

CORE MANAGEMENT PLAN INCLUDING CONSERVATION OBJECTIVES

FOR

RHOS GOCH SPECIAL AREA OF CONSERVATION (SAC)

Version	Date	Summary of changes made	Approved by
Version 3	September 2017	Re-formatting, revision of performance indicators for SAC features, updates on feature condition & conservation status, inclusion of SSSI features and updates of management issues, including air quality standards	David Drewett
Version 2	January 2008	Minor revisions and inclusion of information from the NNR management plan	David Mitchell
Version 1	September 2007		David Mitchell

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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' web site 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' web site.

One of the key functions of this document is to provide Natural Resources Wales' statement of the Conservation Objectives for the relevant Natura 2000 site(s). This is required to implement the Conservation of Habitats and Species Regulations 2010, as amended. 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 Natura 2000 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. More specifically:

Around 95% of the site is wetland, comprising a mosaic of different habitats. The central core of Rhos Goch common consists of fairly open raised bog with a series of pools and hummocks. The drier hummocks support heather, Hare's-tail Cottongrass *Eriophorum vaginatum*, Cross-leaved Heath *Erica tetralix* and Purple Moor-grass *Molinia caerulea*, while the pools are dominated by Common Cottongrass *Eriophorum angustifolium* and bog-mosses *Sphagnum* spp. Purple Moor-grass is not overwhelmingly dominant on the raised bog. The scattered Downy Birch *Betula pubescens* trees and Willow *Salix* spp. scrub do not form a closed canopy.

Most of the core bog area is surrounded by a band of wet woodland. This occupies around 35% of the site in total. About two thirds of this is "bog woodland" that receives acidic water draining from the raised bog. The canopy here consists of Downy Birch and Rusty Willow *Salix cinerea* ssp. *oleifolia* over a ground layer that is generally dominated by mixtures of Purple Moor-grass and Common Reed *Phragmites communis* over carpets of Bog-mosses and other typical "poor-fen" plants. Royal fern *Osmunda regalis* is locally abundant in these areas. Most of the remaining woodland is "fen-carr", occupying the "lagg zone" of the raised mire, which receives drainage water from the surrounding fields and some from the raised bog. This woodland is still largely dominated by Downy Birch and Rusty Willow but they

are joined by frequent Alder *Alnus glutinosa*. The ground flora here consists of a variety of typical tall wetland plants. The canopy in the woodland areas is fairly even but there are occasional gaps where trees have died. Standing and fallen dead wood is plentiful. Plants indicating high nutrient levels, such as Common Nettle *Urtica dioica*, Bramble *Rubus fruticosus* agg., Cleavers *Galium aparine* and Creeping Buttercup *Ranunculus repens*, are generally absent from the bog woodland. They may be prominent in places within the fen carr but they are never overwhelmingly dominant.

On the south-west side, the raised bog grades into a broad zone of fen vegetation that contains patches of Rusty Willow scrub. There are other small patches of this vegetation in the wettest parts of the surrounding pasture areas. The open areas closest to the raised bog have vegetation that is characteristic of more acidic conditions, with plants such as Sedges *Carex* spp., Common Cottongrass and other typical "acid mire" plants over carpets of Bog-mosses. As the ground water becomes less acidic the Bog-mosses are gradually replaced by other mosses and a greater variety of typical poor-fen plants. These areas comprise the "transition mire" habitat. The areas furthest from the raised bog support additional plants that are found in more nutrient-rich fens including the locally rare Greater Spearwort *Ranunculus lingua*. The taller fen plants form a dense canopy during the summer months but the water beneath supports floating plants including a thriving population of Bladderwort *Utricularia australis*.

The edge of the swamp-zone is seasonally waterlogged, supporting tall Rushes *Juncus* spp. or a sward of smaller grasses with a scattering of swamp plants. Temporary pools and water seepages running out from the swamp zone are the favoured habitat of the Scarce Blue-tailed Damselfly *Ischnura pumilio*, which can be seen on the wing during the summer months.

There are large patches of Rusty Willow scrub in the swamp zone but they occupy less than 5% of the site in total and the willow and Birch trees are not encroaching into the open bog and swamp areas. Plants indicating high nutrient levels and disturbance, such as Floating Sweet-grass *Glyceria fluitans* and Creeping Buttercup, may be prominent at the edges of the common but these plants are uncommon in the central wetland areas. There are poached areas with sparse vegetation, where grazing animals roam, but these cover less than 5% of the swamp zone in total.

Marshy grassland borders the swamp zone at the southern end of the common and there are more extensive areas of this habitat in the fields that lie below the spring line in the meadows around the edges of the site. This habitat covers around a quarter of the site in total. It is largely dominated by mixtures of Rushes and Purple Moor-grass, with a good range of typical plants. Around 40% of this marshy grassland also has plants that are typical of species-rich fen-meadow.

There several springs within the meadows, which supply mineral-rich water to a series of boggy flushes. Here there are small Sedges and "brown" mosses, with a variety of other typical plants. In places the spring water is more acidic

and there are flushes dominated by Sharp-flowered Rush *Juncus acutiflorus*, over Bog-mosses. The drier ground within the meadows at the north-eastern end of the site supports some un-improved “neutral” and damp “acidic” grassland.

