CORE MANAGEMENT PLAN INCLUDING CONSERVATION OBJECTIVES

FOR

Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC

Version	Date	Summary of changes made	Made by	Approved by
Version 2	September 2022	Revision of water quality targets for river features, updated formatting, clarification of the relationship between Conservation Objectives and Performance Indicators. Addition of Feature 5: 4010 Northern Atlantic wet heaths with *Erica tetralix.* Units have been added since the previous revision and these details have been updated	Emma Wiik/Ruth Kernohan/ Rhodri Jones	Euros Jones
Version 1	22/04/2008		Joanna Clark/ Pauline Barber/ Fiona Evans	NR Thomas

Contents

Preface

This document provides the main elements of Natural Resources Wales' management plan for the site(s) named. It sets out what needs to be achieved on the site(s), and advice on the action required. This document is made available through Natural Resources Wales' website and may be revised in response to changing circumstances or new information. This is a technical document that supplements summary information on the Natural Resources Wales' website.

One of the key functions of this document is to provide Natural Resources Wales' statement of the Conservation Objectives for the relevant Special Area of Conservation (SAC) and Special Protection Area (SPA) site(s). This is required to implement the changes through the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 in addition to the existing Conservation of Habitats and Species Regulations 2017. As a matter of Welsh Government Policy, the provisions of those regulations are also to be applied to Ramsar sites in Wales.

1. Vision for the site

This is a descriptive overview of what needs to be achieved for conservation on the site. It brings together and summarises the Conservation Objectives (part 4) into a single, integrated statement about the site.

The purpose of the designation of SAC and SPA sites is to help secure the maintenance or restoration of habitats and species to favourable conservation status *for the foreseeable future*. Given that we foresee a changing climate, despite the uncertainty of the nature, degree and timing of those changes, we must address the need to ensure the resilience of each site to that changing environment. This will be achieved in the first instance by ensuring favourable condition of the important features, since a healthy feature is likely to be more resilient to the effects of climate change than one which is already stressed. Secondly, consideration must be given to those structures, functions and processes which maintain or boost the resilience of ecosystems to climate stress, including the avoidance, reduction or mitigation of other stress factors such as invasive species, nutrient enrichment, habitat and population fragmentation.

This site forms part of a wider network and is ecologically connected with its surroundings and with other designated sites in the region. Although the focus of this document is on the individual site, the conservation objectives and management requirements need to be considered in the wider context. A connected network of sites is more robust than sites in isolation, and more resilient to pressures such as climate change.

Our vision for the Meirionnydd Oakwoods and Bat Sites SAC is to maintain, or where necessary restore, the woodland and the bat sites to good condition so that all of its typical and uncommon species are able to sustain themselves in the long-term as part of a naturally functioning ecosystem.

The majority of the SAC comprises "Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles" and it is within the oak woods (and the "mixed woodland on base-rich soils associated with rocky slopes *Tilio-Acerion*", see below) that the rare and

scarce lower plants (mosses, liverworts, lichens and slime moulds), for which the Meirionnydd oak woods are famous for, occur. The lower plants are able to thrive in the most humid locations, usually by streams, rivers, waterfalls and in gorges. An exception to this is the rich lichen flora occurring on mature trees in open parkland.

The oak woodland comprises native broadleaved species such as sessile oak, downy birch, ash, alder, rowan, holly, hazel and hawthorn. The field layer supports typical woodland species such as wood sorrel, greater stitchwort, bluebell, bilberry, ferns and grasses and plenty of tree seedlings. However, the most obvious component of the field layer is the luxuriant carpet of mosses and liverworts.

Amongst the oak woods, there are smaller areas of mixed woodland on rocky slopes. This "*Tilio-Acerion*" or small-leaved lime woodland supports species indicative of base-rich and less acid soils such as dog's mercury, false brome grass and the mosses *Ctenidium molluscum*, *Eurhynchium striatum* and *Thamnobryum alopecurum*. There is also a small area of "Bog woodland" with downy birch, willow sp., purple moor grass, bottle sedge, bog-mosses (*Sphagnum* sp.) and *Polytrichum* sp.

The "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*" occur on the floodplain of the Afon Glaslyn. The canopy is dominated by alder, ash, willow sp., downy birch and other locally native species. Meadowsweet, creeping jenny, remote sedge, marsh marigold, yellow flag and *Dryopteris* ferns form the field layer.

The dry heath consists of tall and bushy heather (*Calluna vulgaris*), with western gorse and bell heather (*Erica cinerea*), with scattered trees such as downy birch and mountain ash. The area of heath should remain stable.

The lesser horseshoe bat population is thriving, and the nursery roosts continue to provide good conditions for breeding and the hibernation roosts provide cool stable temperatures for hibernation, that are free from disturbance. Important navigational flight lines from the roosts to feeding areas are intact.

"Rivers with floating vegetation often dominated by water crowfoot" occur in the Afon Glaslyn. The physical channel should be maintained or restored as far as possible to a near natural state in order to support the coherence of the ecosystem structure and function.

All factors affecting the achievement of favourable condition shall be under control.

The presence of the Meirionnydd Oakwoods and Bat Sites SAC and its special wildlife enhances the economic and social values of the area, by providing a high-quality environment for peaceful enjoyment by local people and visitors.

2. Site description

2.1 Area and designations covered by this plan

Grid reference(s): SH 660386
(This is the approximate central point of the SAC. As this is a large, composite site, this may not represent the location where a feature occurs within the SAC).

Unitary authority: Snowdonia National Park Authority

Area (hectares): 2813

Designations covered: This plan only covers the Meirionnydd Oakwoods and Bat Sites SAC and its SAC features. There are 34 component SSSI as of December 2020.

Maps showing the management units referred to in this plan can be viewed on the Welsh Government's website Map Data Cymru.

2.2 Outline description

The Meirionnydd Oakwoods and Bat Sites SAC is made up of a series of woodlands, stretching from Dolgellau in the south to Eryri in the north.

The majority of the SAC is classified as the woodland type known as "Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles", which covers approximately 84% of the SAC and is the dominant woodland type at most of the sites. A key feature of European importance is the rich Atlantic bryophyte communities that are often well developed within this Annex I habitat. These include numerous rare species, such as *Campylopus setifolius, Sematophyllum demissum, Adelanthus decipiens, Leptoscyphus cuneifolius* and *Plagiochila atlantica*.

Another key feature of the Meirionnydd Oakwoods and Bat Sites SAC is the lichen flora which is exceptionally rich and includes numerous rare species such as, *Micarea xanthonica, Parmelinopsis horrescens, Phyllopsora rosei, Micarea stipitata* and *Tyothallia biformigera*. Frequently the oak woodland occurs as part of a mosaic of woodland types including other Annex I habitats, "Bog woodland", "Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*" and "*Tilio-Acerion* forests of slopes, screes and ravines" which occur in small areas and are only significant at a few of the component SSSI/units. The transitions between these different woodland types are important in terms of maintaining the structure and function of the habitat type and vary across the U.K.

The heath is characterised by abundant *Calluna vulgaris, Ulex gallii* and *Erica cinerea* growing on thin, poor acidic soils. There are many small areas of dry heath interspersed amongst the woodland, which have not been measured, but the three largest areas of dry heath, together comprise 1% of the area of the SAC.

The feature “Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation” occurs in the Afon Glaslyn which is within the Glaslyn SSSI and the SAC.

Lesser horseshoe bats have over 20 known roosts within the SAC and forage widely within the SAC’s woodlands, associated habitats and the surrounding countryside. The SAC includes maternity roost sites in various types of buildings and structures, and winter hibernation sites, especially in mines. There are other types of roost such as night, transitional, leks and swarming sites, about which very little is known.

Outline of past and current management

The woods in the SAC have an extremely long history (at least 600 years) of exploitation for timber, and so the structure, dynamics and species composition of the woodlands are somewhat artificial. Timber exploitation in the past may have resulted in a retrogressive acidification, causing a reduction in the diversity of trees and shrubs present. Oak has been favoured in the more recent past, resulting in monocultures of oak with a very even-aged structure. Diversity of structure is generally lacking: there are few veteran or over mature trees, except in hedgerows or fields adjacent to woodlands, and dead wood volumes tend to be low.

Most of the woodlands have been used to shelter and graze sheep, cattle or ponies for most of the 20th century and probably much of the 19th century. Grazing has led to the characteristic woodland ground layer with often a high percentage cover of mosses and liverworts, a reduced cover of typical grasses and woodland herbs and a very sparse shrub layer. Sporadic or low-intensity grazing levels are thought to be beneficial, as this allows tree regeneration, but also keeps field layer species such as bramble and ivy from becoming too prominent.

The main areas of heath have been largely unmanaged over the past 30 years, as they occur as part of larger woodland compartments, where stock have been deliberately excluded to ensure tree regeneration.

2.4 Management Units

The area covered by this plan has been divided into management units to enable practical communication about features, objectives, and management. This will also allow us to differentiate between the different designations where necessary.

To enable practical communication about features, objectives, and management, this SAC, which comprises whole or parts of 34 SSSIs, has been sub-divided into management units which have been based on the individual SSSI, and additional land parcels which are SAC but not yet SSSI. As Units have been added at different times, the numbering is not sequential. Of the 105 units within the SAC, 83 are SSSI, 15 of which are all or partly NNR.

Maps showing the management units referred to in this plan are on NRW’s website and can also be viewed on Welsh Government’s interactive website Map Data Cymru.

The following tables confirm the relationships between the management units and the designations covered. Most units are terrestrial, but a number have aquatic habitats for which water quality targets apply. Because water quality targets are set for WFD Waterbodies, of which there are two in the Meirionnydd SAC, a table is provided to show how waterbodies link with SAC management units.

Link between WFD water bodies with water quality targets (Appendix 1), and relevant SAC management units.

WFD Water Body ID	SAC management units covered
GB110065053910	7073, 1582, 1579, 2987, 6808, 7070, 6812, 6815, 1587, 6811, 6806
GB110065053860	7074, 1583

Relationships between the management units and the designations covered.
Not all SAC units lie within SSSIs; such units (green highlight) are listed underneath their adjoining SSSI. The units at the bottom in a separate table do not adjoin SSSIs.

NRW internal reference	SAC management unit	SSSI	National Park	National Nature Reserve
1	1559	Aber Mawddach / Mawddach Estuary	Yes	
43	1603	Adjacent to Aber Mawddach/ Mawddach Estuary	Yes	
44	1604	Adjacent to Aber Mawddach/ Mawddach Estuary	Yes	
2	1560	Aberdunant	Yes	
54	7069	Aberdunant	Yes	
46	2984	Adjacent to Aberdunant	Yes	
62	7338	Afon Eden - Cors Goch Trawsfynydd	Yes	
63	7340	Afon Eden - Cors Goch Trawsfynydd	Yes	
64	7342	Afon Eden - Cors Goch Trawsfynydd	Yes	
65	7343	Afon Eden - Cors Goch Trawsfynydd	Yes	
66	7344	Afon Eden - Cors Goch Trawsfynydd	Yes	

NRW internal reference	SAC management unit	SSSI	National Park	National Nature Reserve
67	7345	Afon Eden - Cors Goch Trawsfynydd	Yes	
68	7346	Afon Eden - Cors Goch Trawsfynydd	Yes	
69	7347	Afon Eden - Cors Goch Trawsfynydd	Yes	
70	7348	Afon Eden - Cors Goch Trawsfynydd	Yes	
71	7349	Afon Eden - Cors Goch Trawsfynydd	Yes	
72	7350	Afon Eden - Cors Goch Trawsfynydd	Yes	
73	7351	Afon Eden - Cors Goch Trawsfynydd	Yes	
74	7355	Afon Eden - Cors Goch Trawsfynydd	Yes	
75	7356	Afon Eden - Cors Goch Trawsfynydd	Yes	
76	7360	Afon Eden - Cors Goch Trawsfynydd	Yes	
36	1596	Adjoining Afon Eden - Cors Goch Trawsfynydd	Yes	
37	1597	Adjoining to Afon Eden - Cors Goch Trawsfynydd	Yes	
4	1564	Arthog Hall Woods	Yes	
5	1565	Barmouth Hillside		
47	2985	Adjacent to Barmouth Hillside	Yes	
6	1566	Bryn y Gwin Isaf	Yes	
7	1567	Cadair Idris	Yes	
8	1568	Ceunant Cynfal	Yes	Yes
10	1570	Coed Aber Artro	Yes	
40	1600	Adjoining Coed Aber Artro	Yes	
12	1572	Coed Cors y Gedol	Yes	
13	1573	Coed Graig Uchaf	Yes	

NRW internal reference	SAC management unit	SSSI	National Park	National Nature Reserve
14	1574	Coed Llechwedd	Yes	
15	1575	Coed Lletywalter	Yes	
16	1576	Coed Tremadog	Yes	Yes
17	1577	Coed y Rhygen	Yes	Yes
18	1578	Coedydd Abergwynant	Yes	
38	1598	Adjoining Coedydd Abergwynant	Yes	
19	1579	Coedydd Beddgelert a Cheunant Aberglaslyn	Yes	
55	7070	Coedydd Beddgelert a Cheunant Aberglaslyn	Yes	
9	1569	Coedydd De Dyffryn Maentwrog	Yes	Yes
11	1571	Coedydd De Dyffryn Maentwrog	Yes	Yes
41	1601	Coedydd De Dyffryn Maentwrog	Yes	
45	1605	Coedydd De Dyffryn Maentwrog	Yes	Yes
48	2986	Coedydd De Dyffryn Maentwrog	Yes	Yes
20	1580	Coedydd Dyffryn Ffestiniog (Gogleddol)	Yes	Yes
56	7071	Coedydd Dyffryn Ffestiniog (Gogleddol)	Yes	Yes
21	1581	Coedydd Dyffryn Wnion	Yes	
57	7072	Coedydd Dyffryn Wnion	Yes	
22	1582	Coedydd Nanmor	Yes	Yes
58	7073	Coedydd Nanmor	Yes	Yes
23	1583	Coedydd Nantgwynant	Yes	
59	7074	Coedydd Nantgwynant	Yes	
24	1584	Craig y Benglog	Yes	Yes
25	1585	Dolorgan Barn	Yes	
26	1586	Ganllwyd	Yes	Yes
60	7075	Ganllwyd	Yes	Yes
35	1595	Adjoining Ganllwyd	Yes	

NRW internal reference	SAC management unit	SSSI	National Park	National Nature Reserve
50	2988	Adjoining Ganllwyd	Yes	
27	1587	Glaslyn	Yes	
1587	6755	Glaslyn	Yes	
2	6758	Glaslyn		
3	6761	Glaslyn		
4	6762	Glaslyn	Yes	
5	6763	Glaslyn		
6	6764	Glaslyn	Yes	
7	6765	Glaslyn		
8	6766	Glaslyn		
10	6768	Glaslyn		
11	6769	Glaslyn		
12	6770	Glaslyn		
13	6771	Glaslyn		
14	6772	Glaslyn		
15	6773	Glaslyn		
17	6788	Glaslyn		
18	6789	Glaslyn		
19	6790	Glaslyn		
20	6806	Glaslyn	Yes	
21	6808	Glaslyn	Yes	
22	6811	Glaslyn	Yes	
23	6812	Glaslyn	Yes	

NRW internal reference	SAC management unit	SSSI	National Park	National Nature Reserve
24	6815	Glaslyn	Yes	
28	1588	Glyn Cywarch	Yes	
32	1592	Gwynfynydd	Yes	
33	1593	Gwynfynydd	Yes	
33a	5956	Gwynfynydd	Yes	
53	6503	Mwyngloddiau Llanfrothen	Yes	
29	1589	Mwyngloddiau Wnion a Eglwys Sant Marc	Yes	
61	7076	Mwyngloddiau Wnion a Eglwys Sant Marc	Yes	
30	1590	Penmaenuchaf Hall	Yes	
31	1591	Rhinog	Yes	
52	6520	Ty Bach Ystlumod	Yes	

Management units that are not SSSIs and do not adjoin SSSIs:

NRW internal reference	SAC management unit	National Park
34	1594	Yes
39	1599	Yes
42	1602	Yes
49	2987	Yes
51	6523	Yes

3. The features

3.1 Confirmation of features

Site SAC features and corresponding conservation objective. * = priority feature.

