodlands generally have richer, more characteristic floras, greater vegetation structure and age class diversity and in general a high nature conservation interest. It is now widely recognised that ancient woodlands support a suite of species that are confined to older sites.

Blanket Bog – These ombrotrophic mires are typical of the regions to the north and west of the British Isles where rainfall is very high (>1500mm/annum) and/or evaporation is low. They have developed in shallow depressions and on flat, gently sloping ground, often covering most of the landscape.

Brackish – Partially saline waters often found mid-way between freshwater and saline water. These can be associated with pollution associated with for example coal mining.

Eutrophic – Mineral-rich waters, usually with high levels of soluble nitrogen and phosphorous. Eutrophic water bodies support a high primary productivity.

Fen – A wetland type often following swamp in the hydrosere succession. Fens have a summer water table at or below the sediment surface but flooded in winter. Can be divided into poor and rich fens, based both on the chemical composition of the fen waters and the species diversity of the vegetation.

Hydrosere – A continuum of vegetation types, which replace each other as succession proceeds from open water to forested mire or dry woodland.

LNR – Local Nature Reserve.

Marsh – The wet mineral-ground margin of freshwater swamp or fen. Usually non-peat forming systems only subject to periodic waterlogging during the winter months.

Mesotrophic – The terms oligotrophic and eutrophic are used to describe opposite ends of the spectrum of primary productivity in water bodies. Lakes and rivers may however

have a trophic system between these two extremes, a range of variation, which is encompassed by the term mesotrophic.

Mire – Any stage of the hydrosere where there is a high water table, suppression of organic matter decomposition or undecomposed organic material accumulates as peat.

Moorland – Is a broad term for land above the moor wall (usually 250-300 metre). Moorland supports a wide range of habitats, but is primarily comprised of blanket bog, dry upland heath and acid grassland.

Niche – Is the sum of the characters that determines the position of a species in an ecosystem including all the factors necessary for the survival of the species.

NVC - National Vegetation Classification. The NVC is a standard description of the types of vegetation of Britain that form under particular environmental conditions and in different geographical locations.

Nitrophile – Nitrogen loving species.

NNR – National Nature Reserve

Oligotrophic – In Great Britain, oligotrophic waters are mainly found in upland areas where high rainfall and hard, nutrient-poor rocks provide a supply of mineral-poor waters. Oligotrophic waters support low primary productivity due to low levels, in particular, of Nitrogen and Phosphorous, and are usually very clear.

Ombrotrophic – A supply of nutrients to a wetland system entirely from precipitation (i.e. rainwater, snow and atmospheric fall).

Peat – The partially decomposed or undecomposed organic remains of plants and animals. Peat forms when the decomposition or physical removal of organic material fails to keep pace with its rate of addition. This normally occurs because decomposition is inhibited as a result of a high water table.

Podsol - This is a type of soil that forms over hard rocks of north and west Britain where there is strong leaching of minerals and nutrients from the upper layers of the soil profile and subsequent deposition deeper in the profile. Podsoles can also occur on nutrient-poor coarse sand and gravels. They are nutrient-poor and have an acid reaction.

Primary production – The production by living organisms of organic material from inorganic resources.

Raised Bog (Mire) – These rain-fed peatlands are characteristically dome shaped and the central cupola of peat may be several metres above the mineral ground mire basin. The cupola is more convex in areas of high effective precipitation. Raised mires (unlike blanket mires) are usually limited in extent and definable for most of their perimeter by an easily recognisable boundary stream/swamp, which marks the transition between the raised bog peat and mineral soils.

Ramsar Site - These are internationally important sites for wetlands that have been identified as part of the requirements of the Ramsar Convention.

RSPB – The Royal Society for the Protection of Birds

SAC – Special Area for Conservation. These are internationally important sites for habitats and animals other than birds that have been identified as part of the requirements of the EU Habitats Directive. They are part of the series of sites across the European Union known as Natura 2000.

Semi-natural woodland – The term semi-natural woodland refers to woodland comprised of species native to the locality that have not obviously been planted. Ancient and semi-natural woodland is not necessarily the same thing. Ancient refers to the site as woodland over time, whereas semi-natural refers to what is growing on the site.

SPA – Special Protection Area. These are internationally important sites for birds that have been identified as part of the requirements of the EU Bird Directive. They are part of the series of sites across the European Union known as Natura 2000.

SSSI – Site of Special Scientific Interest.

Swamp - A freshwater wetland habitat characteristic of lake margins in which both organic and inorganic materials contribute to sediment accumulation. The water table is permanently above the sediment surface and the vegetation is usually dominated by herbaceous monocotyledons. Species diversity is often low with plant communities often dominated by 1 or 2 species.

Taxa - A grouping of organisms given a formal taxonomic name such as species, genus, family, etc.

Veteran Tree – These trees are not capable of a precise definition owing to the different characteristics of species. However, veteran trees are trees of interest biologically, aesthetically and culturally because of their age. They are trees in the ancient stage of their life and they are trees that are old relative to others of the same species.

Wildlife Habitat Network – The Lawton report “Making Space for Nature” (Sept 2010) highlighted the importance of Ecological Networks to assist the movement of species between increasingly isolated sites. This was taken up within the National Planning Policy Framework with local planning authorities required to “...take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure...” (para 171). In West Yorkshire each district has a Wildlife Habitat Network which takes as its start points nationally and locally designated sites, then using a combination of UK Priority Inventories, historical Phase 1 Habitat Surveys (1990), species information and aerial photographs links these sites together.

6 CONSULTTEES

The following organisations were consulted about these criteria in January 2011, those marked (*) responded to the consultation.

Botanical Society for the British Isles *
Bradford Botany Group *
Bradford Naturalists' Society
Bradford Ornithology Group *
Bradford Ornithological Group *
Bradford Urban Wildlife Group *
British Waterways
Butterfly Conservation
Calderdale Bird Conservation Group *
Cononley Ornithological Group
Craven Naturalists' and Scientific Association
East Keswick Wildlife Trust
EINC (Ecological Consultancy)
Environment Agency *
Forestry Commission *
Halifax Bird Watchers Club
Halifax Scientific Society
Huddersfield Birdwatchers Club
John Drewett (Ecological Consultant)
Kirklees Planning Department
Kirklees Wildlife and Landscape Partnership
Leeds Birdwatchers Club
Leeds Naturalists' Club and Scientific Society
Mid-Yorkshire Fungus Group
National Farmers Union
National Trust
Natural England
North and East Yorkshire Ecological Data
Centre
Pudsey Ornithological Club
Pugneys CP *
Royal Society for the Protection of Birds *
The National Trust
United Utilities
Upper Calderdale Wildlife Network
Wakefield Biodiversity Group
Wakefield Naturalists' Society
West Yorkshire Bat Group *
Wharfedale Naturalists' Society

Yorkshire Mammal Group
Yorkshire Naturalists' Union *
Yorkshire Water

Thank you to all who took the time to study the document and particularly those who helped by submitting responses.