Purple Moor-grass and Rushes are not completely dominant anywhere within the marshy grassland and there is no significant accumulation of dead vegetation from year to year. Plants indicating disturbance and nutrient enrichment, such as Yorkshire fog *Holcus lanatus*, Floating Sweet-grass, Rough Meadow-grass *Poa trivialis*, Marsh Thistle *Cirsium palustre*, Creeping Buttercup and Cleavers are not prominent in these areas. The marshy grassland is generally free from invading scrub.

The site supports a wide range of specialised wetland insects, including rare and scarce flies, beetles and bugs. Generally, for each wetland plant or insect of particular interest, the population is stable or increasing and is sustainable in the long term, the range is not contracting, sufficient habitat exists to support the species and the factors that may affect the species or its habitat are under control. Rhos Goch also supports a good range of wetland breeding birds.

2. SITE DESCRIPTION

2.1 Area and Designations Covered by this Plan

Grid reference(s): **SO 196 483**

Unitary authority(ies): **Powys**

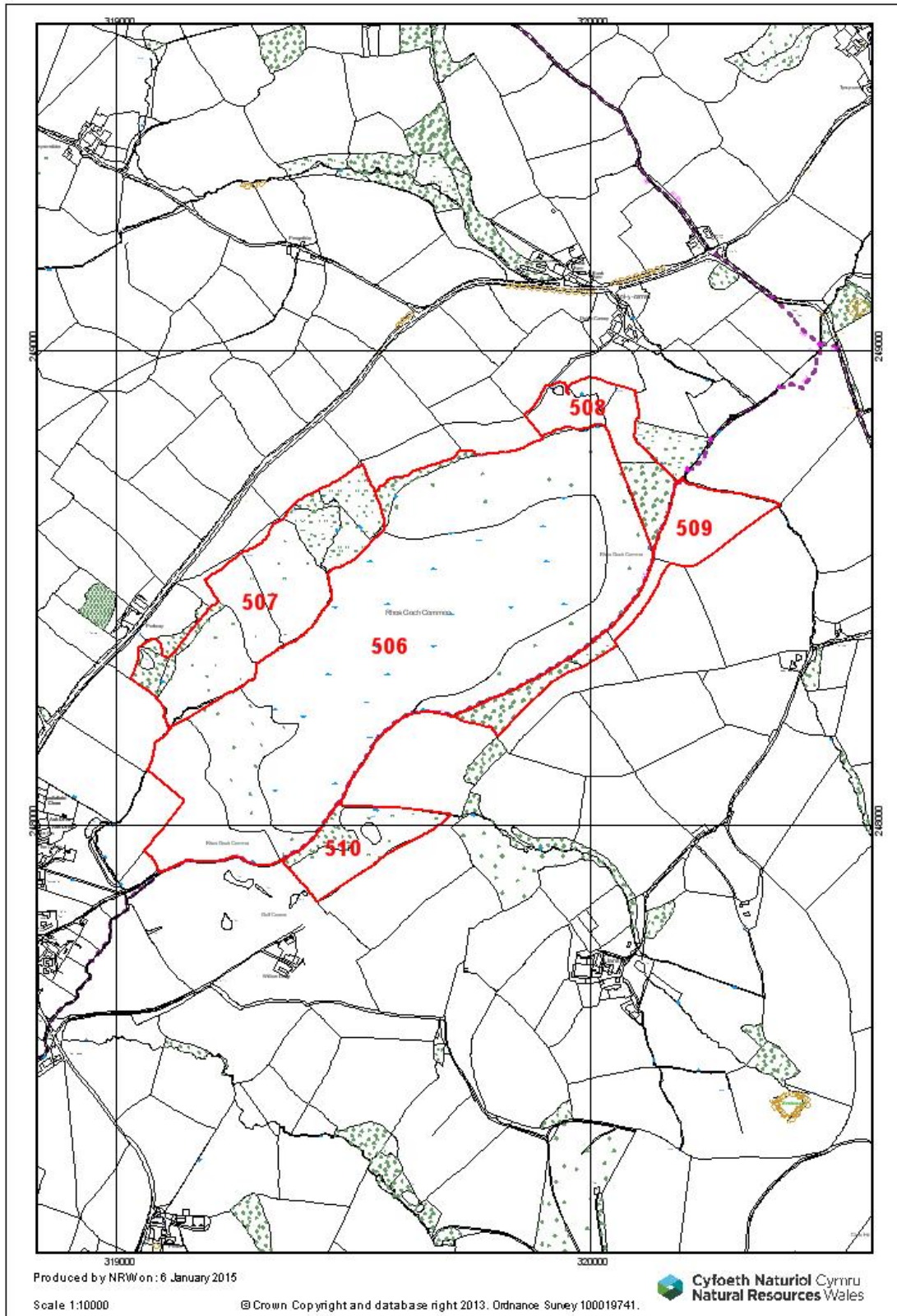
Area (hectares): **67.6**

Designations covered: **Rhos Goch SAC**, which corresponds exactly with
Rhos Goch (Rhos Goch Common) SSSI
Rhos Goch NNR (management unit 506 only)

Detailed maps of the designated sites are available on the Natural Resources Wales web site.

A summary map showing the coverage of this document is shown below:

Map 1: Rhos Goch SAC, showing Management Units



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2.2 Outline Description

The central core of the site comprises Rhos Goch National Nature Reserve (NNR), a peat bog that has developed in a small glacial lake basin to the north of Hay-on-Wye in Powys. The site also includes surrounding wet meadows and patches of woodland forming part of the “lagg zone” of the bog. The site is the source of two streams, the Cwmilla Brook (which flows north-east towards the River Arrow) and the Bach Howey (which flows south-west towards the River Wye).