SAC feature (Annex I habitats and Annex II species)	Primary reason for site selec-tion?	Relationships, nomenclature etc
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	Yes	EU Habitat Code: 91A0 corresponding to the following National Vegetation Classifica-tion (NVC) types: W10.W11, W17
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Yes	EU code 91E0 corresponding to the following NVC types: W5, W6 and W7
Tilio-Acerion forests of slopes, screes and ra-vines*	No	EU code 9180 corresponding to the following NVC types: W8, W9
Bog woodland*	No	EU code 91D0 corresponding to the following NVC type W4c
Lesser horseshoe bat *Rhinolophus hipposideros*	Yes	EU Species Code: 1303
European dry heath	No	EU code 4030 corresponding to the following NVC types H8, H10 and H12
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batra-chion vegetation	No	EU code 3260
Northern Atlantic wet heaths with *Erica tetra-lix*	No	EU code 4010. NVC types: H5, M14, M15, M16

Site SSSI features

SSSI feature	Relationships
Assemblage of RDB and Nationally Scarce lichens	Supports SAC Feature 1: Woodlands
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	Supports SAC Feature 1: Woodlands
Breeding bird assemblage of lowland damp grasslands	Supports SAC Feature 1: Woodlands
Breeding bird assemblage of woodland	Supports SAC Feature 1: Woodlands
Carum verticillatum	
Ceriagrion tenellum	
Eleocharis parvula	

SSSI feature	Relationships
Eu-Oceanic Index of Ecological Continuity: Lichens	Supports SAC Feature 1: Woodlands
Fluvial geomorphology of Wales	
Hedges	Supports SAC Feature 2: Lesser horseshoe bats
Hypericum linariifolium	
Limosella australis	
Luronium natans	
Lutra lutra	
Marshy grassland	
Microdon devius	
Mineralogy of Wales	
Neutral grassland	
New Index of Ecological Continuity: Lichens	Supports SAC Feature 1: Woodlands
Other: Built-up areas	
Parkland/scattered trees, broadleaved	Supports SAC Feature 2: Lesser horseshoe bats
Plebejus argus	
Rhinolophus hipposideros- breeding	Supports SAC Feature 2: Lesser horseshoe bats
Rhinolophus hipposideros- hibernating	Supports SAC Feature 2: Lesser horseshoe bats
Running water -Group D rivers-	Supports SAC Feature 4: Watercourses
Sematophyllum demissum	Supports SAC Feature 1: Woodlands
Semi-natural woodland	Supports SAC Feature 1: Woodlands
Vertigo alpestris	
Vertigo lilljeborgi	
Woodland slime mould assemblage	Supports SAC Feature 1: Woodlands

3.2 Features and management units

This section sets out the relationship between the designated features and each management unit. This is intended to provide a clear statement about what each unit should be managed for, taking into account the varied needs of the different special features. All features are allocated to one of seven classes in each management unit. These classes are:

Key Features

KH - a 'Key Habitat' in the management unit, i.e., the habitat that is the main driver of management and focus of monitoring effort, perhaps because of the dependence of a key species (see KS below). There will usually only be one Key Habitat in a unit but there can be more, especially with large units.

KS – a 'Key Species' in the management unit, often driving both the selection and management of a Key Habitat.

Geo – an earth science feature that is the main driver of management and focus of monitoring effort in a unit.

Other Features

Sym - habitats, species and earth science features that are of importance in a unit but are not the main drivers of management or focus of monitoring. These features will benefit from management for the key feature(s) identified in the unit. These may be classed as 'Sym' (sympathetic) features because:

a. they are present in the unit but may be of less conservation importance than the key feature; and/or

b. they are present in the unit but in small areas/numbers, with the bulk of the feature in other units of the site; and/or

c. their requirements are broader than and compatible with the management needs of the key feature(s), e.g., a mobile species that uses large parts of the site and surrounding areas: and/or

d. key features (KH, KS) are closely associated with these features, and the conservation of key features depends on them being managed appropriately.

Nm - an infrequently used category where features are at risk of decline within a unit as a result of meeting the management needs of the key feature(s), i.e., under Negative Management. These cases will usually be compensated for by management elsewhere in the plan and can be used where minor occurrences of a feature would otherwise lead to apparent conflict with another key feature in a unit.

Mn - Management units that are essential for the management of features elsewhere on a site e.g., livestock over-wintering area included within designation boundaries, buffer zones around water bodies, etc.

x – Features not known to be present in the management unit.

The table below sets out the relationship between the features and management units identified in this plan.

Table: Relationship between the features and management units

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Aber Mawddach / Mawddach Estuary	Adjoining Aber Mawddach	Adjoining Aber Mawddach	Aberdunant	Aberdunant	Adjacent Aberdunant	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd

SAC Unique Unit Number	1559	1603	1604	1560	7069	2984	7338	7340
NRW internal reference	1	43	44	2	54	46	62	63
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes			Yes	Yes		Yes	
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**								
Bog woodland*								
European dry heaths			KH					
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH				KH	
Rhinolophus hipposideros	Sym	Sym	Sym	KS	KS	KS		
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens							KS	KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								

Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens							KS	KH
Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								Sym
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens							KS	KH
Other: Built-up areas								
Parkland/scattered trees, broadleaved								
Plebejus argus								

Rhinolophus hipposideros- breeding				KS	KS			
Rhinolophus hipposideros- hibernating				KS	KS			
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH						KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd
SAC management unit	7342	7343	7344	7345	7346	7347	7348	7349
NRW internal reference	64	65	66	67	68	69	70	71
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior - Alno-Padion, Alnion incanae, Salicion albae-**								
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH	KH	KH	KH	KH	KH
Rhinolophus hipposideros								
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens	KS	KS	KS	KS	KS	KS	KS	KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								

Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens	KS	KS	KS	KS	KS	KS	KS	KS
Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland							KH	
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens	KS	KS	KS	KS	KS	KS	KS	KS
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-								KH
Sematophyllum demissum								
Semi-natural woodland	KH	KH	KH	KH	KH	KH	KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Afon Eden - Cors Goch Trawsfynydd	Adjoining Afon Eden - Cors Goch	Adjoining Afon Eden - Cors Goch	Arthog Hall Woods
SAC management unit	7350	7351	7355	7356	7360	1596	1597	1564
NRW internal reference	72	73	74	75	76	36	37	4
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes			Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* - *Alno-Padion, Alnion incanae, Salicion albae*-*								
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH	KH	KH	KH	KH	KH
Rhinolophus hipposideros						Sym	Sym	KS
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens	KS	KS	KS	KS	KS			
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								

Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens	KS	KS	KS	KS	KS			
Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens	KS	KS	KS	KS	KS			
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH	KH	KH	KH	KH			KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Barmouth Hillside	Adjacent to Barmouth Hillside SSSI	Bryn y Gwin Isaf	Cadair Idris	Ceunant Cynfal	Coed Aber Artro	Adjoining Coed Aber Artro	Unit Name: Coed Aber Artro A
SAC management unit	1565	2985	1566	1567	1568	1570	1600	7119
NRW internal reference	5	47	6	7	8	10	40	10.1
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes		Yes	Yes	Yes	Yes		
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-* *								
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH			KH	KH	KH	KH	
Rhinolophus hipposideros	Sym		KS	KS	Sym	Sym	Sym	
Tilio-Acerion forests of slopes, screes and ravines*					KH			
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens								
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes					KS	KS		
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens					KS			

Fluvial geomorphology of Wales					Geo			
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding			KS					
Rhinolophus hipposideros- hibernating				KS				
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH				KH	KH		
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Unit Name: Coed Aber Artro B	Unit Name: Coed Aber Artro C	Unit Name: Coed Aber Artro D	Unit Name: Coed Aber Artro E	Unit Name: Coed Aber Artro	Coed Cors y Gedol	Coed Graig Uchaf	Coed Llechwedd
SAC management unit	7121	7122	7124	7125	7126	1572	1573	1574
NRW internal reference	10.2	10.3	10.4	10.5	10.6	12	13	14
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes		Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-* *								
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH					KH	KH	KH
Rhinolophus hipposideros	Sym					Sym	Sym	KS
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens						KS	KS	
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	KS					KS	KS	
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens								

Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								
Rhinolophus hipposideros- hibernating								KS
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland						KH	KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Coed Lletywalter	Coed Tremadog	Coed y Rhygen	Coedydd Abergwynant	Adjoining Coedydd Abergwynant	Coedydd Beddgelert a Cheunant	Coedydd Beddgelert a Cheunant	Coedydd De Dyffryn Maentwrog
SAC management unit	1575	1576	1577	1578	1598	1579	7070	1569
NRW internal reference	15	16	17	18	38	19	55	9
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes		Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-* *								
Bog woodland*	KH							
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH	KH	KH	KH	KH	KH
Rhinolophus hipposideros	Sym	Sym	Sym	Sym	Sym	KS	KS	Sym
Tilio-Acerion forests of slopes, screes and ravines*				KH				KH
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens								KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes		KS	KS	KS		KS	KS	KS
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland				KS				
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens			KS	KS				KS
Fluvial geomorphology of Wales						Geo	KS	

Hedges								
Hypericum linariifolium		KS						
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding						KS	KS	
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH	KH	KH	KH		KH	KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Coedydd De Dyffryn Maentwrog	Coedydd De Dyffryn Maentwrog	Coedydd De Dyffryn Maentwrog	Coedydd De Dyffryn Maentwrog	Coedydd Dyffryn Ffestiniog (Gogled-	Coedydd Dyffryn Ffestiniog (Gogled-	Coedydd Dyffryn Wnion	Coedydd Dyffryn Wnion
SAC management unit	1571	1601	1605	2986	1580	7071	1581	7072
NRW internal reference	11	41	45	48	20	56	21	57
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes				Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-* *								
Bog woodland*								
European dry heaths	KH							
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH	KH	KH	KH	KH	KH
Rhinolophus hipposideros	Sym	Sym	Sym	Sym	KS	KS	Sym	Sym
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens					KS	KS	KS	KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes					KS	KS	KS	
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland					KS	KS		
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens					KS	KS	KS	KS
Fluvial geomorphology of Wales								

Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens					KS	KS	KS	KS
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding					KS	KS		
Rhinolophus hipposideros- hibernating					KS	KS		
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH				KH	KH	KH	KS
Vertigo alpestris							KS	KS
Vertigo lilljeborgi								
Woodland slime mould assemblage					KS		KS	

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Coedydd Nanmor	Coedydd Nanmor	Coedydd Nantgwynant	Coedydd Nantgwynant	Craig y Benglog	Dolorgan Barn	Ganllwyd	Ganllwyd
SAC management unit	1582	7073	1583	7074	1584	1585	1586	7075
NRW internal reference	22	58	23	59	24	25	26	60
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**	KH							
Bog woodland*								
European dry heaths							KH	
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH	KH	KH		KH	KH
Rhinolophus hipposideros	KS		Sym	Sym	Sym	KS	KS	KS
Tilio-Acerion forests of slopes, screes and ravines*							KH	KH
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens	KS		KS				KS	KS
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes	KS		KS	KS			KS	KS
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum		KS						
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens	KS		KS				KS	KS
Fluvial geomorphology of Wales								

Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius							KS	Sym
Mineralogy of Wales							Geo	Geo
Neutral grassland								
New Index of Ecological Continuity: Lichens							KS	KS
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus		KS						
Rhinolophus hipposideros- breeding	KS					KS	KS	KS
Rhinolophus hipposideros- hibernating							KS	KS
Running water -Group D rivers-								
Sematophyllum demissum							KS	
Semi-natural woodland	KH	KH	KH	KH	KH		KH	KS
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage							Sym	

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Adjoining Ganllwyd	Adjoining Ganllwyd	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn
SAC management unit	1595	2988	1587	6755	6758	6761	6762	6763
NRW internal reference	35	50	27	1587	2	3	4	5
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI			Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**							KH	KH
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH						
Rhinolophus hipposideros	Sym	Sym	KS					
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation			KH	KH	KH	KH		
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens								
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula					KS	KS		
Eu-Oceanic Index of Ecological Continuity: Lichens								

Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis					KS	KS		
Luronium natans			KS	KS				
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-			KH	KH	KH	KH		
Sematophyllum demissum								
Semi-natural woodland							KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn
SAC management unit	6764	6765	6766	6768	6769	6770	6771	6772
NRW internal reference	6	7	8	10	11	12	13	14
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**	KH	KH	KH					
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles				KH	KH	KH	KH	
Rhinolophus hipposideros								KS
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens								
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands		KS	KS					
Breeding bird assemblage of woodland								
Carum verticillatum		KS	KS					
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens								
Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								

Lutra lutra								
Marshy grassland		KH	KH					
Microdon devius								
Mineralogy of Wales								
Neutral grassland		Sym	Sym					
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								KS
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH	KH	KH	KH	KH	KH	KH	
Vertigo alpestris								
Vertigo lilljeborgi	KS							
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn	Glaslyn
SAC management unit	6773	6788	6789	6790	6806	6808	6811	6812
NRW internal reference	15	17	18	19	20	21	22	23
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**				KH	KH	KH	KH	KH
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH	KH	KH					
Rhinolophus hipposideros								
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens								
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes								
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens								
Fluvial geomorphology of Wales								

Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens								
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding								
Rhinolophus hipposideros- hibernating								
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH	KH	KH	KH	KH	KH	KH	KH
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)								
SSSI_Name	Glaslyn	Glyn Cywarch	Gwynfynydd	Gwynfynydd	Gwynfynydd	Mwyngloddiau Llan-frothen	Mwyngloddiau Wnion a Eglwys	Mwyngloddiau Wnion a Eglwys
SAC management unit	6815	1588	1592	1593	5956	6503	1589	7076
NRW internal reference	24	28	32	33	33a	53	29	61
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes		Yes	Yes	Yes
SAC Features								
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-* *								
Bog woodland*								
European dry heaths								
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	KH		KH	KH	KH			
Rhinolophus hipposideros		KS	Sym	Sym	Sym	KS	KS	KS
Tilio-Acerion forests of slopes, screes and ravines*								
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation								
SSSI Features								
Assemblage of RDB and Nationally Scarce lichens			KS	KH				
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes			KS	KH				
Breeding bird assemblage of lowland damp grasslands								
Breeding bird assemblage of woodland								
Carum verticillatum								
Ceriagrion tenellum								
Eleocharis parvula								
Eu-Oceanic Index of Ecological Continuity: Lichens			Sym	Sym				

Fluvial geomorphology of Wales								
Hedges								
Hypericum linariifolium								
Limosella australis								
Luronium natans								
Lutra lutra								
Marshy grassland								
Microdon devius								
Mineralogy of Wales								
Neutral grassland								
New Index of Ecological Continuity: Lichens			Sym	Sym				
Other: Built-up areas								
Parkland/scattered trees, broad-leaved								
Plebejus argus								
Rhinolophus hipposideros- breeding		KS					KS	KS
Rhinolophus hipposideros- hibernating						KS	KS	KS
Running water -Group D rivers-								
Sematophyllum demissum								
Semi-natural woodland	KH		KH	KH				
Vertigo alpestris								
Vertigo lilljeborgi								
Woodland slime mould assemblage								

Coedydd Derw a Safleoedd Ystlumod Meirion/Meirionnydd Oakwoods and Bat (SAC)									
SSSI_Name	Penmaenuchaf Hall	Rhinog	Ty Bach Ystlumod	Ysbyty Bron y Garth	Unit name: Unit 34 Coed Hafod y Bryn,	Unit name: Unit 39 Garth Gell	Unit name: Unit 42 Coed Garth Byr	Unit name: Coed Hafod-y-llyn	Unit name: Dolserau
SAC management unit	1590	1591	6520	6790	1594	1599	1602	2987	6523
NRW internal reference	30	31	52	19	34	39	42	49	51
SAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSSI	Yes	Yes	Yes	Yes					
SAC Features									
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior -Alno-Padion, Alnion incanae, Salicion albae-**				KH					
Bog woodland*									
European dry heaths									
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles		KH			KH	KH	KH	KH	
Rhinolophus hipposideros	KS	Sym	KS		Sym	Sym	Sym	KS	KS
Tilio-Acerion forests of slopes, screes and ravines*									
Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation									
SSSI Features									
Assemblage of RDB and Nationally Scarce lichens									
Assemblage of RDB and/or Nationally Scarce and/or Atlantic-Western British bryophytes									
Breeding bird assemblage of lowland damp grasslands									
Breeding bird assemblage of woodland									
Carum verticillatum									
Ceriagrion tenellum									
Eleocharis parvula									

Eu-Oceanic Index of Ecological Continuity: Lichens									
Fluvial geomorphology of Wales									
Hedges	Sym								
Hypericum linariifolium									
Limosella australis									
Luronium natans									
Lutra lutra									
Marshy grassland									
Microdon devius									
Mineralogy of Wales									
Neutral grassland									
New Index of Ecological Continuity: Lichens									
Other: Built-up areas	Sym								
Parkland/scattered trees, broadleaved	Sym								
Plebejus argus									
Rhinolophus hipposideros- breeding	KS		KS						
Rhinolophus hipposideros- hibernating									
Running water -Group D rivers-									
Sematophyllum demissum									
Semi-natural woodland		KH		KH					
Vertigo alpestris									
Vertigo lilljeborgi									
Woodland slime mould assemblage									

4. Conservation objectives

Background to Conservation Objectives

Outline of the legal context and purpose of conservation objectives.

Conservation objectives for individual SACs and SPAs are required by the 1992 'Habitats' Directive (92/43/EEC) as implemented through the Conservation of Habitat and Species Regulations 2017 (As amended). The aim of the Habitats Directive is the maintenance, or where appropriate the restoration, of the 'favourable conservation status' (FCS) of habitats and species listed in the Annexes to the Directive (see Box). Therefore, FCS provides the overarching framework for defining the conservation objectives for individual SACs.

Although neither the Birds Directive nor the Ramsar Convention refer to FCS, Natural Resources Wales considers that the overall aim of both those legal instruments is sufficiently similar to FCS to make it practical and proportionate to use the same guiding principle when establishing the conservation objectives for SPAs and Ramsar sites, as well as SACs. Therefore, the Habitats Directive definition of FCS is considered to provide the overarching framework for conservation objectives for all SACs, SPAs and Ramsar sites in Wales.

Favourable conservation as defined in Articles 1(e) and 1(i) of the Habitats Directive: "*The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:*

- *its natural range, and areas it covers within that range, are stable or increasing, and*
- *the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and*
- *the conservation status of its typical species is favourable.*

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- *population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."*

The achievement of FCS is not an objective that applies at the level of the individual sites. Rather it is a wider objective to which each individual site contributes. Therefore, the conservation objectives for an individual site are intended to express what is considered to be that site's appropriate contribution to achieving FCS. Since SACs

are the most important mechanism in the Habitats Directive for achieving FCS, and the sites represent the most important areas for conservation of the Annex I habitat types and Annex II species, the objectives for each individual SAC should seek to ensure that the site makes a substantial contribution which properly reflects its importance in a local, national and European context and the particular reasons why the site was selected for inclusion in the UK National Sites Network of SACs. A similar approach is taken to setting conservation objectives for SPAs and Ramsar sites.

Achieving the conservation objectives of individual sites requires appropriate management and the control of factors which are influencing, or may influence, the features.

The conservation objectives have a number of specific roles:

- **Communication**: The conservation objectives should help convey to stakeholders what are the reasons for the designation and what it is intended to achieve.
- **Site planning and management**: The conservation objectives guide management of sites, to maintain or restore the designated habitats and species. They provide the basis for identifying what management is required both within the site boundary, and outside it, where achieving the objectives requires action to be taken outside the site.
- **River Basin Management Planning**: Conservation Objectives for aquatic and water dependent SAC and SPA features are also used as the "standards and objectives" referred to in Article 4 (1c) of the Water Framework Directive (WFD) (2000/60/EC). In 2009, Welsh Ministers decided that where SAC and SPA conservation objectives are more stringent than 'Good Ecological Status' (GES) as defined in the WFD, they (and the standards they contain) are the objectives referred to in Article 4(1c) of the WFD.
- **Assessing plans and projects**: Article 6(3) of the 'Habitats' Directive requires the assessment of proposed plans and projects in view of a site's conservation objectives. Subject to certain exceptions, plans or projects may not proceed unless it is established that they will not adversely affect the integrity of sites. There are similar requirements for the review of existing decisions and consents. Note that the assessment of plans and projects should be made in view of the entirety of the conservation objectives for the site, including the performance indicators.
- **Monitoring and reporting***:* In addition to foregoing purposes, conservation objectives provide the basis for defining the evidence that will be used for assessing the condition of a feature and the status of factors that affect it. That evidence is contained in a sub-set of conservation objectives called 'performance indicators'. The performance indicators are those conservation objectives which are quantifiable and measurable, and which provide the basis for monitoring and reporting. The performance indicators are set out in Appendix 2 of this document.

The conservation objectives in this document reflect Natural Resources Wales' current information and understanding of the site and its features and their importance in an international context. The conservation objectives are subject to review by Natural Resources Wales in the light of new knowledge.

Format of the conservation objectives

Each conservation objective is a composite statement defining a site-specific aspiration for each designated feature. This composite statement contains clauses that correspond to all the elements of FCS, namely:

For habitat features:

- Extent should be stable in the long term, or where appropriate increasing*;
- Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving;
- Populations of the habitat's typical species must be being maintained or where appropriate increasing*;
- Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.

For species features:

- The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term*;
- The distribution of the population should be being maintained*;
- There should be sufficient habitat, of sufficient quality, to support the population in the long term;
- Factors affecting the population or its habitat should be under appropriate control.

There is one conservation objective for each designated feature listed in part 3. In some cases, where there are distinct areas or forms of a designated habitat or separate populations of a designated species within a site, the conservation objective is sub-divided into different sections to enable different aspirations to be expressed for different occurrences of the features within the site.

As well as describing the aspirations for the condition of the feature, each conservation objective contains a statement that the factors which significantly affect the feature are under appropriate control.

4.1 Conservation Objective for Feature 1

Woodlands including the following: Old sessile oakwoods with *Ilex* and *Blechnum* (NVC W17, W11, W10); Bog woodland (NVC W4c); *Tilio-Acerion* forests of slopes, screes and ravines (NVC W8 and W9); Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (NVC W5, W6 and W7).

Favourable Conservation Status component	Supporting information / current knowledge
Extent should be stable in the long term, or where appropriate increasing.	The total extent of the woodland area, including woodland canopy and scrub, woodland glades and associated dry heath, bracken and grassland shall be maintained, some 1826 ha in total. The location of the different woodland SAC features, as listed in the title above. The distribution of these woodland communities is largely a reflection of the topography, soils, geology and aspect and is unlikely to change.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The tree canopy percentage cover within the woodland area for the whole SAC shall be no less than 80%, 87% being the current canopy cover (excepting natural catastrophic events). Some units will have a lower canopy cover which is acceptable provided this is compatible with safeguard of the habitat, features and special interest.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The canopy and shrub layer comprises locally native species. There shall be sufficient natural regeneration of locally native trees and shrubs to maintain the woodland canopy and shrub layer, by filling gaps and allowing the recruitment of young trees and encouraging a varied age structure. The typical ground layer species of each woodland SAC feature will be common. It is important for most of the woodland SAC that the vegetation does not becomes rank and overgrown with a height above 40cm and/or dominated by species such as bramble, ivy and young holly. Limits may be set on a unit or compartment basis. The abundance and distribution of common and typical (Atlantic, sub-Atlantic, western, oceanic) mosses and liverworts, lichens (and slime moulds), will be maintained or increased. Refer to indicative lists in Appendix 3.

Favourable Conservation Status component	Supporting information / current knowledge
	The abundance and distribution of uncommon mosses and liverworts, lichens and slime moulds, will be maintained or increased. Refer to indicative lists in Appendix 3. There will be a scattering of 5 mature trees per hectare within the existing tree canopy or parkland, that is trees of c60cm diameter plus for oak and ash and/or with signs of decay, holes etc. In the longer-term, by 2060 there should be 1 veteran trees per hectare that is trees of c100cm diameter plus for oak and ash and 75cms birch. The volume of dead wood will exceed 30 cubic metres per hectare throughout and consist of a mixture of fallen trees (minimum 1 per hectare), broken branches, dead branches on live trees, and standing dead trees (minimum 1 per hectare). Volumes of deadwood are currently at relatively low levels because the woodlands, in general, have an even-age structure and lack mature trees and any quantity of deadwood because of past silvicultural management. Some lower plants are dead wood specialists but these woodlands tend to lack the rare dead wood invertebrate assemblage found in other parts of the UK.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	All factors affecting the achievement of these conditions are under control. Invasive non-native species such as Rhododendron, Japanese knotweed and Himalayan balsam will not be present. F1. Grazing Without an appropriate light grazing regime, the woodland tends to become overgrown with a reduction in lower plant diversity. Too light grazing can result in stock, often sheep, concentrating just on the grassy areas. There are some areas that have not been grazed for 30 years or more and which now need grazing and conversely some woods are grazed too heavily suppressing regeneration. Too heavy grazing can result in excessive trampling, poaching and loss or disturbance of the ground flora and soils. Favourable management is often light summer grazing by sheep, cattle and /or ponies at a rate of 0.15 LSU/ha/year. This guidance level of grazing is based on recent trials and observations at Coed y Rhygen. F2. Non-native species

Favourable Conservation Status component	Supporting information / current knowledge
	Beech, *Rhododendron*, Japanese knotweed, conifers, Himalayan balsam, sycamore, sweet chestnut. Non-native species should be absent, unless individual trees are known to be important for maintaining humidity or for defined wildlife interest and there are mechanisms in place to ensure no seeding or encroachment. Exceptionally individual trees may be retained for landscape reasons provided there is no adverse impact on nature conservation. F3. Humidity High humidity is essential for mosses and liverworts to survive and reproduce. High humidity must be maintained. F4. Goats Grazing by goats can be detrimental to regenerating trees in areas e.g. Rhinog where the numbers are increasing. Keep grazing by goats under control F5. Woodland management Tree felling and scrub clearance, can be beneficial if carried out appropriately. It could however cause damage if for example important trees are felled or if mosses, other plants and/or wildlife are damaged or disturbed as a result. Any woodland management that is proposed will be considered by looking carefully at the advantages and disadvantages on a case-by-case basis. F6. Woodland fragmentation Sites where the remaining woodland is only a small fragment of its former size should be enlarged wherever possible. Increase the size of woodlands where only fragments remain. F7. Adventure gorge walking & white-water canoeing rafting Activities such as gorge walking and kayaking should be monitored so that this may provide feedback to management. No significant damage to mosses, liverworts and ferns growing within the gorges should take place. Gorge walking and kayaking at sensitive sites may be permitted

Favourable Conservation Status component	Supporting information / current knowledge
	through access agreements with local users providing monitoring shows that there is no risk to rare and notable species.

4.2 Conservation Objective for Feature 2: Lesser horseshoe bats *Rhinolophus hipposideros*

Favourable Conservation Status component	Supporting information / current knowledge
The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	The population of lesser horseshoe bats should be maintained at its current size and encouraged where possible to increase. See table for summaries of population counts at recorded roost sites in Appendix 2.2. As there has been an upward trend in lesser horseshoe bats numbers in Wales it is reasonable to expect the Gwynedd population to increase. Population of lesser horseshoe bats We expect roost counts to be within the normal range for that particular site, but also to be in line with current trends identified by the National Bat Monitoring Program. If numbers are lower (or higher) than usual we consider factors such as roost integrity, weather, disturbance, predation and annual and longer- term trends within Wales/UK.
The distribution of the population should be being maintained or where appropriate increasing.	The range of the population within the SAC/Gwynedd is stable or increasing. Range of the population Map of known roosts should be maintained. We expect to continue to find new roosts.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	There are sufficient breeding roosts (buildings, structures and trees) and hibernation roosts (mines and buildings) of appropriate quality. The other types of roost such as night, transitional, leks and swarming sites, should also be maintained as our knowledge of these often-significant roosts improves. Foraging or feeding habitat in the SAC and surrounding countryside, including grasslands and some gardens, is of

Favourable Conservation Status component	Supporting information / current knowledge
	appropriate quality, extent and connectivity across the range. Foraging or feeding habitat: No loss of foraging habitat or decline in its quality affecting invertebrate availability, such as over intensive woodland or grassland management and drainage of marshes or bogs.
Factors affecting the population or its habitat should be under appropriate control.	All factors affecting the achievement of these conditions are under control. F1. Building or structure including mine Lesser horseshoe bats have very specific requirements for roosts and hibernation sites, see section **Error! Reference source not found.** for more detail. Condition of breeding and hibernating roosts should be enhanced wherever possible, see section **Error! Reference source not found.** for more detail. F2. Disturbance to roosts Disturbance to bats, particularly during the breeding season and hibernation period can affect the population's success at a specific roost. Human access should be controlled & disturbance kept to minimum levels, so that they do not negatively impact on the bats. F3. Bat navigation flight lines Bats use linear and other features including hedges, walls, lines of trees, scrub, ditches streams etc. between roosts and feeding areas. Clear felling of conifers around mine roosts can be an issue as the bats can abandon the roost site. There should be no loss or decline in the quality of physical features used as flight lines. There should be no clearance of vegetation, trees or shrubs near the roost without assessment of likely impact. be no loss or decline in the quality of physical features used as flight lines. There should be no clearance of vegetation, trees or shrubs near the roost without assessment of likely impact.

Favourable Conservation Status component	Supporting information / current knowledge
	F4. Roads and development Roads, particularly new widened routes, can cause increased mortality through collision with vehicles. This may also be through interruption to flight lines, by removal of traditional safe flight lines along linear features or by lighting. Lighting of roosts can have similar effects. Maintain closed canopy crossings over roads with connectivity to hedges and tree lines to foraging sites and roosts. Lighting should be avoided. F5. Weather This is very significant factor acting on bats through temperature and severe unseasonable weather, including storms & unusually high temperatures. Thus, weather affects bat emergence from roosts, feeding (availability of prey), hibernation timing, activity, breeding timing and success. We must always be mindful of the effects of weather when analysing trends and interpreting data and bat behaviour.

4.3 Conservation Objective for Feature 3: European dry heaths

Favourable Conservation Status component	Supporting information / current knowledge
The extent should be stable in the long term, or where appropriate increasing.	The total extent of the dry heath area, approximately 21 ha, shall be maintained. The distribution of the dry heath will at least be as previously mapped.
Quality (including in terms of ecological structure and function) should be being maintained, or where	The structure of the heath should be maintained and restored, to show natural regeneration by layering and seeding, and to ensure that the component vegetation communities are naturally diverse (refer also to 3 above). The heath will be generally free from trees and at most have only a few individuals at a density of no more than 2

Favourable Conservation Status component	Supporting information / current knowledge
appropriate improving.	per hectare. Exceptions to this rule are transition zones from woodland to heath land where trees may be denser grading to open heath. Limits for woodland transition zones should be set on a unit or sub-unit basis.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	The typical and uncommon species of the vegetation communities comprising the dry heath will be frequent and abundant.
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	Invasive non-native species such as conifers, Rhododendron, Japanese knotweed and Himalayan balsam will not be present. All factors affecting the achievement of these conditions are under control. F1. Grazing Heaths are likely to have always been grazed to some extent, by a variety of herbivores. In an unmodified heathland, species composition is regulated by soil composition, water levels, altitude and aspect, as well as factors such as grazing. Where stock are excluded, the heath vegetation becomes very deep and bushy, and the scattered scrub develops into woodland. If this is undesirable, then some light grazing of the relevant compartments may be necessary. Favourable management is often summer grazing by sheep, cattle and /or ponies at a rate of 0.225 LSU/ha/year (1.4 ewes). F2 Burning Burning generally is not appropriate here as lack of adequate control could result in devastation of woodland habitat immediately adjacent. If it is to be considered, the proposal should have clearly stated objectives and be limited to: appropriate areas of dry heath, at a small scale, be well controlled and follow good practise and codes. There is therefore a general presumption against burning of heath within Meirionnydd Oakwoods and Bat Sites SAC. Burning of some stands of dry heath may be consented on a case-by-case basis.

Favourable Conservation Status component	Supporting information / current knowledge
	F3. Mowing Cutting can be a viable alternative to burning and offers a controlled, safe way to manage heather without the associated risks of fires. The main areas of dry heath in this SAC are however either on very steep slopes or in inaccessible areas, so cutting is generally difficult. May be consented where practical. F4. Afforestation The presence of conifers (and other invasive non-native species) on heaths immediately No planting of conifers or other trees on heath. conifer encroachment places the conservation status of the heath as 'unfavourable'. Conifers/trees shade out the heath vegetation and acidify the groundwater. Associated activities such as heavy plant access, planting, fertiliser input, construction and maintenance of access tracks, and drainage works lead to further damage of the heath. The trees also provide seed-source of future conifers to encroach further out onto the heath. F5. Bracken Bracken is a natural component of the moorland edge communities, however, where bracken is encroaching at the expense of dry heath, some form of control may be required. Defined limits for bracken and bracken encroachment bordering heath where it is not expected that woodland may expand.