2.3 Outline of Past and Current Management

The common is subject to grazing rights attached to some of the surrounding farms and houses. One of the commoners still turns out a few cattle to graze during the summer months but this may not continue beyond 2014 and from 2014 onwards experimental pony grazing will be introduced. This practice was more widespread in the past and large numbers of horses were present up to the early 1980's.

There are also common rights to cut rushes, dig peat (turbary) and take brushwood (estovers) but these practices largely ceased in the early 20th Century when alternative resources became available locally. Since that time tree cover on the common has increased. The spread of birch may also have been helped by wild fires. The last major fire occurred in the 1950's.

Mechanical ditch cleaning along the edge of the common may have led to a lowering of the water table in the 1970s and '80's but these ditches became blocked in the 1990's causing parts of the common, especially the marshy grassland, to become much wetter.

Water levels are now carefully managed to reduce the risk of significant flooding or drying out of the peat. Willow and birch trees are also cut and treated with herbicide to prevent them from dominating the open bog and fen.

The fields surrounding the common are subject to traditional agricultural management, consisting of summer grazing by cattle and sheep.

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. In this plan the management units have been based on tenure

Maps showing the management units referred to in this plan are available from: <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/find-protected-areas-of-land-and-seas/designated-sites/?lang=en>

The following table confirms the relationships between the management units and the designations covered:

Unique unit number	Unit name	SAC	SSSI	Natural Resources Wales owned/managed	Other <i>Add columns as required, e.g. NNR, SPA, Ramsar</i>
Rhos Goch					
506	Rhos Goch Common NNR	✓	✓	✓	NNR
507	Portway Meadows	✓	✓		
508	Dol-y-cannau	✓	✓		
509	Upper Llanshiver	✓	✓		
510	Cefn-y-blaen	✓	✓		

2.5 Position within an ecological network

Rhos Goch occupies an isolated position in relation other similar sites in Wales. The nearest large lowland peatland SSSI is at Waen Rydd near Llanwrtyd Wells, which is more than 30km distant. However there are examples of good quality swamp vegetation at Llan-bwchllyn Lake SSSI only 7.5 km from Rhos Goch. Fen meadow habitat is now scarce in this part of Wales but a good example may be found at Rhos Garth-fawr SSSI, which is 9.5 km from Rhosgoch, and there are still fragmentary stands of this vegetation in the Bach Howey valley close by. The Bach Howey and Cwmilla Brook both arise within Rhos Goch bog, flowing south-west and north-east respectively. Wet woodland and marshy grassland are both quite widespread in the riparian zones of these two rivers that form a valuable connection with Rhos Goch for more mobile wetland species.

Rhos Goch is not currently believed to be at high risk from the effects of climate change as annual rainfall remains high and water levels can be controlled by manipulation of drainage ditches within and adjacent to the site. Some elements of the raised mire and bog woodland flora may be at risk from elevated temperatures but the habitats present are generally fairly resilient and examples can still be found much further south in Britain and Europe where average temperatures are generally higher.

3. THE FEATURES

3.1 Confirmation of Features

Designated feature	Relationships, nomenclature etc.	Conservation Objective in part 4
SAC features		
<i>Annex I habitats that are a primary reason for selection of this site:</i>		
1. Active raised bogs	A type that has affinities with dry, “heathy” blanket bog vegetation, wet heath and “heathy” marshy grassland, with purple moor-grass and cross-leaved heath.	1
2. Transition mires and quaking bogs	“Poor fen” vegetation corresponding to a variety of National Vegetation Classification (NVC) mire and swamp types. A sub-set of the fen vegetation (see below).	2
<i>Annex I habitats present as a qualifying feature, but not a primary reason for site selection:</i>		
3. Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>)	Wet woodland dominated by alder birch and willow. The ground flora consists of a variety of swamp and fen plants including common reed, meadowsweet, purple moor-grass, soft rush, greater tussock sedge and opposite-leaved golden-saxifrage. A sub-set of broadleaved semi-natural woodland (see below).	3
4. Bog woodland	Dominated by alder, birch and willow but with a more acidic ground flora that includes bog mosses. A sub-set of broadleaved semi-natural woodland (see below).	4

5. <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)	Fen-meadow with purple moor-grass, meadow thistle and a variety of other plants (NVC type: M24). A sub-set of marshy grassland (see below).	5
SPA features		
Not applicable		
Ramsar features		
Not applicable		
SSSI features		
Lowland Raised Mire	See active raised bogs SAC feature above	1
6. Fen	Basin/floodplain fen, found mainly in the lagg zone of the raised bog. Includes the transition mires and quaking bogs SAC feature (see above) and more eutrophic swamp vegetation.	2
Broadleaved Semi-natural Woodland	See SAC features 3 & 4 above.	3 & 4
7. Marshy Grassland	Of principle interest are the <i>Molinion caeruleae</i> (see SAC feature above) and the tall herb variant of purple moor-grass mire (National Vegetation Type M25c).	5 & 6
8. Bladderwort <i>Utricularia australis</i>	Found in transition mire areas	7
9. Peatland invertebrate assemblage	Including flies, beetles, bugs and damselflies (see below).	8
10. Scarce blue-tailed damselfly <i>Ischnura pumilio</i>	Occurs within the transition mire and wetter marshy grassland areas.	9

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.

Rhos Goch	Management unit				
	506	507	508	509	510
SAC	✓	✓	✓	✓	✓
SSSI	✓	✓	✓	✓	✓
NNR/Natural Resources Wales managed	✓				
SAC features					
1. Active raised bogs	KH	x	x	x	x
2. Transition mires and quaking bogs	KH	Sym	x	x	x
3. Alluvial forests	KH	Sym	Sym	x	Sym
4. Bog woodland	KH	x	x	x	x
5. Eu Molinion meadows	Sym	KH	x	Sym	KH
SSSI features					
6. Non SAC fen	KH	KH	x	x	x
7. Non SAC marshy grassland	Sym	KH	KH	KH	Sym
8. Bladderwort	KS	x	x	x	x
9. Peatland invertebrates	KS	KS	KS	Sym	Sym
10. Scarce blue-tailed damselfly	KS	x	x	x	x

4. CONSERVATION OBJECTIVES

Background to Conservation Objectives:

a. 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). 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 network. 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 Natura 2000 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 Natura 2000 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.
- **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 separate but closely related set of 'performance indicators' which provide the basis for monitoring and reporting. To avoid confusion between the conservation objectives and the measures specified in performance indicators, the performance indicators are set out in an Appendix to 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.

b. 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.

*In some cases, the conservation objectives can accommodate reductions, if that is necessary to achieve the objectives for other features which are considered a higher priority on this site.

The elements above constitute a generic checklist or guide to the elements that should normally be included in the conservation objectives, in order to ensure that the site makes an effective and appropriate contribution to achieving favourable conservation status for the habitats and species for which it is designated.

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:
Lowland raised mire - Active raised bogs (EU Habitat Code: 7110)**

<p>Extent should be stable in the long term, or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Raised mire habitat with only a few scattered trees covers occupies around 12% of the site. • There is no significant bracken encroachment around the bog edges or on the bog dome.
<p>Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.</p>	<ul style="list-style-type: none"> • The bog surface consists of a series of pools and hummocks. • The drier hummocks support heather, hare’s-tail cottongrass, cross-leaved heath and purple moor-grass, while the pools are dominated by common cottongrass and bog-mosses. • Purple moor-grass is not overwhelmingly dominant on the raised bog. • Scattered birch trees and willow scrub, where present, do not form a closed canopy.
<p>Populations of the habitat’s typical species must be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Typical plants are listed above.
<p>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</p>	<ul style="list-style-type: none"> • Water levels on the bog remain high throughout the year. • The vegetation is not affected by atmospheric pollution. • Nutrient nitrogen critical loads to be achieved. • Acid critical loads to be achieved. • Critical levels to be achieved. • All other factors affecting the achievement of the foregoing conditions are under control

control.

**4.2 Conservation Objective for Feature 2:
Fen, including transition mires and quaking bogs (EU Habitat Code:
7140)**

<p>Extent should be stable in the long term, or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Transition mire vegetation forms a broad band on the common to the south-west of the raised bog (unit 506), with small patches of similar vegetation within Portway meadows (unit 507). • Willow and birch trees are not encroaching into the open transition mire areas.
<p>Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.</p>	<ul style="list-style-type: none"> • The transition mire vegetation includes a range of plants that are typical of fairly acidic conditions, including bottle sedge, common cottongrass, bog mosses, spear-mosses, ericoids, water horsetail, bogbean, bog pondweed and marsh cinquefoil. • The vegetation is not dominated by common reed, purple moor-grass, lesser pond sedge or rushes. • Plants indicating high nutrient levels and disturbance, such as cleavers and stinging nettle are generally absent. • There are no invasive alien plants, such as Indian balsam, Japanese knotweed and New Zealand pigmyweed. • Willow and birch trees and saplings are scarce in the transition mire areas.
<p>Populations of the habitat's typical species must be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • These are listed above.
<p>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.</p>	<ul style="list-style-type: none"> • Water levels are maintained so that surface water is present throughout the year. • There is no significant input of nutrient-rich water from ditches and surrounding land. • The vegetation is not affected by atmospheric pollution. • Nutrient nitrogen critical loads to be achieved. • Acid critical loads to be achieved. • Critical levels to be achieved. • All other factors affecting the achievement of the foregoing conditions are under control.

4.3 Conservation Objective for Feature 3:
Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (EU Habitat Code: 91E0)

<p>Extent should be stable in the long term, or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Around 15-20% of the site supports alluvial forest. • The majority of this woodland is found in the “lagg zone” of the raised bog around the north-eastern edge of the common (unit 506). With small patches within the meadows at Portway (unit 507), Dol-y-cannau (unit 508) and Cefn-y-blaen (unit 510).
<p>Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.</p>	<ul style="list-style-type: none"> • The tree canopy consists of mixtures of downy birch, alder and rusty willow, with some ash and aspen in places. • The ground flora consists of a variety of wetland plants, including common reed, greater tussock sedge, purple moor-grass, meadowsweet, hemp-agrimony, bittersweet, soft rush, opposite-leaved golden-saxifrage and marsh marigold. • The woodland is maintained as far as possible by natural processes. • The canopy is fairly even but there occasional gaps where trees have died. • The location of open glades varies over time. • Standing and fallen dead wood is plentiful. • Non native trees and shrubs, such as Scots pine and sycamore, are rare. • Plants indicating high nutrient levels, such as common nettle, bramble, cleavers and creeping buttercup, occur locally but are nowhere overwhelmingly dominant. • Plants indicating surface drying, such as purple moor-grass, bracken and bramble, do not dominate the woodland ground flora.
<p>Populations of the habitat’s typical species must be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Typical plants are listed above. • The wet woodland supports populations of typical breeding birds, including water rail.
<p>Factors affecting the extent and quality of the habitat and its</p>	<ul style="list-style-type: none"> • Grazing is light enough to allow regeneration of trees and shrubs. • Water levels are maintained so that surface water is present throughout the year.