4.4 Conservation Objective for Feature 4: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

Favourable Conservation Status component	Supporting information / current knowledge
The extent should be stable in the long term, or where appropriate increasing.	The extent of suitable river habitat within which the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation can occur should be stable or increasing. Part of the river Glaslyn (5.2 ha) is included in the SAC. The current distribution (not known) of the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation should be stable or increasing.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	The river with floating vegetation may be dominated by water crowfoot species usually *Ranunculus fluitans*, (but this species is not recorded in Meirionnydd), *Callitriche stagnalis* and bryophytes. Species indicative of unfavourable condition for this feature e.g., filamentous algae associated with eutrophication and invasive non-native species, should be absent or below an acceptable threshold level, indicative of high ecological status, within the SAC. This attribute is considered further under factors.
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	All factors affecting the achievement of these factors are under control F1 Flow regime Requires moderately swift flows. *Ranunculion* vegetation can withstand fast flows, but cannot tolerate spatey conditions, so prefers medium-width rivers in lowland situations as in Afon Glaslyn. No increase in water abstraction upstream that will alter flow regime F2 Water quality

Favourable Conservation Status component	Supporting information / current knowledge
	Mesotrophic conditions required (i.e., not eutrophic or calcareous). No reduction in water quality. See Appendix 1 for water quality standards for the Glaslyn River waterbodies. F3 Water quantity *Ranunculion* vegetation needs considerable water movement to maintain good growth & deeper channels usually of at < 1m + deep. No reduction in water quantity F5 Channel morphology - river engineering The physical channel should be maintained or restored as far as possible to a near-natural state in order to support the coherence of the ecosystem structure and function. No modification of channel or banks F6 Channel substrate The riverbed should consist of stable stony beds of gravel or pebbles, sometimes with larger stones or boulders. No modification of channel substrate F7 Shading Shading by tree-growth on the bankside is important in rivers less than 20m wide. No shading of rivers less than 20m wide

4.5 Conservation Objective for Feature 5: Northern Atlantic wet heaths with *Erica tetralix*

Favourable Conservation Status component	Supporting information / current knowledge
The extent should be stable in the long term, or where appropriate increasing.	TBC
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	TBC

Favourable Conservation Status component	Supporting information / current knowledge
Populations of the habitat's typical species must be being maintained or where appropriate increasing.	TBC
Factors affecting the extent and quality of the habitat and its typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	TBC

5. Assessment of status and management requirements

This section provides a summary of the assessment of the status of each feature, and a summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Status and Management Requirements of Feature 1:

Woodlands: Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles; Bog woodland; Mixed woodland *Tilio-Acerion* associated with rocky slopes; Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*

Status of Feature 1: Woodlands

Bigham and Roberts (2007) and Guest (2007). *As assessed in this plan.

Woodland feature name	Conservation status*
Old sessile oakwoods with *Ilex* and *Blechnum* in the British Isles	Unfavourable: recovering* Unfavourable: unclassified
Bog woodland	Unfavourable: unclassified* Favourable: maintained
Tilio-Acerion forests of slopes, screes and ravines	Favourable: maintained Based on survey by Regional staff 2007

Woodland feature name	Conservation status*
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Unfavourable: unclassified Apparently failed on the lack of dead wood and veteran trees.

The conservation status is discussed in more detail under separate headings for each woodland feature.

5.1.1 Conservation Status: Old sessile Oakwoods with *Ilex* and *Blechnum* in the British Isles

The canopy and shrub layer and were recorded by Bigham and Roberts (2007) as favourable in 88% of the compartments used for monitoring purposes.

Some lower plants are dead wood specialists, but these woodlands tend to lack the rare dead wood invertebrate assemblage found in other parts of the UK. This attribute is considered to be unfavourable in Bigham and Roberts (2007), however volumes of deadwood are currently at relatively low levels because the woodlands, in general, have an even-age structure and lack mature trees. The level of 12 dead canopy forming trees per ha used in the monitoring report is set rather high, as the Meirionnydd Oakwoods are not notified for dead-wood flora or fauna. If the target level of a minimum of 2 dead canopy-forming trees per ha (one standing dead and one fallen) is used, then all the SSSI/units are likely to pass as favourable. **In this plan we consider this attribute to be unfavourable: recovering. With appropriate management we are not concerned about this apparent failure.**

Mature-veteran trees: The lack of mature-veteran trees was a reason for assessment of the woodland as unfavourable in some areas. **In this plan we consider this attribute to be unfavourable: recovering. With appropriate management and most importantly given time, we are not concerned about this apparent failure.**

Regeneration: Of the woodlands surveyed by Bigham and Roberts (2007) two-thirds of the woodlands were ungrazed and one-third grazed. Regeneration was unfavourable in 60% of grazed management compartments, but plentiful throughout the ungrazed ones. Regeneration needs to be considered in the longer term and it is important to note that not all units need to have regeneration visible at all times provided the woodland themselves have sufficient to regenerate in the longer term.

Locally high levels of non-native species led Bigham and Roberts (2007) to conclude that the SAC is unfavourable based on this attribute. The non-natives species present were generally beech, sycamore, sweet chestnut, conifers and *Rhododendron*. In most cases however action is being taken to control them so this factor may be considered as under control provided financial support and current projects continue.

Lower plants. There are several lower plant monitoring projects at a number of SSSI including Coed Ganllwyd, Ceunant Llenyrch, Coed yr Rhygen and those where hydro-electric power schemes are in existence e.g., Coed Aber Artro. The monitoring projects are on-going, but we do have results from 2000-2005 for some sites some notable moss and liverwort species are increasing in frequency and some decreasing (Newton, 2005). There are no obvious changes to report, but the author does

mention that in some compartments important lichen trees are threatened by growth of tree regeneration, shrubs and ivy on the trunks.

Field layer: The surveyors in the Bigham and Roberts (2007) monitoring report assessed the field layer condition (plan attribute A6) by recording where the field layer does not impede walking or obscure tree bases and where no significant other problems are apparent. They concluded that locally poor condition of the field layer across the SAC, is a major contributor to the overall categorisation of the SAC as Unfavourable.

5.1.2 Conservation Status: Bog woodland

Extent: Bog woodland within Coed Derw Meirion SAC is confined to Coed Llety Walter and Hafod Garegog. The habitat itself is strictly confined by the hydrology, topography and vegetation history and as such there is little or no scope for expansion.

The following is based on monitoring of the bog woodland at Coed Llety Walter only:- Ground layer: Further spread of bracken and bramble and the moss *Polytrichum commune* on to the bog surface (*Sphagnum* carpet) was also seen as undesirable with the two former indicating drying and the latter suggesting increased disturbance and possibly enrichment. Tree cover: maintenance of tree cover is important, but in bog woodland this is typically sparse, comprising an open canopy of stunted trees suppressed by the extreme waterlogging of the ground surface. Non-native species: Scots pine is present therefore the plan assessment is unfavourable. Veteran trees and dead wood: these are not significant attributes for bog woodland.

5.1.3 Conservation status: Mixed woodland (*Tilio-Acerion*)

No further information is available for *Tilio-Acerion.*

5.1.4 Conservation status: Alluvial woodland

The report by Bigham and Roberts (2007) suggests that the alluvial woodland feature is in unfavourable condition, failing due to the shortage of dead wood and veteran trees in several of the component woodland blocks. It is however likely that the monitoring limits for these attributes were set too high.

Management requirements of Feature 1: Woodlands

Humidity: The uncommon lower plants (mosses, liverworts and lichens) are generally restricted to “hotspots”, often but not always in or close to river gorges where humidity is highest. The requirements vary according to the species, with some species requiring high humidity, but not being able to tolerate total immersion in water, and others requiring total immersion but unable to tolerate periods of drought. The humidity and river flow regime should be sufficient to maintain the common, typical and the rare and scarce lower plants that occur within each individual SSSI/unit. Refer to tables (nationally rare and scarce species) in Appendix 3. A reduction in the humidity within the gorge woodlands could result in gradual or rapid loss of moss, liverwort or slime mould species especially if ambient humidity levels frequently fall below the high levels required by individual species or communities. Inappropriate tree felling or natural events in key areas can result in damage to the special interest due to

reduced shading and thereby reduced humidity levels. Significant water abstraction from any of the rivers, upstream of the lower plant interest, would result in a reduction in humidity that is also likely to be damaging.

No loss of canopy cover or an increase in abstraction from rivers particularly where important lower plant communities occur.

Drainage: The bog and alluvial woodland habitat would be damaged by drainage, but this is not currently likely as the only stands are in conservation management.

Presumption against drainage works especially where this may affect wet woodland.

Grazing and woodland management: Across the Meirionnydd oak woodlands it is important that we recognise that different forms of woodland management may produce very different woodland structures, each of which can be of high conservation value in its own right supporting quite different suites of associated species. These can be covered by the following four categories: 'wood pasture'; 'conservation management with grazing'; 'conservation management without grazing' and; 'sylvicultural management'. All of these types are represented across the SAC, mostly lightly grazed or completely ungrazed. We must be able to respond when an area becomes over-grazed or lacks sufficient regeneration of trees (by reducing grazing levels, or closing them to stock altogether for a period of time) or at the opposite end of the scale, where ungrazed woodlands are becoming overgrown with dense brambles or holly and/or with ivy covering the trunks of trees (by re-introducing grazing).

We can infer from the unfavourable (overgrown) ground layer assessment therefore that grazing generally is too low and/or not extensive enough across the SAC. Important lichen trees are threatened by tree regeneration, shrubs such as holly, bramble and ivy growing on some key trees.

Bog woodland condition is affected by neglect, that is lack of grazing management, or some other control of the bracken and bramble, such as by cutting.

Woodland management, which may include tree felling and scrub clearance, can be beneficial if carried out appropriately. It could however cause damage if for example important trees are felled or if mosses, other plants and/or wildlife are damaged or disturbed as a result, or if the tree-canopy is opened–up, causing reduction in humidity in lower plant "hotspots". Care also needs to be taken with pruning trees within parkland situations, as even small branches can be important for the lichens they support. Expert ecological advice should be sought before planning such work.

Review current attributes relating to woodland structure and grazing on a unit basis and action changes to grazing regimes where appropriate. Favourable management is often light summer grazing by sheep, cattle and /or ponies at a rate of 0.05 LSU/ha/year.

Continue to assess whether woodland management will be deleterious or beneficial on a case-by-case basis, informed by expert ecological advice.

Protection of mature trees and tree planting: Lichens, generally require trees in open sunny yet sheltered situations. Many good lichen trees are at the edge of the wood, or where the woodland is fairly open as in parkland situations, or next to a watercourse, where the habitat is fairly open and also humid.

The lack of mature-veteran trees attribute will recover over time provided management ensures the protection of mature trees in the longer term by appropriate siting of paths so that health and Safety reasons are not then invoked as reasons to prune and fell them. Power lines and other development should be encouraged to go round, under or re-route to avoid mature-veteran trees and there should be tree planting, on a parkland scale where possible, out in the open.

Retain mature/veteran trees and ensure plans and projects (such as access and recreation with the associated health and safety requirements or power lines and development) do not indirectly threaten their long-term survival. Ensure the number of veteran/over-mature trees increases gradually with time so that trees lost are more than compensated by others aging.

Plant parkland and individual trees in appropriate locations

Non-natives: The non-natives present species are generally beech, sycamore, sweet chestnut, conifers and *Rhododendron*. Many organisations have combined efforts to control non-native and exotic species including NRW, Snowdonia National Park, Woodland Trust, RSPB, National Trust and also through the Meirionnydd Oakwoods Habitat Management Project (MOHMP-a consortium of the above-named bodies and private forestry companies). In most woodlands (but not all) action is being taken to control particularly invasive non-natives so this factor may be considered as under control provided financial support and projects continue to be approved. Both Rhaglen Tir Eryri and MOHMP are about to finish and there are, as yet, no replacement projects.

Infestation by non-native species is seen as a potential threat to the bog woodland and no non-native species (including Scot's pine) should be present. This is currently an issue as the bog woodland is unfavourable.

Rhododendron is problematic wherever it occurs, because even one bush can release millions of seeds in a year. There is a lot of work being undertaken throughout Meirionnydd to remove *Rhododendron*, not only in the designated woodlands, but also in surrounding non-wooded areas that may be acting as a seed source, such as gardens and road verges.

Beech trees are not recognised as being native in Britain beyond a line drawn between the Wash and the Severn, according to the pollen record since the last Ice Age. It is a recognised native species south of that approximate line. In Wales, and specifically Meirionnydd, beech has been extensively planted in 'avenues', as individual trees, hedges and plantations. It has then established itself in the oak woodlands by being able to regenerate under dense canopy shade, and by being at home with even the most acidic soils and with the local climate. A group of beech trees in woodland will result in a patch of bare ground underneath, due to the extremely dense shade cast, as beech foliage is highly efficient at light absorption. Only the most shade tolerant of plant species can survive there, and often it is too shady for any plants to survive under them. This would have serious implications for rare and restricted lower plant species such as mosses, liverworts and lichens for which the oak woodlands in Meirionnydd are famous. In addition, beech seedlings and saplings are extremely shade tolerant. They survive and grow slowly even under a dense and shady oak canopy and can often be seen scattered throughout an oak woodland where mature beech is present, within a few years after removing or controlling sheep grazing. The end result of this process is domination of beech in the canopy.

This is why we are effectively treating beech in some sites as an undesirable exotic species, which threatens to alter a valued habitat and its communities.

Non-native, particularly invasive, species must continue to be controlled under a long-term sustainable programme of funding, vigilance and active management.

Goats: Where goat populations are preventing natural regeneration of trees, the numbers will need to be controlled.

Survey, monitor and control goat numbers appropriately so that significant damage to woodland does not occur.

Deadwood: Deadwood should ideally be left where it falls and standing dead trees should be allowed to decay naturally. The removal of dead and decaying wood will lead to a reduction of the diverse wood decay conditions that many specialised plants and animals of woodland habitats depend upon. Without a continuous supply of dead wood of various sizes at various stages of decay, many of these species may not be present. Deadwood specialists of moss, liverwort, lichen, fungi and insect species only occur if there is an abundance of large trunks that take a very long time to rot. Smaller branches rot much more quickly, so cannot support such a good range of the less mobile species. Movement and cutting and tidying of dead wood should be avoided unless essential for public and livestock safety.

Encourage site managers to leave deadwood in situ including standing deadwood so this attribute increases gradually with time.

Woodland fragmentation: This can happen anywhere within the SAC over time by a combination of natural events and management and is measured to a certain extent by canopy cover. This ‘factor’ is also particularly relevant where the remaining SAC woodland is only a small fragment of its former size and there, woodlands should be enlarged wherever possible.

Ensure that action is taken if the tree canopy attribute is unfavourable within the SAC and increase the size and connectivity of woodlands where possible by encouraging natural regeneration and where appropriate planting on adjacent land.

Recreation within gorges: Activities such as gorge walking and kayaking should be discouraged within sensitive sites/units to reduce risk of damage to uncommon mosses, liverworts and ferns growing within the gorges. If allowed, these activities must be regulated and the effects of measured access levels on the vegetation monitored. Refer to tables in Appendix 3 which indicate likely sensitive sites. Sometimes the nationally rare or scarce species is present in minute amounts and very locally distributed to the extent of sometimes being present as one tiny weft, which is obviously extremely vulnerable to damage from one ‘boot’ in the wrong place.

Recreational activities such as gorge walking and white-water canoeing and rafting need to be assessed carefully if they are considered to be plans and projects using the precautionary principle. Any proposed mitigation measures must be completely enforceable at all times. Obtaining regulation of an uncontrolled activity may however be seen as management for conservation. Legal opinion should be sought on this point.

5.2 Status and Management Requirements of Feature 2: Lesser horseshoe bat *Rhinolophus hipposideros*

Status of Feature 2

The lesser horseshoe bats are assessed as **Unfavourable: unclassified** by Hall, C. (2006) "Monitoring selected colonies of lesser horseshoe bats (*Rhinolophus hipposideros*) and bat feeding habitat within the Meirionnydd and Oak woods and Bat Sites SAC". This report concludes that as one out of the eight roosts selected does not meet the target of two flight lines to link the roost with the nearest feeding habitat, then the feature is unfavourable**. The plan assessment is Favourable** as one roost being considered unfavourable for not having two flight lines would not appear to justify, calling the whole SAC feature unfavourable. Lesser horseshoe bats are capable of flying across open spaces, although this is less desirable, it becomes more of an issue where increased mortality is likely to result from a change in behaviour. The bat roost numbers are also healthy at the roost in question so there is no evidence of the apparent lack of two flight lines having a negative impact.

Management Requirements of Feature 2

Nursery roosts should have a range of temperatures in the region of 20C in July, large apertures to access roost, unobstructed access routes and no artificial light onto the access point or flight line. Building work should be avoided during the breeding season. The roosts should not be subject to light or water penetration or temperature, humidity or ventilation changes. Excessive tree shading can be an issue. Mine water levels should be kept to a minimum.

Conversion of buildings used as roosts will not take place except in ways that will enhance, or do not affect, the living conditions of the bats. Roof coverings of buildings and the structures used should be maintained sufficiently to prevent deterioration in roost conditions.