typical species (and thus affecting the habitat's future prospects) should be under appropriate control.	<ul style="list-style-type: none"> • There is no significant input of nutrient-rich water from ditches and surrounding land. • All other factors affecting the achievement of the foregoing conditions are under control.
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4.4 Conservation Objective for Feature 4: Bog woodland (EU Habitat Code: 91D0)

Extent should be stable in the long term, or where appropriate increasing.	<ul style="list-style-type: none"> • Around 10-15 % of the site supports bog woodland. • All of this woodland occurs in patches around the edges of the raised bog or in the adjacent "lagg zone" around the north-eastern edge of the common.
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	<ul style="list-style-type: none"> • The woodland is maintained as far as possible by natural processes. • The tree canopy consists of mainly downy birch on the bog surface and mixtures of downy birch, rusty willow and alder in the lagg zone. • The ground flora generally consists of purple moor-grass and common reed over carpets of bog-mosses. Other typical plants found here include marsh cinquefoil, water horsetail, lady fern, bilberry and velvet bent grass. Royal fern is abundant in some areas • The canopy may be fairly open, particularly on the raised bog dome, with large glades. • The location of open glades may vary over time. • Standing and fallen dead wood are common in places. • Non native trees and shrubs, such as Scots pine, are rare. • Plants indicating high nutrient levels, such as common nettle, bramble, cleavers and creeping buttercup are absent. • Plants indicating surface drying, such as bracken, do not dominate the ground flora.
Populations of the habitat's typical species must be being maintained or where appropriate	<ul style="list-style-type: none"> • Typical plants are listed above.

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.	<ul style="list-style-type: none"> • Grazing is light enough to allow some regeneration of trees and shrubs. • Water levels are maintained so that water table is at or close to the surface throughout the year. • The vegetation is not affected by atmospheric pollution. • Nutrient nitrogen critical loads to be achieved. • Acid critical loads to be achieved. • Critical levels to be achieved. • All other factors affecting the achievement of the foregoing conditions are under control.

**4.5 Conservation Objective for Feature 5:
Molinia meadows on calcareous, peaty or clayey-silt-laden soils
(Molinion caeruleae) (EU Habitat Code: 6410)**

Extent should be stable in the long term, or where appropriate increasing.	<ul style="list-style-type: none"> • Species-rich “fen-meadow” vegetation occupies between 5 and 10% of the site in total. • A large part of Portway meadows (unit 507) support this vegetation and there are smaller stands at Cefn-y-blaen (unit 510). There are some other small patches on the drier ground at the south-west end of the common (unit 506).
Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.	<ul style="list-style-type: none"> • The vegetation consists of mixtures of purple moor-grass and sharp-flowered rush, with a wide variety of other plants, including devil’s-bit scabious, meadow thistle, fen bedstraw, marsh valerian, flea sedge, quaking grass, cross-leaved heath, tawny sedge and marsh orchids. • Purple moor-grass and rushes are not completely dominant and there is no significant accumulation of dead vegetation from year to year. • Plants indicating disturbance and nutrient enrichment, such as Yorkshire fog, floating sweet-grass, rough-meadow grass, marsh thistle, creeping buttercup and cleavers are not prominent in these areas. • The fen-meadow areas may have scattered trees or bushes but are generally free from dense or invading scrub. • Some bare ground is present but cattle poached areas are not extensive.
Populations of the habitat’s	<ul style="list-style-type: none"> • Typical plants are listed above. • There are good populations of wetland breeding

<p>typical species must be being maintained or where appropriate increasing.</p>	<p>birds, such as snipe and lapwing.</p>
<p>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.</p>	<ul style="list-style-type: none"> • Water levels are maintained so that the water table is close to the surface throughout the year but these areas are not subject to regular flooding. • There is no significant input of nutrient-rich water from ditches and surrounding land. • The vegetation is not affected by atmospheric pollution. • Nutrient nitrogen critical loads to be achieved. • Acid critical loads to be achieved. • Critical levels to be achieved. • All other factors affecting the achievement of the foregoing conditions are under control.

4.6 Conservation Objective for Features 6: Fen (including swamp and transition mire vegetation)

<p>Extent should be stable in the long term, or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Fen, comprising transition mire and swamp vegetation, with some scattered trees and scrub, covers at around 20% of the site. • There is a broad zone of fen (including transition mire) extending to at least 10.8 ha on the south-west side of the raised bog dome (unit 506), with smaller areas of similar vegetation within Portway meadows (unit 507). • There are large patches of rusty willow scrub in unit 506 but they occupy less than 10% of the south-western fen zone in total and the willow and birch trees are not encroaching into the open fen areas.
<p>Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.</p>	<ul style="list-style-type: none"> • A wide variety of different fen plant communities are present representing a transition from mildly acidic to nutrient rich conditions. • The more nutrient-rich swamp areas support a range of typical plants, including common spike-rush, bulrush, lesser pond-sedge, greater tussock-sedge, gipsywort and the locally rare greater spearwort. • Here the taller swamp plants form a dense canopy during the summer months but the

	<p>water beneath supports floating plants such as floating club-rush, ivy-leaved duckweed and bladderwort.</p> <ul style="list-style-type: none"> • Soft rush may be common in the swamp zones but should not form large stands where it is overwhelmingly dominant. • Other plants indicating high nutrient levels and disturbance, such as floating sweet-grass and creeping buttercup, may be prominent at the edges of the common but these plants are uncommon in the open fen areas. • There are poached areas with sparse vegetation, where grazing animals roam, but these cover less than 5% of the fen habitat in total.
<p>Populations of the habitat's typical species must be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Typical plants are listed above. • There are good populations of wetland breeding birds, including water rail, snipe, sedge warbler and reed bunting.
<p>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.</p>	<ul style="list-style-type: none"> • See 4.2 above.

4.7 Conservation Objective for Feature 7: Marshy Grassland (and associated habitats)

<p>Extent should be stable in the long term, or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Pasture dominated by rushes and/or purple moor-grass, or meadowsweet (including species-rich fen-meadow – see feature 5 above) occupies 18% of the site in total. • This vegetation is widespread in the surrounding meadows (units 507–510) and also occurs at the south-west end of the common (unit 506).
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	<ul style="list-style-type: none"> • Portway meadows (unit 507) supports a large patches of purple moor-grass pasture containing tall herbs, such as wild angelica, meadowsweet and common valerian. • There are mineral rich springs, with associated small sedge and brown moss vegetation, in Portway meadows and at Cefn-y-blaen (units 507 & 510) and transitions to areas of unimproved neutral grassland at Llanshiver (unit 509).
<p>Quality (including in terms of ecological structure and function) should be being maintained, or where appropriate improving.</p>	<ul style="list-style-type: none"> • Purple moor-grass and rushes are not completely dominant and there is no significant accumulation of dead vegetation from year to year. • Plants indicating disturbance and nutrient enrichment, such as Yorkshire fog, floating sweet-grass, rough-meadow grass, marsh thistle, creeping buttercup and cleavers may be locally abundant but are not prominent across large areas. • The marshy grassland areas may have scattered trees or bushes but are generally free from dense or invading scrub. • There are large patches open ground where cattle pass through regularly or congregate but these poached areas do not make up more than 5% of the total grassland area.
<p>Populations of the habitat's typical species must be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • Typical plants are listed above. • There are good populations of wetland breeding birds, such as snipe.
<p>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.</p>	<ul style="list-style-type: none"> • Water levels are maintained so that the water table is close to the surface throughout the year and areas bordering the swamp margin on the common, or close to the meadow ditches, are subject to seasonal flooding. • There is no significant input of nutrient-rich water from ditches and surrounding land. • The vegetation is not affected by atmospheric pollution. • Nutrient nitrogen critical loads to be achieved. • Acid critical loads to be achieved. • Critical levels to be achieved. All other factors affecting the achievement of the foregoing conditions are under control.

4.8 Conservation Objective for Feature 8: Bladderwort

<p>The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.</p>	<ul style="list-style-type: none"> • Generally, the bladderwort population is stable or increasing and is sustainable in the long term.
<p>The distribution of the population should be being maintained or where appropriate increasing.</p>	<ul style="list-style-type: none"> • There is a thriving population of bladderwort along the margins of the swamp zone and in adjacent marshy grassland at the south-west end of the common (unit 506). • The range is not contracting.
<p>There should be sufficient habitat, of sufficient quality, to support the population in the long term.</p>	<ul style="list-style-type: none"> • Vegetation in the zone where bladderwort occurs is fairly open and there is minimal scrub cover. • There is standing water present in these areas for much of the year and patches of bare mud in the summer, providing suitable habitat for this plant.
<p>Factors affecting the population or its habitat should be under appropriate control.</p>	<ul style="list-style-type: none"> • Factors that may affect the species or its habitat are under control.

4.9 Conservation Objective for Feature 9: Peatland invertebrate assemblage

<p>The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.</p>	<ul style="list-style-type: none"> • There are thriving populations of the characteristic invertebrates associated with bog, fen/willow carr, marshy grassland, open water and bare mud/peat, such as beetles, bugs, flies, spiders and molluscs, including many rare and scarce species. • Generally, for a key species, the population is stable, or increasing and is sustainable in the long term.
<p>The distribution</p>	<ul style="list-style-type: none"> • Generally, for a key species, the range is not

of the population should be being maintained or where appropriate increasing.	contracting.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	<ul style="list-style-type: none"> • Sufficient plants, such as sedges, reeds and cottongrass, are available to support insects that are dependent on specific food plants. • Vegetation structure throughout the site is varied and complex providing shelter for the full range of typical invertebrates. • Sufficient areas of bare or sparsely vegetated sediments should be exposed at the south western end of the common.
Factors affecting the population or its habitat should be under appropriate control.	<ul style="list-style-type: none"> • Water levels vary and other physical features provide suitable habitat for particular species of interest. • All other factors affecting the key species are under control.