Disturbance. Lesser horseshoe bats are very sensitive to disturbance. Even the presence of a person nearby causes a lot of activity, and excessive regular disturbance will mean the loss of the location as a suitable roost. In particular, disturbance during winter may cause the bats to arouse from hibernation resulting in increased use of stored body fat, which increases the risk of mortality before spring. There should be no artificial light around entrances, nor any noise or other disturbing activity. Human access inside the building and mine sites should be limited to monitoring visits by licensed bat workers. Grilling or fencing will be considered if there is evidence of continuing unauthorised disturbance. Grilles and fences need to be constructed with advice from a bat expert to ensure they are suitable for use by bats.

Human access should be controlled, and disturbance kept to minimum levels, which do not negatively impact on the bat population.

Flight lines. Lesser horseshoe bats use linear vegetation features, (hedgerows, lines of trees, areas of scrub, ditches, streams and rivers) for navigation between roosts and feeding grounds and these should be maintained, particularly in the vicinity of

roost entrances. It is also important to ensure that access points and flight lines to nearby foraging habitat are not illuminated.

There should be no loss or decline in the quality of physical features used as flight lines. There should be no clearance of vegetation, trees or shrubs right by the roost without assessment of likely impact. New planting of hedge-rows/rows of trees could be considered in places where few other flight lines exist.

Roads/development roads, particularly new widened routes, can cause increased mortality through collision with vehicles. This may also be through interruption to flight lines by removal of traditional safe flight lines along linear features or by light-ing. Lighting of roosts can have similar effects.

Other developments, particularly those with tree and vegetation clearance and light-ing could have similar effects to roads within and adjacent to the SAC.

Maintain closed canopy crossings over roads with connectivity to hedges and tree lines to foraging sites and roosts. Lighting should be avoided.

5.3 Status and management requirements of Fea-ture 3: European dry heaths

Status of Feature 3

The dry heath is Unfavourable, as reported by Lloyd and Lough (2006). This is be-cause the heather is tall and bushy, with bracken dominating some areas and in oth-ers scrub and trees are encroaching from the adjacent woodland.

Management requirements of Feature 3

Grazing: The three largest areas of heath are ungrazed, as they are part of larger management units containing woodland. Grazing is excluded from the management compartments to allow regeneration of tree seedlings and establishment of young trees.

Consider re-introducing grazing in the relevant woodland/heath compartments, if tree regeneration is sufficient. Consider possible action, which can be agreed with land managers.

Burning: *Continue the current presumption against burning dry heath unless a case can be made.*

Non-native invasive species: Although subject to control, *Rhododendron* remains a potential problem in the forestry plantation adjacent to the NNR.

Maintain vigilance for non-native plants, including conifers and Rhododendron, and instigate early control.

5.4 Status and management requirements of Feature 4: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

Status of Feature 4

The “floating vegetation often dominated by water-crowfoot” within the Afon Glaslyn, currently outside the SAC, has not been assessed.

A survey of the floating vegetation should be carried out.

Management Requirements of Feature 4

A baseline survey should be carried out before considering management requirements further than already outlined in section 4.

5.5 Status and management requirements of Feature 5: Northern Atlantic wet heaths with *Erica tetralix*

Status of Feature 5

TBC

Management Requirements of Feature 5

TBC

6. Action plan

This section takes the management requirements outlined in Section 5 a stage further, assessing the specific management interventions required on each management unit. This information is presented in two parts:

- A summary of the information held in Natural Resources Wales' Actions Database for sites
- A summary of ongoing management which is not recorded in Natural Resources Wales' actions database

6.1 Actions in Natural Resources Wales' actions database

Exported: 01/2021

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
1	1559	Site visit required as we have no information on the condition of this unit	Yes
2	1560	This unit is believed to be in appropriate conservation management.	Yes
4	1564	Continue to keep clear of *Rhododendron*. Surveillance required in 2013. Further investigation is required into whether grazing levels should be increased or decreased or if grazing should be re-introduced in any of the compartments.	Yes
5	1565	Check for presence of *Rhododendrons* and remove if present. Grazing rates need to be set on a compartment basis and may need to be increased or	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
		decreased, also grazing may need to be re-introduced in some areas.	
6	1566	Main issue is the fascia boards need replacing. The bat droppings need to be removed annually, because if they are left and allowed to build-up, this reduces the area available for bats to roost in. Control problems of lighting the outside of the building through consenting process.	Yes
7	1567	After investigation, we now know that there isn't much of a *Rhododendron* problem. There is both over- and undergrazing occurring within the many woodland compartments.	Yes
8	1568	Grazing needs to be re-introduced to some areas, after investigation. There is a problem with lack of tree regeneration in one area, thought to be due to severe acidification of soils - NRW are looking into this. Conifers are invading. There is a lot of sweet chestnut and beech in some areas. Continued vigilance is required for *Rhododendron* - surveillance required in 2013. Extreme kayaking takes place here.	Yes
9	1569	*Rhododendron* - continued vigilance required in all areas. Surveillance required in 2013. Some small areas of *Rhododendron* left on cliffs, which require roped access. Lichen interest at Ceunant Llenyrch is fantastic. It is very important that light grazing is re-introduced, to try to maintain quite an open structure, with good light levels, particularly in the section south of the river. This area will require fencing before grazing can be introduced. Gorge-walking and extreme kayaking are both potentially damaging - agreements will be sought with users to limit use.	Yes
10	1570	*Rhododendrons*, conifers and beech are present. Grazing levels need to be increased where woodland is becoming difficult to walk through and there is plentiful regeneration in the 150cms + category or decreased after further investigations. Grazing levels need to be reduced in areas of woodland where there is little tree regeneration in any size class.	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
11	1571	Even-aged stand of oak woodland, with little significant lichen or bryophyte interest. NRW are content to allow this woodland to follow its natural development, i.e., allow gaps in the canopy to form naturally as trees age etc without any need for management intervention. Some *Rhododendron* and beech control required.	Yes
12	1572	Continued monitoring of *Rhododendron* in the woodland necessary to keep track of any spread. Site needs grazing particularly in areas with dense bramble.	Yes
13	1573	Continue to keep clear of *Rhododendron*. Surveillance required in 2013. Grazing levels should be increased where brambles are developing and decreased where tree regeneration is sparse.	Yes
14	1574	Most of the SSSI to be managed by the Woodland trust as part of a 5-year Management Plan (2018-2023), including woodland management for public safety, control of invasive species with glyphosate (namely *Rhododendron* and Japanese knotweed), monitoring of bat populations, maintenance of PROW's. Area surveyed for lichens in 2014 by Orange. Grazing not formally arranged, but due to porous boundaries stock from nearby parcels are wandering onto Woodland Trust property, having a positive effect that could not be achieved through a formal grazing plan.	Yes
15	1575	There are occasional *Rhododendrons* - continued vigilance is required. Beech and conifer control. Lichen interest - a young Lobarion community is developing - grazing may need to be considered to maintain an open canopy for lichens.	Yes
16	1576	Important area for rock-climbing. Continue to manage access by agreement with British Mountaineering Council. Grazing needs to be re-introduced to protect SSSI features (Rock stonecrop and Flax-leaved St John's wort), as they are threatened by shading through development of woodland and growth of heath land species, respectively. Problem with fencing though as topography will make	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
		this difficult. *Rhododendron* not a problem, but continued vigilance is required. Surveillance to take place in 2013.	
17	1577	This unit is believed to be in appropriate conservation management. Surveillance for *Rhododendron* required in 2013.	Yes
18	1578	Site needs to be re-notified. Continue to keep clear of *Rhododendron*. Surveillance required in 2013. Japanese knotweed is a problem. Frequent beech was recorded and rarely horse chestnut and conifers. Grazing levels need to be increased in some compartments and reduced in others.	Yes
19	1579	*Rhododendron* and conifer regeneration. Further investigation is required into whether grazing should be increased or decreased in the various compartments. Investigation of disturbance in the Dinas Ddu bat roost has indicated that domestic cats may have been predating on the bats and some renovations are needed to open at least one new access point to the roost as well as some other works to make it more suitable. S15 signed March 2011 and works to improve roost were completed in April 2011. The 2011 emergence counts revealed that bats are using the new exit but that the cat sits under the old exit and may still be predating the bats, or at least preventing them from emerging from there. Further investigation of needed of ways in which to eliminate cat predation.	Yes
20	1580	As this is very large SSSI, there are a wide variety of issues to be tackled, including undergrazing, overgrazing, control of *Rhododendrons*, conifers and beech. The bat roost known as Mill Cottage Grain Dryer needs some work for it to remain in weather-proof condition.	Yes
21	1581	*Rhododendron* and conifer regeneration. There are a lot of mature beech trees within the Torrent Walk area. Grazing rates need to be set on a compartment basis and may need to be increased or decreased.	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
22	1582	Big storm event (in c. 2002) made lots of canopy gaps, so this attribute is now sufficient. *Rhododendron* is still a problem in the alluvial woodland, as seeds etc are constantly washed down from bushes upstream. Also, other aliens in Alluvial woodland are Japanese knotweed and *Montbretia*. Hafod Garregog is to return to management by NT which may require S16 support by NRW.	Yes
23	1583	This site is believed to be in appropriate conservation management. Currently *Rhododendron*-free, but continued vigilance required. Surveillance required in 2013. Lichen survey of Dinas Emrys needed.	Yes
24	1584	There are no *Rhododendrons* here. Continued vigilance required, however. Surveillance required in 2013. Woodland is restricted to a narrow strip within the gorge itself. It is important to try to increase the size and connectivity of these woodlands, where possible, by encouraging natural regeneration or planting on adjacent land. Grazing needs to be reduced or shut off from certain areas to allow tree regeneration.	Yes
25	1585	Building needs to be kept in a weatherproof condition for conditions to be suitable for bats. Roof and doors need replacing.	Yes
26	1586	*Rhododendron* and conifer regeneration needs to be cleared. Grazing rates need to be set on a compartment basis, as some areas are becoming overgrown, but other areas are lacking tree regeneration. Deer are grazing the regenerating trees in some areas. Trees are being planted as replacement lichen trees in the parkland area at Dolmelynllyn. The success of this project will need to be reviewed. Extreme kayaking takes place after heavy rainfall.	Yes
27	1587	No management issues.	Yes
28	1588	The building is too light for the bats (due to a dormer window). Also building conversion works are planned, which can be dealt with through the planning system.	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
29	1589	This unit is believed to be in appropriate conservation management.	Yes
30	1590	There are new plans for buildings & alterations to buildings that will be dealt with through the planning system. The floor in the bat roost will need to be re-laid within the next 5 years. The bat droppings need to be cleaned out annually. The grounds of the hotel (although not included in the SAC are important as flightlines for the bats.	Yes
31	1591	Goat grazing. Grazing levels need to be investigated, as some areas are likely to be over-grazed and some undergrazed. Removal of ornamental trees from broad-leaved oak woodland (at Cwm Bychan). *Rhododendron* is not present, but vigilance should be maintained. Surveillance required in 2013.	Yes
32	1592	This unit is believed to be in appropriate conservation management.	Yes
33	1593	This unit contains some of the best quality woodland within the SSSI. It is crossed by a mountain bike trail - tree roots were damaged during construction of this path. If possible, this path should be re-routed in the future, to avoid the oak woodland. Tree roots on the current path should be protected.	Yes
34	1594	Continue to maintain the *Rhododendron* free status. Surveillance to take place in 2013. Laurel, conifer, horse chestnut, beech and *Montbretia* should be removed. The re-establishment of grazing is required.	Yes
35	1595	This unit is believed to be in appropriate conservation management.	Yes
36	1596	Keep clear of *Rhododendron* (none there at present). The lichen interest here is on open-grown trees. As there is no grazing here, the shrub layer is becoming dense and may be shading important lichen trees, also ivy growing on tree trunks may shade out important lichen species. Light grazing may need to be re-introduced, but this needs to be investigated first.	Yes
37	1597	Keep clear of *Rhododendron* (none there at present). The lichen interest here is on	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
		open-grown trees. As there is no grazing here, the shrub layer is becoming dense and may be shading important lichen trees, also ivy growing on tree trunks may shade out important lichen species. Light grazing may need to be re-introduced, but this needs to be investigated first.	
38	1598	Site needs to be re-notified - unit currently only designated as SAC. Continue to keep clear of *Rhododendron*. Surveillance required in 2013. Japanese knotweed is a problem. Frequent beech was recorded and rarely horse chestnut and conifers. Grazing levels need to be increased in some compartments and reduced in others. (for issues and actions refer to unit 1598)	Yes
39	1599	Young *Rhododendrons* are fairly frequent and should be controlled. Consider re-introduction of light grazing.	Yes
40	1600	Invasive growth of beech scrub.	Yes
41	1601	Conifer, beech, *Rhododendron*, Sweet chestnut to be removed. Light grazing should be introduced.	Yes
42	1602	Maintain current *Rhododendron* free status. Surveillance required in 2013. Light grazing needs to be introduced.	Yes
43	1603	investigation required	Yes
44	1604	Maintain current *Rhododendron* free status. Surveillance required in 2013. Further investigation is required to check whether light grazing needs to be introduced. Scrub removal from heathland.	Yes
45	1605	Control of beech, conifers (in progress), occasional *Rhododendrons*, sweet chestnut and Himalayan balsam. Introduce a light grazing regime, to keep the woodland fairly open for lichens.	Yes
46	2984	This unit is believed to be in appropriate conservation management.	Yes
47	2985	This unit is believed to in appropriate conservation management.	Yes
48	2986	This unit is believed to be in appropriate conservation management.	Yes
49	2987	This unit is believed to be in appropriate conservation management.	Yes
33a	5956	This small part of the SAC (15m X 65m) does not contain any of the SAC or	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
		Gwynfynydd SSSI features and is believed to be a mapping error from long ago. It should be deleted from the SAC at the next opportunity.	
53	6503	This unit is believed to in appropriate conservation status.	Yes
52	6520	This unit is believed to be in appropriate conservation status.	Yes
51	6523	No known management issues	Yes
1587	6755	Japanese knotweed thought to be present. The Glaslyn Anglers are willing to tackle this with a S15 agreement or help from another organisation	Yes
2	6758	No management issues.	Yes
3	6761	No management issues.	Yes
4	6762	Himalayan balsam is being treated by the owner under a Glastir agreement	Yes
5	6763	Current grazing levels impeding natural woodland regeneration.	Yes
6	6764	No management issues.	Yes
7	6765	Unit would benefit from botanical site survey.	Yes
8	6766	No management issues.	Yes
10	6768	Woodland regeneration at risk from current grazing level.	Yes
11	6769	No known actions needed	Yes
12	6770	No known actions needed	Yes
13	6771	No known actions needed	Yes
14	6772	No known actions needed	Yes
15	6773	No known actions needed	Yes
17	6788	No known actions needed	Yes
18	6789	No known actions needed	Yes
19	6790	No known actions needed	Yes
20	6806	No management issues.	Yes
21	6808	Japanese knotweed thought to be present. The Glaslyn Anglers are willing to tackle this with a S15 agreement or help from another organisation	Yes
22	6811	Japanese knotweed thought to be present. The Glaslyn Anglers are willing to tackle this with a S15 agreement or help from another organisation	Yes
23	6812	No management issues.	Yes
24	6815	No management issues.	Yes
54	7069	No known management issues.	Yes
55	7070	*Rhododendron* and conifer regeneration. Further investigation is required into	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
		whether grazing should be increased or decreased in the various compartments. (This unit will be further sub-divided following the notification of the SAC extension in May 2010) For issues and actions refer to unit 1579.	
56	7071	As this is very large SSSI, there are a wide variety of issues to be tackled, including undergrazing, overgrazing, control of *Rhododendrons*, conifers and beech. (refer to unit 1580 for details of issues & actions)	Yes
57	7072	Investigation is required to see if there is *Rhododendron* and/or conifer regeneration. Grazing rates need to be set on a compartment basis and may need to be increased or decreased.	Yes
58	7073	*Rhododendron* is still a problem in the alluvial woodland, as seeds etc are constantly washed down from bushes upstream. Also other aliens in Alluvial woodland are Japanese knotweed and *Montbretia*. (This unit will be further sub-divided following the notification of the SAC extension in May 2010) For issues & actions refer to unit 1582	Yes
59	7074	This site is believed to be in appropriate conservation management. *Rhododendron* to be eradicated; was *Rhododendron* free in 2010, but continued vigilance required. Surveillance required in 2013. (This unit will be further sub-divided following the notification of the SAC extension in May 2010)	Yes
60	7075	*Rhododendron* and conifer regeneration needs to be cleared. Grazing rates need to be set on a compartment basis, as some areas are becoming overgrown, but other areas are lacking tree regeneration. Deer are grazing the regenerating trees in some areas. Trees are being planted as replacement lichen trees in the parkland area at Dolmelynllyn. The success of this project will need to be reviewed. Extreme kayaking takes place after heavy rainfall. (For details of issues & actions refer to unit 1586)	Yes

NRW internal reference	SAC management unit	Summary of conservation management issues	Action needed
61	7076	This unit is believed to be in appropriate conservation management.	Yes
10.1	7119		Yes
10.2	7121		Yes
10.3	7122		Yes
10.4	7124		Yes
10.5	7125		Yes
10.6	7126		Yes
62	7338		No
63	7340		No
64	7342		No
65	7343		No
66	7344		No
67	7345		No
68	7346		No
69	7347		No
70	7348		No
71	7349		No
72	7350		No
73	7351	*Rhododendron* and Japanese knotweed are the priority here. Woodland regeneration should also be considered for the future sustainability of this wood.	No
74	7355		No
75	7356		No
76	7360		No

7. Glossary

This glossary defines some of the terms used in this **Core Management Plan**. Some of the definitions are based on definitions contained in other documents, including legislation and other publications of Natural Resources Wales and the UK nature conservation agencies.