4.10 Conservation Objective for Feature 10: Scarce blue-tailed damselfly *Ischnura pumilio*

The size of the population should be stable or increasing, allowing for natural variability, and sustainable in the long term.	<ul style="list-style-type: none"> • There is a thriving population of scarce blue-tailed damselfly associated with shallow pools or streams with muddy margins. • Generally, the damselfly population is stable or increasing and is sustainable in the long term.
The distribution of the population should be being maintained or where appropriate increasing.	<ul style="list-style-type: none"> • Temporary pools and water seepages running out from the swamp zone at the south-west end of the common are the favoured areas for this species, which can be seen on the wing during the summer months. • Their range is not contracting.
There should be sufficient habitat, of sufficient quality, to support the population in the long term.	<ul style="list-style-type: none"> • Vegetation structure close to the areas of aquatic habitat favoured by this species consists of tall emergent plants where adult damselflies can perch. • These areas are not heavily shaded but nearby trees and scrub provide some shelter from the wind.
Factors affecting	<ul style="list-style-type: none"> • There is standing water present in the areas

the population or its habitat should be under appropriate control.

favoured by damselflies for much of the year and patches of bare mud in the summer.

- The water in these areas is not highly acidic and there no significant nutrient pollution.
- All other factors affecting the species are under control.

5. ASSESSMENT OF STATUS AND MANAGEMENT REQUIREMENTS

This section provides:

- A summary of the assessment of the status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.
- Under Article 17 of the Habitats Directive Member States are required to report on the impact of nitrogen deposition has on the designated features, its overall conservation status and current and future threat.

5.1 Status and Management Requirements of Feature 1: Lowland raised mire - Active raised bogs (EU Habitat Code: 7110)

Status of Feature 1

The condition of this feature within the site is considered to be **un-favourable, un-classified** (August 2015).

The extent of the raised mire habitat within management unit 506 appears to meet the targets area set out in the current Performance Indicators and the mire structure is also within limits. However, the habitat quality, from the plot samples recorded in 2015, was below that required. The failure to meet targets for habitat quality in the plot was primarily due to the frequency of woody saplings and shrubs in the samples.

It is not possible to establish a trend for raised mire habitat quality based on 2015 data because different performance indicators and sampling methodology were used up to 2012. However, tree cover on the raised mire does appear to have increased between 2006 and 2009, which may indicate a decline.

Water levels are measured on a regular basis and are generally within set limits. Concentrations of atmospheric pollutants were monitored directly by the Environment Agency between November 2003 and November 2004 and deposition was estimated for this period and predicted for 2010 using standard modelling techniques. As result, critical levels are not likely to have been exceeded in 2010 but it is likely that critical loads for both total Nitrogen and Sulphur were exceeded.

Due to the exceedance of the minimum value of the nutrient nitrogen critical load range the *current threat* is **high**. The cause of this exceedance is due to nitrogen deposition from offsite sources. Although remedial measures to restore the surface wetness have been implemented, measures to improve air quality have not yet been fully implemented, making the *future threat* to be **high** and the feature not able to recover if measures are not in place to reduce atmospheric pollution to target levels.

Therefore, overall conservation status for the feature within the site is deemed to be **un-favourable**.

Management Requirements of Feature 1

Grazing

Maintain a suitable grazing regime on the common (unit 506) using cattle and ponies during the summer months, so that, ideally, there is sufficient grazing pressure on the raised bog area to prevent tree and shrub re-generation. In practice this may be difficult to achieve as stock access is difficult except in very dry periods. Grazing pressure should not be high enough to suppress the growth of heather or cause significant poaching.

Water level management

Maintain a high water table beneath the raised bog by carefully managing water levels (see 5.2 below).

Tree/Scrub control

Continue to manage birch and willow on the raised bog by cutting and removal and/or chemical treatment with approved herbicide, as necessary. A few scattered Scot's Pine may also need to be removed to ensure they do not seed onto the raised bog. Clearance should leave an uneven boundary with the adjacent woodland to provide sheltered areas for wetland invertebrates.

Atmospheric pollution reduction

Pollution from distant and local sources may be having a detrimental effect on the sensitive bog vegetation. Background levels, arising from emissions by traffic, agriculture and major and local point sources, should be reduced below target thresholds.

5.2 Status and Management Requirements of Feature 2: Transition mires and quaking bogs (EU Habitat Code: 7410)

Status of Feature 2

The condition of this feature within the site is considered to be **un-favourable, un-classified** (July 2015).

The extent of transition mire and other fen vegetation appears to be increasing in units 506 & 507. However, the habitat quality in all sampling plots recorded in 2015 was below that required. The failure to meet targets for habitat quality in all three plots was primarily due to the frequency of woody saplings and shrubs in the samples, otherwise all three plots would have passed with respect to habitat quality.

The transition mire feature was reported to be in un-favourable condition as a result of monitoring in 2012. As in 2015, the primary reason was too much scrub cover but this was measured in a different way in 2012 and the number of samples was less. Consequently, no trend can be assigned based on 2015 monitoring results, although

it may be assumed that scrub cover and abundance has probably increased in the intervening period in the absence of any control measures.

Water levels and quality are measured on a regular basis and are generally within set limits and critical levels of atmospheric pollutants are not likely to have been exceeded in 2010 but it is likely that critical loads for both total Nitrogen and Sulphur were exceeded (see 5.1 above).

Due to the exceedance of the minimum value of the nutrient nitrogen critical load range the *current threat* is **high**. The cause of this exceedance is due to nitrogen deposition from offsite sources. Measures to improve air quality have not yet been fully implemented, making the *future threat* to be **high** and the feature not able to recover if measures are not in place to reduce atmospheric pollution to target levels.