Action A recognisable and individually described act, undertaking or **project** of any kind, specified in section 5 or 6 of a **Core Management Plan** or **Management Plan**, as being required for protecting, managing or enhancing one or more of the **features** for which a site is designated.

Attribute A quantifiable and monitorable characteristic of a **feature** that, in combination with other such attributes, describes its **condition**.

Common standards See **JNCC common standards.**

Condition A description of the state of a feature in terms of qualities or **attributes** that are relevant in a nature conservation context. For example, the condition of a habitat usually includes its extent and species composition and might also include aspects of its ecological functioning, spatial distribution and so on. The condition of a species population usually includes its total size and might also include its age structure, productivity, relationship to other populations and spatial distribution. Aspects of the habitat(s) on which a species population depends may also be considered as attributes of its condition. Condition is considered favourable when all the conservation objectives are being met.

Conservation management Acts or undertaking of all kinds, including but not necessarily limited to **actions,** taken with the aim of achieving the **conservation objectives** of a site. Conservation management includes the taking of statutory and non-statutory measures, it can include the acts of any party and it may take place outside site boundaries as well as within sites. Conservation management may also be embedded within other frameworks for land/sea management carried out for purposes other than achieving the conservation objectives.

Conservation objective The expression of the desired state of a **feature,** expressed as a composite statement defining the **condition** that we wish the feature to be in. Each feature has one conservation objective.

Core Management Plan A Natural Resources Wales document containing the conservation objectives for a site and a summary of other information contained in a full site **Management Plan**.

Factor Anything that has influenced, is influencing or may influence the **condition** of a **feature**. Factors can be natural processes, human activities or effects arising from natural process or human activities. They can be positive or negative in terms of their influence on features, and they can arise within a site or from outside the site. Physical, socio-economic or legal constraints on management of the site can also be considered as factors.

Favourable condition See **condition**.

Favourable conservation status The Habitats Directive definition of **Favourable Conservation Status** (FCS) is given in full in section 4.

Feature The species population, habitat type or other entity for which a site is designated. The ecological or geological interest which justifies the designation of a site, and which is the focus of **conservation management.**

Integrity See **Site integrity.**

JNCC common standards A set of principles developed jointly by the UK nature conservation agencies to help ensure a consistent approach to monitoring and reporting on the features of sites designated for nature conservation, supported by guidance on identification of attributes and monitoring methodologies.

Key Feature The habitat or species population within a **management unit** that is the primary focus of management and **monitoring** in that unit.

Management Plan The full expression of a designated site's legal status, **vision**, **features**, **conservation objectives**, **performance indicators** and management requirements. A complete management plan may not reside in a single document but may be contained in a number of documents (including in particular **the Core Management Plan**) and sets of electronically stored information.

Management Unit An area within a site, defined according to one or more of a range of criteria, such as topography, location of **features**, tenure, patterns of land/sea use. The key characteristic of management units is to reflect the spatial scale at which site management and **monitoring** can be most effectively organised. They are used as the primary basis for differentiating priorities for conservation management and monitoring in different parts of a site, and for facilitating communication with those responsible for management of different parts of a site.

Monitoring An intermittent (regular or irregular) series of observations in time, carried out to show the extent of compliance with a formulated standard or degree of deviation from an expected norm. In monitoring of sites designated for habitat and

species conservation, the formulated standard is the quantified expression of favourable **condition** based on **attributes**.

Operational limits The levels or values within which a **factor** is considered to be acceptable in terms of its influence on a **feature**. A factor may have both upper and lower operational limits, or only an upper limit or lower limit. For some factors an upper limit may be zero.

Performance indicators A subset of the conservation objectives that are quantifiable and measurable. They consist of **attributes** and factors together with their associated target values (or ranges of values) which provide the standard against which information from **monitoring** and other sources is used to determine the degree to which the **conservation objectives** for a **feature** are being met.

Plan or project **Project:** Any form of construction work, installation, development or other intervention in the environment, the carrying out or continuance of which is subject to a decision by any public body or statutory undertaker.
Plan: a document prepared or adopted by a public body or statutory undertaker, intended to influence decisions on the carrying out of **projects.**

Decisions on plans and projects which affect SAC, SPA and Ramsar sites are subject to specific legal and policy procedures.

Site integrity This is defined in Welsh Government policy as the coherence of a site's ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it is designated.

Site Management Statement (SMS) The document containing Natural Resources Wales' views about the management of a site issued as part of the legal notification of an SSSI under section 28(4) of the Wildlife and Countryside Act 1981, as substituted.

Special Feature See **feature**.

Specified limits The levels or values for an **attribute** which define the degree to which the attribute can fluctuate without creating cause for concern about the **condition** of the **feature**. The range within the limits corresponds to favourable, the range outside the limits corresponds to unfavourable. Attributes may have lower specified limits, upper specified limits, or both.

Unit See **management unit.**

Vision Statement	The statement conveying an impression of the whole site in the state that is intended to be the product of its **conservation management.** A ‘pen portrait’ outlining the **conditions** that should prevail when all the **conservation objectives** are met. A description of the site as it would be when all the **features** are in **favourable condition**.

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Appendix 1: Water Quality Targets

(as revised in Common Standards Monitoring guidance for Rivers, JNCC 2016)

River SACs designated under the Habitats Regulations 2017 (UK Gov, 2017) overlap river water bodies designated under Water Framework Directive Regulations (NRW, 2015; UK Gov, 2015). The water quality standards that apply come from the source legislation – i.e., for the water body the WFD Regulations standards and for a SAC the Habitats Regulations standards. Note that the words 'targets' and 'standards' are used under the various documents that sit under these two Regulations. We have interpreted these to mean the same thing and for this document we will use the term standard unless directly quoting from a specific document. Water quality standards for Special Area of Conservation (SAC) rivers are set via agreement at a UK level and presented in the JNCC Common Standards Monitoring (CSM) guidance (JNCC 2015, 2016).

However, having two sets of standards for the same area of river can lead to confusion both internally and externally as to which apply in a given situation. This Appendix sets out the standards for water quality attributes for the two water bodies within the Meirionnydd Oak Woods and Bat Sites SAC which support the riverine SAC feature. Where they are more stringent, WFD Regulation 2017 standards are adopted as the CSM standards.

Organic pollution

The following table (Table 1a) provides the values for the physio-chemical attributes to be applied across all river types. Standards apply throughout the assessment unit, not just at sparsely distributed monitoring sites.

The standards for DO, BOD and un-ionised ammonia are the same for all river water bodies whereas the standard for total ammonia varies according to river type and previous WFD Regulations classification for ammonia (Table 1a). For the 90%ile total ammonia the CSM standard is 0.25mg/l. However, if High Status under WFD is being reached for a water body for certain river types then the more stringent WFD standard at 0.2mg/l is applied. This is due to the no deterioration principle. Total ammonia standards for each waterbody are given in Table 1b.

Table 1 Organic pollution standards for SAC rivers

Organic pollution attribute	Unit	Test Statistic	Standard
Dissolved Oxygen (DO)	% saturation	10%ile	≥85
Biochemical Oxygen Demand (BOD)	mg l^{-1}	Mean calculated over a 3-year period	≤1.5
Total Ammonia	mg l^{-1}	90%ile	Varies by water body. See Table 1b.
95%ile un-ionised ammonia	mg l^{-1}	95%ile	≤0.025

Table 2. Total ammonia standards for water bodies in the Meirionnydd SAC. * Reason for total ammonia standard: some water bodies that meet WFD high status for ammonia have the WFD high standard of 0.2 mg l^{-1}, all other water bodies have the CSM standard of 0.25 mg l^{-1}.

Water Body ID	Water Body Name	Total Ammonia (90%ile, mg l^{-1})	Reason for total ammonia standard*
GB110065053860	Glaslyn - tidal to Afon Croesor	0.2	WFD (high)
GB110065053910	Glaslyn - Nanmor to Colwyn	0.25	CSM

Reactive phosphorus

Phosphorous standards are set according to altitude, alkalinity, and river size, with the tightest targets in low alkalinity, high altitude headwater areas, reflecting natural variation (JNCC 2016). River Habitat Survey (EA, 2003) river flow categories are used to determine river size.

The process also includes an alignment procedure to ensure that standards are never less stringent than the Water Framework Directive (WFD) phosphorus standard for the same water body. If the WFD standard is more stringent than the CSM standard then the WFD standard applies.

Individual phosphorus standards for all waterbodies in the Meirionnydd SAC are given in Table 2. As explained previously, the WFD phosphate standard has been applied where it is more stringent than CSM standards.

Table 3. Phosphorus standards and typology for all waterbodies in the Meirionnydd SAC. * Phosphorus standard to be applied to annual and growing season means. Standards calculated from annual mean expressed in µg L-1 SRP.
** Reason for phosphorus standard: CSM (near natural/max allowable) are derived from the CSM guidance for Rivers and WFD (good/high) from the relevant Water Framework Directive standard.

Water Body ID	Water Body Name	SAC Management Unit	Phosphorus standard* (µg l^{-1})	Reason for phosphorus standard**	CSM_Alt type	CSM_Alk type	River size
GB11006 5053860	Glaslyn - tidal to Afon Croesor	7074 1583	19	WFD (high)	low Alt <80 m	low Alk <50mg l	river
GB11006 5053910	Glaslyn - Nanmor to Colwyn	7073 1582 1579 2987 6808 7070 6812 6815 1587 6811 6806	13	WFD (high)	low Alt <80 m	low Alk <50mg l	river

Trophic diatom index

The standard should be equivalent to WFD high ecological status using the current version of the diatom classification tool (via light microscopy). This is a tool developed to measure increases in nutrient concentrations through assessing degree of change in floristic composition in benthic diatoms (algae) in streams and rivers.

Acidification

This standard only applies to Water Bodies whose water body type is classified as siliceous or peat. Other types have good buffering ability and so will not be affected by acidification. See tables 4a and 4b for standards for all water bodies in the Meirionnydd SAC.

The water bodies in the Meirionnydd SAC are not classed at risk of acidification (Hankin *et al*. 2014). However, to comply with CSM guidance, acid standards have been applied. **Note that monitoring and reporting will only be carried out for water bodies classified as either 'at risk' or 'probably at risk'.** If ANC data is available then water bodies should be assessed against the ANC standard but if ANC data is not available then pH should be used.

Table 4. Acidification standards for SAC rivers. *Acid Neutralising Capacity; ** Dissolved Organic Carbon

Standards for acidification	Method of assessment
ANC*: Mean ANC for all waters > 80 pH (Clear waters with DOC**<10 mg L-1): mean > 6.54 pH (Humic waters with DOC>10 mg L-1): mean > 5.1	Analysis of water chemistry data from environment agencies. At least 36 samples (3 years of data) are required, which must include winter samples.

Table 5. Acidification standards for all waterbodies in the Meirionnydd SAC. *

Water Body ID	Water Body Name	Acidification risk	Acid Neutralising Capacity (ANC)	pH
GB110065053910	Glaslyn - Nanmor to Colwyn	Probably not at risk	>80	>6.54
GB110065053860	Glaslyn - tidal to Afon Croesor	Not at risk	>80	>6.54

Appendix 2: Performance indicators

These performance indicators are a sub-set of the conservation objectives and describe the evidence, including in particular evidence to be obtained from monitoring of sites and features, that will be used to inform judgements about whether or not the conservation objectives (in section 4 of the Core management plans) are being met.

The assessment of plans and projects should be made in view of the entirety of the conservation objectives, including the performance indicators.

Performance indicators for Feature 1: Woodlands

The performance indicators are part of the conservation objective, not a substitute for it. Assessment of plans and projects must be based on the entire conservation objective, not just the performance indicators.

Table: Performance indicators for feature condition:

Attribute	Attribute rationale and other comments	Specified limits
A1. Extent of broad-leaved woodland and associated habitats	Lower limit is based on current extent of SAC woodland.	Lower limit: 1832ha
A2. Location of woodland types		
A3. Tree canopy cover	The tree canopy percentage cover within the woodland area is about 87% of the woodland area. If there is a natural catastrophic event assessment should be made to see if follow up management is required.	Upper Limit: Tree canopy 87% of woodland area. Lower Limit: Tree canopy may only be less after a natural catastrophic event.
A4. Canopy and shrub layer	The canopy and shrub layer comprises locally native species.	Some non-native species may be tolerated where they support important species such as lichens and are not highly invasive. Phased removal of non-natives is often appropriate with long-term management to control regrowth/ reinvasion.
A5. Native tree and shrub regeneration	Natural regeneration of native trees*. * *Quercus petraea, Q. robur, Q. hybrids, Betula pubescens, Fraxinus excelsior,*	Upper Limit: none set. Lower Limit: This may vary considerably compartment to compartment depending on ecological assessment. A general guide is 2 viable seedlings/saplings

Attribute	Attribute rationale and other comments	Specified limits
	Ilex aquifolium, Salix cinerea, Alnus glutinosa, Tilia cordata, Ulmus sp, *Salix* sp.	per 0.01 ha (100 square metre ie 200 per hectare) of gap, within 15 years of gap formation (where viable seedlings/saplings are taken to be healthy and vigorous native* tree species reaching a minimum height of 3m and comprise species that will replenish the canopy.
A6. Ground layer	The ground layer should be characteristic of the vegetation subcommunity and at a height where there is there is the most plant diversity for which that location is special or has been designated. Usually this means that it should not be too overgrown.	Upper Limit: Areas of overgrown vegetation (eg bramble, ivy and holly) may be mapped for individual sites/compartments with planned management such as grazing reintroduction when the upper limit of taller vegetation is exceeded. Lower Limit: none set
A7. Common mosses, liverworts, lichens and slime moulds	The abundance and distribution of common and typical (Atlantic, sub-Atlantic, western, oceanic) mosses and liverworts, lichens (and slime moulds), will be maintained or increased. Refer to indicative lists in Appendix 3.	Upper Limit: none set Lower Limit: The current abundance and distribution should be maintained or preferably increased.
A8. Uncommon mosses, liverworts, lichens and slime moulds	Current populations of uncommon mosses, liverworts, lichens and ferns will flourish and expand where possible (Appendix 3).	Upper Limit: none set Lower Limit: The current abundance and distribution should be maintained or preferably increased.
A9. Mature / Veteran trees	There will be a scattering of mature (c60cm diameter plus for oak and ash and/or with signs of decay, holes etc.) and eventually veteran trees (c100cm diameter plus for oak and ash and 75cms birch) through the wood where they are not likely to be affected by health and safety considerations of paths, tracks and power lines.	Upper Limit: none set Lower Limit: This is set at a level appropriate to each unit which is usually above the current number. Achievement of this limit is dependent on time passing and lack of disturbance/destruction of mature and maturing trees so they may be allowed to grow into veterans.
A10. Dead wood	The volume of dead wood exceeds 30 cubic metres per hectare throughout and consists of a mixture of fallen trees (minimum 1 per hectare), broken branches, dead	Upper Limit: Not required Lower Limit: 30 cubic metres per hectare N.B In the very long term a target of 40+ cubic metres might be appropriate, but only when the active management associated with non-native

Attribute	Attribute rationale and other comments	Specified limits
	branches on live trees, and standing dead trees (minimum 1 per hectare).	removal has been completed and the wood is essentially operating under natural processes.

Table: Performance indicators for factors affecting the feature

Factor	Factor rationale and other comments	Operational Limits
F1. Grazing	Without an appropriate light grazing regime, the woodland tends to become overgrown with a reduction in lower plant diversity. Too light grazing can result in stock, often sheep, concentrating just on the grassy areas. There are some areas that have not been grazed for 30 years or more and which now need grazing and conversely some woods are grazed too heavily suppressing regeneration. Too heavy grazing can result in excessive trampling, poaching and loss or disturbance of the ground flora and soils.	Favourable management is often light summer grazing by sheep, cattle and /or ponies at a rate of 0.15 LSU/ha/year. This guidance level of grazing is based on recent trials and observations at Coed y Rhygen.
F2. Non-native species	Beech, *Rhododendron*, Japanese knotweed, conifers, Himalayan balsam, sycamore, sweet chestnut.	Non-native species should be absent, unless individual trees are known to be important for maintaining humidity or for defined wildlife interest and there are mechanisms in place to ensure no seeding or encroachment. Exceptionally individual trees may be retained for landscape reasons provided there is no adverse impact on nature conservation.
F3. Humidity	High humidity is essential for mosses and liverworts to survive and reproduce.	High humidity must be maintained.
F4. Goats	Grazing by goats can be detrimental to regenerating trees in areas e.g., Rhinog where the numbers are increasing.	Keep grazing by goats under control
F5. Woodland management	Tree felling and scrub clearance can be beneficial if carried out appropriately. It could however cause damage if for example important trees are felled or if mosses, other plants and/or wildlife are damaged or disturbed as a result.	Any woodland management that is proposed will be considered by looking carefully at the advantages and disadvantages on a case-by-case basis.

Factor	Factor rationale and other comments	Operational Limits
F6. Woodland fragmentation	Sites where the remaining woodland is only a small fragment of its former size should be enlarged wherever possible.	Increase the size of woodlands where only fragments remain.
F7. Adventure gorge walking & white-water canoeing rafting	Activities such as gorge walking and kayaking should be monitored so that this may provide feedback to management. No significant damage to mosses, liverworts and ferns growing within the gorges should take place.	Gorge walking and kayaking at sensitive sites may be permitted through access agreements with local users providing monitoring shows that there is no risk to rare and notable species.

Table: Typical species of the different woodland SAC features

Feature	Tree and shrub layer	Field and ground layer
Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles	*Quercus petraea, Betula pubescens, Sorbus aucuparia, Ilex aquifolium, Corylus avellana* and other locally native species including *Fraxinus excelsior, Tilia cordata, Betula pendula* and *Ulmus* sp.	*Calluna vulgaris, Vaccinium myrtilis, Anthoxanthum odoratum, Agrostis capillaris, Deschampsia flexuosa, Galium saxatile, Oxalis acetocella, Endymion non-scripta, Molinia caerulea* and/or mosses and liverworts including *Thuidium tamarisinum, Hylocomium splendens, Dicranum majus, Pleurozium schreberi, Polytrichum formosum, Plagiothecium undulatum, Rhytidiadelphus loreus.*
Bog woodland	*Betula pubescens, Salix* sp.	*Molinia caerulea*, *Carex rostrata*, bog-mosses (*Sphagnum* sp.) and *Polytrichum* sp.
Tilio-Acerion forests of slopes, screes and ravines	*Fraxinus excelsior, Ulmus* sp., *Tilia cordata, Sorbus aucuparia, Corylus avellana* and other locally native species.	*Mercurialis perenne, Dryopteris felix-mas, Athyrium felix-femina, Circaea lutetiana, Oxalis acetocella, Galium odoratum* and *Geranium robertianum.*
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	*Alnus glutinosa, Fraxinus excelsior, Salix* sp., *Betula pubescens* and other locally native species.	*Filipendula ulmaria, Lysimachia nummularium, Carex remota, Caltha palustris, Iris pseudacorus* and *Dryopteris ferns*.

Table: Indicative list of Atlantic, sub-Atlantic & western British mosses & liverworts found within the Meirionnydd Oak woods SAC. From Seddon, collated by Evans (2008); those marked * = Oceanic species, Averis (2000)

Atlantic species of liver-wort	Western British species of Liverwort	Sub-Atlantic species of Moss
Adelanthus decipiens	*Bazzania tricrenata*	*Breutelia chrysocoma*
Aphanolejeunea micro-scopica	*Bazzania trilobata*	*Campylopus atrovirens*
Drepanolejeunea hamati-folia	*Frullania fragilifolia*	*Campylopus flexuosus*
Frullania teneriffae	*Metzgeria conjugata*	*Entosthodon attenuatus*
Gymnomitrion crenulatum	*Mylia taylorii*	*Entosthodon obtusus*
Harpalejeunea molleri	*Nowellia curvifolia*	*Fontinalis squamosa*
Herbertus aduncus ssp. Hutchinsiae	*Riccardia chamedryfolia*	*Heterocladium heterop-terum*
Jubula hutchinsiae	*Riccardia palmata*	*Hookeria lucens*
Lejeunea lamacerina	*Scapania compacta*	*Hyocomium armoricum*
Lepidozia cupressina	*Scapania umbrosa*	*Hygrohypnum eugyrium*
Lepidozia pearsonii		
Marchesinia mackaii		*Hypnum resupinatum*
Plagiochila exigua		*Pterogonium gracile*
Plagiochila killarniensis	Oceanic species of liver-wort*	*Ptychomitrium polyphyllum*
Plagiochila punctata	*Anastrophyllum minutum**	*Racomitrium ellipticum*
Radula aquilegia	*Hygrobiella laxifolia*	*Tetrodontium brownianum*
Saccogyna viticulosa	*Lophocolea fragrans**	*Zygodon conoideus*
	*Metzgeria leptoneura**	*Ulota drummondii*

Sub-Atlantic species of liverwort	Atlantic species of Moss	Western British species of Moss
Anastrepta orcadensis	*Fissidens celticus*	*Dicranodontium denuda-tum*
Calypogeia arguta	*Isothecium holtii*	*Grimmia hartmanii*
Douinia ovata	*Dicranum scottianum*	*Hylocomiastrum umbra-tum*
Lejeunea patens	*Rhabdoweisia crenulata*	*Hypnum callichroum*
Metzgeria temperata		*Sphagnum quinquefarium*
Microlejeunea ulicina		*Thuidium delicatulum*
Odontoschisma sphagni		*Trichostomum tenuirostre*
Plagiochila spinulosa		*Ulota hutchinsiae*
Porella rbores-vitae		
Scapania compacta		Oceanic species of moss*
Scapania gracilis		*Fissidens curnovii**

Table: Indicative list of EUOCIEC and NIEC lichens found within Meirionnydd Oak woods SAC. EUOCIEC = Eu-Oceanic Calcifuge Woodlands Index of Ecological Continuity; NIEC = New Index of Ecological Continuity. (B) also = Bonus.

EUOCIEC	NIEC	NIEC
Bryoria fuscescens	*Agonimia allobata*	*Ochrolechia inversa*
Buellia griseovirens	*Agonimia octospora*	*Opegrapha fumosa* (B)
Bunodophoron melano-carpon	*Arthonia astroidestera*	*Pachyphiale carneola*
Cetrelia olivetorum	*Arthonia ilicina*	*Pannaria conoplea*
Graphina ruiziana	*Arthonia vinosa*	*Parmeliella parvula*
Hypotrachyna endochlora	*Anisomeridium ranunculo-sporum*	*Parmeliella testacea* (B)
Hypotrachyna laevigata	*Bacidia biatorina*	*Parmeliella triptophylla*
Hypotrachyna sinuosa	*Biatora epixanthoides*	*Parmelinopsis horrescens* (B)
Hypotrachyna taylorensis	*Biatora sphaeroides*	*Parmotrema crinitum*
Japewiella tavaresiana	*Catinaria atropurpurea*	*Peltigera collina*
Lecidia doliiformis	*Cetrelia olivetorum*	*Peltigera horizontalis*
Lepraria membranacea	*Chaenotheca spp*	*Pertusaria multipuncta*
Loxospora elatina	*Cladonia caespiticia*	*Phaeographis dendritica*
Megalaria pulverea	*Cladonia parasitica*	*Phaeographis inusta*
Menegazzia terebrata	*Collema furfuraceum*	*Phyllopsora rosei*
Micarea alabastrites	*Collema. Subflaccidum*	*Porina hibernica*
Micarea stipitata	*Cresponea premnea*	*Punctelia reddenda*
Mycoblastus caesius	*Degelia atlantica*	*Rinodina isidioides*
Mycoblastus sanguinarius	*Degelia plumbea*	*Schismatomma quercicola*
Ochrolechia inversa	*Dimerella lutea*	*Stenocybe septata*
Ochrolechia tartarea	*Fuscopannaria sampaiana* (B)	*Sticta duphourii* (B)
Parmelinopsis horrescens	*Hypotrachyna endochlora* (B)	*Sticta fuliginosa*
Pertusaria ophthalmiza	*Lecanora jamesii*	*Sticta limbata*
Sphaerophorus globosus	*Leptogium burgessii* (B)	*Sticta sylvatica*
Trapelia corticola	*Leptogium cyanescens*	*Strangospora ochrophora*
Usnea filipendula	*Leptogium lichenoides*	*Thelopsis rubella*
	Leptogium teretiusculum	*Thelotrema lepadinum*
NEIC Bonus Species	*Lobaria amplissima*	*Usnea ceratina*
Fuscopannaria mediterra-nea	*Lobaria pulmonaria*	*Usnea florida*
Hypotrachyna sinuosa	*Lobaria scrobiculata*	
Hypotrachyna taylorensis	*Lobaria virens*	
Menegazzia terebrata	*Loxospora elatina*	
Parmelinopsis horrescens	*Megalospora tuberculosa*	
Parmeliella testacea	*Micarea alabastrites*	
Porina rosei	*M. cinerea*	
Sticta canariensis forma dufourii	*Mycoporum antecellens*	
Usnea articulata	*Nephroma laevigatum*	
	Nephroma parile	

Performance indicators for Feature 2: Lesser horseshoe bats *Rhinolophus hipposideros*

Table: Performance indicators for feature condition

Attribute	Attribute rationale and other comments	Specified limits
A1. Population of lesser horseshoe bats	Emergence counts in June for SAC roosts (See further down in this section). Some roosts are split between buildings or adits, but counts are combined to form a 'site' count. If a decline or lack of increase cannot be explained, a licensed bat worker should investigate.	We expect roost counts to be within the normal range for that particular site, but also to be in line with current trends identified by the National Bat Monitoring Program. If numbers are lower (or higher) than usual we consider factors such as roost integrity, weather, disturbance, predation and annual and longer- term trends within Wales/UK.
A2. Roosts	Breeding roosts (buildings, structures and trees), Hibernation roosts (mines and buildings), Night, transitional, leks and swarming sites of appropriate quality.	See factors F1-F4
A3. Foraging or feeding habitat	Sufficient surrounding roosts.	No loss of foraging habitat or decline in its quality affecting invertebrate availability, such as over intensive woodland or grassland management and drainage of marshes or bogs.
A4. Range of the population	SAC/Gwynedd	Map of known roosts should be maintained. We expect to continue to find new roosts.

Table: Performance indicators for factors affecting the feature

Factor	Factor rationale and other comments	Operational Limits
F1. Building or structure including mine	Lesser horseshoe bats have very specific requirements for roosts and hibernation sites, see section **Error! Reference source not found.** for more detail.	Condition of breeding and hibernating roosts should be enhanced wherever possible, see section **Error! Reference source not found.** for more detail.
F2. Disturbance to roosts	Disturbance to bats, particularly during the breeding season and hibernation period can affect the population's success at a specific roost.	Human access should be controlled & disturbance kept to minimum levels, so that they do not negatively impact on the bats.

Factor	Factor rationale and other comments	Operational Limits
F3. Bat navigation flight lines	Bats use linear and other features including hedges, walls, lines of trees, scrub, ditches streams etc. between roosts and feeding areas. Clear felling of conifers around mine roosts can be an issue as the bats can abandon the roost site.	There should be no loss or decline in the quality of physical features used as flight lines. There should be no clearance of vegetation, trees or shrubs near the roost without assessment of likely impact.
F4. Roads and development	Roads, particularly new widened routes, can cause increased mortality through collision with vehicles. This may also be through interruption to flight lines, by removal of traditional safe flight lines along linear features or by lighting. Lighting of roosts can have similar effects.	Maintain closed canopy crossings over roads with connectivity to hedges and tree lines to foraging sites and roosts. Lighting should be avoided.
F5. Weather	This is very significant factor acting on bats through temperature and severe unseasonable weather, including storms & unusually high temperatures. Thus, weather affects bat emergence from roosts, feeding (availability of prey), hibernation timing, activity, breeding timing and success.	We must always be mindful of the effects of weather when analysing trends and interpreting data and bat behaviour.

Table: SSSI and roost sites with June emergence or winter counts for recent years.

SSSI and roost site	01	02	03	04	05	06	07
Aberdunant SSSI	No value	No value	No value	No value	No value	No value	No value
Aberdunant Adits (hibernacula)	No value	Awaiting count	Awaiting count	Awaiting count	Awaiting count	114	Awaiting count
Aberdunant Barn (nursery)	161	164	134	No value	139	172	Awaiting count
Aberdunant Lodge (satellite roost)						3	
Bryn-y-Gwin Isaf SSSI (nursery)	551	526	680	661	520	527	578
Cadair Idris SSSI	No value	No value	No value	No value	No value	No value	No value
Pandy Mine (hibernacula)	76	98	83	63	82	91	69

SSSI and roost site	01	02	03	04	05	06	07
Coedydd Beddgelert a Cheunant Aber-glaslyn SSSI	No value	No value	No value	No value	No value	No value	No value
Dinas Du disused building (nursery)		47	102	84	36	84	Await-ing count
Coed Llechwedd SSSI	No value	No value	No value	No value	No value	No value	No value
Llechwedd adits (hi-bernacula)		18	39	34	30	45	21
Coedydd Dyffryn Ffestiniog Gogleddol SSSI	No value	No value	No value	No value	No value	No value	No value
Mill Cottage grain drier (nursery)	138		157		102	87	126
Coed Cae Fali former explosives store (nursery)	73	70	100	102	6 + tawny owl problem	58 + tawny owl prob-lem	90
Coed Cae Fali former explosives store (hi-bernation)	New site	New site	New site	New site			4
Coed Maentwrog dis-used mine level (hi-bernacula)- Plas y Dduallt adit	New site	New site	New site	44	104	107	Await-ing count
Cymerau Isaf Barn disused building (nursery)	Await-ing count	Await-ing count	Await-ing count	10	Await-ing count	19	43
Coedydd Nanmor SSSI	No value	No value	No value	No value	No value	No value	No value
Hafod garegog (nursery)	244	402	313	329	384	424	314
Hen Dolfriog (nursery)	167	199	183	198	176	208	255
Dolorgan Barn SSSI (nursery)	248	219	10 + barn owl problem	33 + barn owl problem	7 + barn owl problem	34	82
Ganllwyd SSSI	No value	No value	No value	No value	No value	No value	No value
Capel Libanus, Ganll-wyd (nursery)	238	346	172	263	127	261	255
Glaslyn SSSI	No value	No value	No value	No value	No value	No value	No value
Hendy (nursery)	168	24	44	92	68	102	Await-ing count

SSSI and roost site	01	02	03	04	05	06	07
Hendre henydd (nursery)	131	178	168	147	176	156	132
Glyn Cywarch SSSI	No value	No value	No value	No value	No value	No value	No value
Potting shed (nursery)	148	87	120	208	168	135	132
Mwyngloddia Wnion a Eglwys Sant Marc SSSI	No value	No value	No value	No value	No value	No value	No value
Dolserau adit (hibernacula)	98	62	84	70	56	114	88
Penmaenuchaf Hall SSSI (nursery)	216	229	254	215	221	218	290

Performance indicators for Feature 3: European dry heaths

Table: Performance indicators for feature condition

Attribute	Attribute rationale and other comments	Specified limits
A1. Extent of dry heath	Lower limit is based on the most recent estimate from the NRW SAC feature assessment report (Lloyd and Lough, 2006).	Lower limit Dry heath: 21 ha Upper limit: Dry heath: 21 ha
A2. Distribution of dry heath	As mapped.	No value
A3. Vegetation composition	Typical species are important so that natural biodiversity is maintained and enhanced.	Refer to site quadrat data and Rodwell (1991) for typical species frequencies.
A5. Heath land structure	The heath surface should be regenerating and characteristic of the vegetation community and generally at a height where there is the most plant diversity.	Set limits relevant to particular location/stand in context of whole site.
A6. Non-native species	Non-native species especially invasive species such as conifers, *Rhododendron*, Japanese knotweed and Himalayan balsam should not be present.	Acceptable limit: None present within SAC. Target: None present within species specific buffer zones around SAC.

Table: Performance indicators for factors affecting feature condition

Factor	Factor rationale and other comments	Operational Limits
F1. Grazing	Heaths are likely to have always been grazed to some extent, by a variety of herbivores. In an unmodified heathland, species composition is regulated by soil composition, water levels, altitude and aspect, as well as factors such as grazing. Where stock are excluded, the heath vegetation becomes very deep and bushy, and the scattered scrub develops into woodland. If this is undesirable, then some light grazing of the relevant compartments may be necessary.	Favourable management is often summer grazing by sheep, cattle and /or ponies at a rate of 0.225 LSU/ha/year (1.4 ewes).
F2 Burning	Burning generally is not appropriate here as lack of adequate control could result in devastation of woodland habitat immediately adjacent. If it is to be considered, the proposal should have clearly stated objectives and be limited to: appropriate areas of dry heath, at a small scale, be well controlled and follow good practise and codes.	There is therefore a general presumption against burning of heath within Meirionnydd Oakwoods and Bat Sites SAC. Burning of some stands of dry heath may be consented on a case-by-case basis.
F3. Mowing	Cutting can be a viable alternative to burning and offers a controlled, safe way to manage heather without the associated risks of fires. The main areas of dry heath in this SAC are however either on very steep slopes or in inaccessible areas, so cutting is generally difficult.	May be consented where practical.
F4. Afforestation/ conifer encroachment	The presence of conifers (and other invasive non-native species) on heaths immediately places the conservation status of the heath as 'unfavourable'. Conifers/trees shade out the heath vegetation and acidify the groundwater. Associated activities such as heavy plant access, planting, fertiliser input, construction and maintenance of access tracks, and drainage works lead to further damage of the heath. The trees also provide seed-	No planting of conifers or other trees on heath.

Factor	Factor rationale and other comments	Operational Limits
	source of future conifers to encroach further out onto the heath.	
F5. Bracken	Bracken is a natural component of the moorland edge communities, however, where bracken is encroaching at the expense of dry heath, some form of control may be required.	Defined limits for bracken and bracken encroachment bordering heath where it is not expected that woodland may expand.

Table: Typical species of the European dry heath SAC feature

NVC Vegetation community, Dry Heath	Typical Species-constants
H8 *Calluna vulgaris-Ulex gallii* heath	Constants: *Calluna vulgaris, Ulex gallii, Erica cinerea*
H10 Calluna *vulgaris – Erica cinerea* heath	Constants: *Calluna vulgaris, Erica cinereal, Potentilla erecta*
H12 Calluna *vulgaris – Vaccinium myrtillus* heath	Constants: *Calluna vulgaris, Descampsia fleuxuosa, Vaccinium myrtillus, Dicranum scoparium, Hypnum jutlandicum, Pleurozium schreberi*

Performance indicators for Feature 4: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion vegetation*

Table: Performance indicators for feature condition

Attribute	Attribute rationale and other comments	Specified limits
A1. Extent	The extent of suitable river habitat where the plant community can occur should be stable or increasing.	Part of the river Glaslyn (5.2 ha) will be included in the SAC.
A2. Distribution	Currently unknown	NRW internal reference unit 27
A3. Typical species	Should conform to appropriate JNCC type	Sub-type 3
A4. Undesirable and non-native species	Algae indicative of eutrophication should only be present at low cover.	Non-native and algal species indicative of eutrophication maintained below threshold over the medium to long term

Table: Performance indicators for factors affecting the feature

Factor	Factor rationale and other comments	Operational Limits
F1. Flow regime	Requires moderately swift flows. *Ranunculion* vegetation can withstand fast flows, but cannot tolerate spatey conditions, so prefers medium-width rivers in lowland situations as in Afon Glaslyn.	No increase in water abstraction upstream that will alter flow regime
F2. Water quality	Mesotrophic conditions required (i.e., not eutrophic or calcareous). Water quality standards presented in Appendix 1 of this document to be met.	No reduction in water quality See Appendix 1.
F3. Water quantity	*Ranunculion* vegetation needs considerable water movement to maintain good growth & deeper channels usually of at < 1m + deep.	No reduction in water quantity
F5. Channel morphology - river engineering	The physical channel should be maintained or restored as far as possible to a near-natural state in order to support the coherence of the ecosystem structure and function.	No modification of channel or banks
F6. Channel substrate	The riverbed should consist of stable stony beds of gravel or pebbles, sometimes with larger stones or boulders.	No modification of channel substrate
F7. Shading	Shading by tree-growth on the bankside is important in rivers less than 20m wide.	No shading of rivers less than 20m wide

Performance indicators for Feature 5: Northern Atlantic wet heaths with *Erica tetralix*

Table: Performance indicators for feature condition

Attribute	Attribute rationale and other comments	Specified limits
TBC	TBC	TBC

Table: Performance indicators for factors affecting the feature

Factor	Factor rationale and other comments	Operational Limits
TBC	TBC	TBC

Appendix 3. Indicative lists of Nationally rare and scarce mosses, liverworts and lichens

Sites and NRW internal unit references for lower plant data following Newton (2005).

Unit no.	Name
1	Aber Mawddach/ Mawddach Estuary
2	Aberdunant Mine
3	Afon Eden – Cors Goch, Trawsfynydd
4	Arthog Hall Woods
5	Barmouth Hillside
6	Bryn-y-Gwin Isaf
7	Cadair Idris
8	Ceunant Cynfal
9	Ceunant Llennyrch
10	Coed Aber Artro
11	Coed Camlyn
12	Coed Cors y Gedol
13	Coed Graig Uchaf
14	Coed Llechwedd
15	Coed Lletywalter
16	Coed Tremadog
17	Coed y Rhygen
18	Coedydd Abergwynant
19	Coedydd Beddgelert a Cheunant Aberglaslyn
20	Coedydd Dyffryn Ffestiniog Gogleddol
21	Coedydd Dyffryn Wnion
22	Coedydd Nanmor
23	Coedydd Nantgwynant
24	Craig y Benglog
25	Dolorgan Barn
26	Ganllwyd
27	Glaslyn
28	Glyn Cywarch
29	Mwyngloddia Wnion a Eglwys Sant Marc
30	Penmaenuchaf Hall
31	Rhinog
32 - 45	Non-underpinned units

Table: Indicative list of nationally rare and scarce lichens recorded for individual NRW internal reference units (Newton, 2005). Green type = on Welsh list not UK; Red type = not now listed as Nationally scarce (2006); Blue type = bog/flush species.

Nationally rare lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Biatoridium monasteriense																		Yes		
Chaenothecopsis savonica					Yes															
Cladonia norvegica	Yes													Yes		Yes				
Epigloea medioincrassata								Yes												
Melaspilea amota														Yes					Yes	
Micarea hedlundii	Yes						Yes													
Micarea viridileprosa	Yes				Yes								Yes							
Micarea xanthonica	Yes				Yes								Yes	Yes	Yes				Yes	
Parmelia robusta																				Yes
Porina hibernica					Yes															
Porocyphus kenmorensis					Yes															
Pyrenula hibernica					Yes															
Ramonia dictyospora																			Yes	
Rinodina flavosoralifera								Yes												
Verrucaria pachyderma					Yes															

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Acarospora glaucocarpa			Yes																	
Agonimia allobata	Yes				Yes															
Agonimia octospora					Yes														Yes	
Arthonia anombrophila					Yes															
Arthonia arthonioides					Yes										Yes					
Arthonia astroidestera					Yes									Yes						
Arthonia leucopellaea					Yes															
Arthonia stellaris					Yes															
Arthopyrenia carneobrunneola					Yes															
Arthopyrenia fraxini								Yes												
Arthopyrenia viridescens	Yes																			
Arthothelium ruanum	Yes				Yes						Yes				Yes			Yes	Yes	Yes
Bacidia absistens	Yes				Yes															
Bacidia carneoglauca	Yes						Yes									Yes				
Bacidia trachoma	Yes															Yes				
Bactrospora corticola	Yes																			

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Biatoria chrysantha	Yes																			
Biatoria epixanthoides	Yes				Yes									Yes	Yes			Yes		
Biatoria vernalis	Yes																			
Calicium lenticulare	Yes				Yes															
Calicium subquercinum											Yes									
Chaenothecopsis nigra																			Yes	
Cladonia cyathomorpha																Yes				
Cladonia incrassata					Yes														Yes	
Dermatocarpon meiphyllizum							Yes													
Fuscidea intercincta			Yes																	
Fuscidea viridis	Yes																			
Fuscopannaria mediterranea			Yes											Yes					Yes	Yes
Fuscopannaria sampaiana					Yes														Yes	
Graphina ruizana	Yes				Yes			Yes			Yes			Yes				Yes	Yes	Yes
Gyalecta derivata			Yes																	
Gyalideopsis muscicola	Yes		Yes					Yes						Yes		Yes				
Herteliana taylorii	Yes		Yes		Yes								Yes	Yes		Yes				

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Hypotrachyna endochlora					Yes						Yes			Yes					Yes	Yes
Japewiella tavaresiana								Yes						Yes						
Lecanactis dilleniana			Yes								Yes								Yes	
Lecanora ecorticola																			Yes	
Lecanora epanora					Yes								Yes							
Lecanora ochroidea														Yes						
Lecanora quercicola																				Yes
Lecanora subcarnea																				Yes
Lecidea ahlesii																Yes				
Lecidea doliiformis					Yes									Yes	Yes					
Lecidea sanguineoatra	Yes				Yes								Yes	Yes	Yes	Yes				
Lecidea swartzioidea																			Yes	
Lecidoma demissum			Yes																	
Lepraria atlantica														Yes						
Lepraria eburnean	Yes																			
Lepraria elobata													Yes	Yes						
Lepraria umbricola	Yes				Yes									Yes	Yes					

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Leptogium brebissonii																			Yes	
Lobaria amplissima																			Yes	
Lopadium disciforme				Yes											Yes					
Macentina stigonemoides																			Yes	
Megalospora tuberculosa														Yes					Yes	Yes
Melaspilea ochrothalamia			Yes																	
Micarea adnata	Yes		Yes									Yes							Yes	
Micarea alabastrites			Yes												Yes					
Micarea coppinsii	Yes												Yes			Yes			Yes	
Micarea lutulata			Yes																	
Micarea myriocarpa																			Yes	
Micarea stipitata	Yes		Yes	Yes	Yes								Yes	Yes	Yes				Yes	Yes
Micarea synotheoides					Yes															
Ochrolechia inversa	Yes				Yes								Yes	Yes		Yes			Yes	Yes
Opegrapha dolomitica														Yes						
Opegrapha fumosa					Yes														Yes	
Opegrapha lithyrga	Yes															Yes				

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Opegrapha xerica					Yes			Yes												
Parmelia endochlora			Yes																	
Parmeliella testacea			Yes											Yes				Yes	Yes	Yes
Parmelinopsis horrescens	Yes		Yes	Yes	Yes	Yes					Yes	Yes		Yes		Yes			Yes	Yes
Peltigera degenii	Yes																			
Pertusaria excludens			Yes																	
Pertusaria monogona			Yes																	
Pertusaria ophthalmiza	Yes																			
Phaeographis inusta					Yes								Yes	Yes		Yes			Yes	
Phaeographis lyellii																		Yes		
Phyllopsora rosei	Yes		Yes	Yes	Yes		Yes							Yes	Yes	Yes		Yes	Yes	Yes
Physcia stellaris			Yes											Yes						
Pilophorus strumaticus			Yes																	Yes
Porina borreri					Yes															
Porina coralloidea					Yes															
Porina rosei														Yes					Yes	
Porpidia glaucophaea	Yes												Yes	Yes						

Nationally scarce lichens	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
Porpidia hydrophila			Yes																	
Porpidia soredizodes			Yes																	
Pyrenula laevigata					Yes															
Pyrenula occidentalis					Yes									Yes						
Ramonia chrysophaea					Yes															
Rhizocarpon lecanorinum			Yes																	
Rinodinia isidioides					Yes								Yes	Yes		Yes			Yes	Yes
Ropalospora viridis					Yes										Yes	Yes			Yes	
Schaereria fuscocinerea			Yes																	
Schismatomma quercicola														Yes						
Schismatomma umbrinum														Yes		Yes			Yes	
Stenocybe bryophila																			Yes	
Tonina pulvinata			Yes																	
Tyothallia biformigera	Yes		Yes		Yes								Yes	Yes		Yes		Yes	Yes	Yes
Usnea articulata																		Yes		
Usnea wasmuthii	Yes							Yes												

Table: Indicative list of nationally rare and scarce mosses and liverworts (Newton, 2005). Green type = on Welsh list not U.K.; Red type: not now listed as nationally scarce (2006); Blue type: bog/flush species; + recorded from open habitat-river boulder – Pont y Grible.

Count	Nationally rare mosses	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
1	*Dichodontium flavescens*																		Yes		
1	*Rhytidiadephus subinnatus*						Yes														
5	*Sematophyllum demissum*					Yes						Yes						Yes		Yes	Yes

Count	Nationally scarce mosses	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
2	*Andreaea megistospora*																Yes	Yes			
5	*Andreaea rothii ssp. rothii*				Yes									Yes	Yes			Yes		Yes	
3	*Bartramia halleriana*			Yes		Yes													Yes		
1	*Bryum weigelii*			Yes																	
4	*Campylopus setifolius*			Yes		Yes														Yes	Yes
1	*Cynodontium jenneri*					Yes															
2	*Ditrichum lineare*			Yes																Yes	
2	*Fissidens polyphyllus*													Yes				Yes			
1	*Glyphomitrium davesii*																Yes				
1	*Grimmia atrata*					Yes															
3	*Grimmia retracta*					Yes	Yes	Yes													

Count	Nationally scarce mosses	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
4	*Hedwigia integrifolia*			Yes											Yes		Yes		Yes		
1	*Hygrohypnum duriusculum*			Yes																	
8	*Leucobryum juniperoideum*				Yes	Yes								Yes	Yes	Yes	Yes	Yes		Yes	
2	*Paraleptodontium recurvifolium*			Yes																Yes	
1	*Philontis arnelii*																				
1	*Philontis rigida*							Yes													
1	*Plagiopus oederianus*																				
2	*Plagiothecium laetum*																	Yes	Yes		
3	*Platyhypnidium alopecuroides*				Yes		Yes							Yes							
1	*Pohia flexuosa*																	Yes			
10	*Racomitrium affine*			Yes	Yes	Yes								Yes	Yes	Yes	Yes	Yes	Yes	Yes	
2	*Racomitrium elongatum*			Yes																Yes	
6	*Racomitrium sudeticum*			Yes		Yes											Yes	Yes	Yes	Yes	
9	*Rhabdoweisia crenulata*			Yes		Yes			Yes					Yes	Yes		Yes	Yes		Yes	Yes
2	*Schistidium agassizii*						Yes	Yes													

Count	Nationally scarce mosses	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
1	*Sematophyllum micans*						Yes														
4	*Sphagnum affine*	Yes													Yes					Yes	Yes
4	*Sphagnum angustifolium*			Yes		Yes										Yes				Yes	
9	*Sphagnum flexuosum*			Yes		Yes								Yes	Yes	Yes	Yes	Yes	Yes	Yes	
1	*Sphagnum platyphyllum*			Yes																	
5	*Sphagnum subsecundum*			Yes											Yes	Yes		Yes		Yes	
1	*Ulota coarciata*						Yes														

Count	Nationally scarce liverworts	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
4	*Adelanthus decipiens*						Yes		Yes		Yes										Yes
3	*Anastrophyllum hellerianum*				Yes	Yes														Yes	
4	*Barbilophozia atlantica*													Yes	Yes	Yes	Yes				
1	*Calypogeia azurea*			Yes																	
4	*Cephalozia catenulata*					Yes	Yes								Yes					Yes	
2	*Cololejeunea minutissima*					Yes				Yes											
5	*Colura calyptrifolia*			Yes			Yes													Yes	Yes
1	*Cryptothallus mirabilis*																				

Count	Nationally scarce liverworts	3	4	7	8	9	10	12	13	14	15	17	18	19	20	21	22	23	24	26	31
3	*Eremonotus myriocarpus*			Yes		Yes														Yes	
2	*Harpanthus scutatus*											Yes			Yes						
13	*Jamesoniella autumnalis*		Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes		Yes		Yes		Yes	Yes	Yes
4	*Jubula hutchinsiae*					Yes	Yes						Yes							Yes	
1	*Jungermannia subelliptica*					Yes															
3	*Kurzia sylvatica*													Yes	Yes					Yes	
1	*Leiocolea heterocolpos*					Yes															
3	*Leptoscyphus cuneifolius*					Yes						Yes								Yes	
1	*Marsupella sprucei*																			Yes	
2	*Plagiochila atlantica*					Yes						Yes									
4	*Porella pinnata*	Yes +					Yes	Yes													Yes
9	*Radula voluta*		Yes	Yes		Yes	Yes		Yes				Yes			Yes			Yes	Yes	
1	*Riccia subbifurca*																		Yes		
9	*Tritomaria exsecta*			Yes	Yes	Yes	Yes		Yes						Yes	Yes			Yes	Yes	

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Natural Resources Wales
Cambria House
29 Newport Road
Cardiff
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0300 065 3000 (Mon-Fri, 8am - 6pm)

enquiries@naturalresourceswales.gov.uk
www.naturalresourceswales.gov.uk