Therefore, overall conservation status for the feature within the site is deemed to be **un-favourable**.

Management Requirements of Feature 2

Grazing

Maintain a suitable grazing regime on the common (unit 506) using cattle and ponies during the drier months, so that, ideally, there is sufficient grazing pressure on the transition mire and swamp areas to prevent tree and shrub re-generation and prevent a build-up of dead vegetation. In practice this may be difficult to achieve sufficient grazing during wet summers when stock access is more difficult.

Grazing pressure should not be high enough to suppress the growth of tall swamp plants in the wetter areas or cause widespread poaching. Temporary fencing or other barriers may be needed on the common to encourage stock to graze particular areas and prevent them falling into deep water.

Water level management

Maintain a high water table with significant amounts of surface water throughout the year by maintaining inflows (see 5.5 below) and carefully managing water levels in the main boundary ditches around the common. Periodically clean out the northern boundary ditch downstream of the common at Portway Farm in order to maintain the flow of water away from the site. Control the level of outflows using dams and sluices if necessary. Ditch cleaning should not over-deepen the channel and dredgings should not be dumped in areas with sensitive vegetation.

Tree/scrub control

Continue to manage willow and birch in the transition mire areas, as necessary, by cutting and removal or chemical treatment through injection. Sufficient scrub should be retained to provide shelter and breeding habitat for wetland invertebrates and birds.

Pollution control

Prevent water pollution from nutrient run-off (see 5.5 below). Background levels of atmospheric pollution should be reduced below target thresholds (see 5.1 above).

5.3 Status and Management Requirements of Feature 3: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) (EU Habitat Code: 91E0)

Status of Feature 3

The condition of this feature within the site is considered to be **favourable, maintained** (September 2014).

The extent of the alluvial woodland habitat within management units 506, 507, 508 and 510 appears to meet the targets set out in the Performance Indicators. The habitat structure and quality targets for unit 506 were also met.

Up to 2013, water quality was measured on a regular basis and was generally within set limits. Consequently overall conservation status for the feature within the site is deemed to be **favourable**.

Management Requirements of Feature 3

Grazing

Anything other than occasional light grazing could damage the wet woodland areas. However, the main woodland areas are located on the parts of the common (unit 506) that are fairly inaccessible to stock and it is neither practical nor desirable to erect fencing to achieve total exclusion.

Water level management

Maintain a high water table with significant amounts of surface water in the wooded lagg zone throughout the year by maintaining inflow (see 5.5 below) and carefully managing water levels (see 5.2 above).

Woodland management

It is unlikely that any management of the wet woodland will be necessary. Due to the instability of the ground, the trees reach a limited height before collapsing and regenerating naturally. This natural process is expected to continue. Dead wood is also accumulating naturally. Holders of common rights may wish to remove brushwood but are unlikely to do so in the wettest areas where access is so difficult. Some small-scale cutting for firewood around the margins would probably be acceptable, so long as re-growth is protected from grazing stock.

Pollution control

Prevent water pollution from nutrient run-off (see 5.5 below).

5.4 Status and Management Requirements of Feature 4: Bog woodland (EU Habitat Code: 91D0)

Status of Feature 4

The condition of this feature within the site is considered to be **favourable, maintained** (September 2014).

The extent of the bog woodland habitat within management units 506 appears to meet the targets set out in the Performance Indicators. The habitat structure and quality targets for unit 506 were also met.

Up to 2013, water quality was measured on a regular basis and was generally within set limits. Water level measurements also fell within set limits. However, there are still issues with atmospheric pollution:

Due to the exceedance of the minimum value of the nutrient nitrogen critical load range the *current threat* is **high**. The cause of this exceedance is due to nitrogen deposition from offsite sources. Measures to improve air quality have not yet been fully implemented, making the *future threat* to be **high** and the feature not able to recover if measures are not in place to reduce atmospheric pollution to target levels.

Therefore, overall conservation status for the feature within the site is deemed to be **un-favourable**.

Management Requirements of Feature 4

Grazing

Keep grazing pressure in bog woodland to a minimum (see 5.3 above).

Water level management

Maintain a high water table with significant amounts of surface water in the wooded lagg zone throughout the year by maintaining inflow (see 5.5 below) and carefully managing water levels (see 5.2 above).

Woodland management

It is unlikely that any management of the wet woodland will be necessary (see 5.3 above).

Pollution control

Prevent water pollution from nutrient run-off (see 5.5 below). Background levels of atmospheric pollution should be reduced below target thresholds (see 5.1 above).

5.5 Status and Management Requirements of Feature 5: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (EU Habitat Code: 6410)

Status of Feature 5

The condition of this feature within the site is considered to be **favourable** (July 2014).

The extent of the fen meadow habitat within management units 507 and 510 appears to meet the targets area set out in the current Performance Indicators and the habitat is still present in unit 506. The habitat quality targets for all plots recorded in 2014 in management units 507 & 510 were also met.

In 2012, feature condition for unit 510 (and hence the whole fen meadow feature) was recorded as un-favourable. However, a lower (more realistic) threshold for the number of indicator plants in this unit was set for the 2014 monitoring. If this threshold had been applied in 2012, then the result would have been favourable.

All areas containing fen-meadow vegetation are currently (2016) subject to agreements that ensure appropriate agricultural management. Up to 2013, water quality was measured on a regular basis and was generally within set limits. Water level measurements also fell within set limits. However, there are still issues with atmospheric pollution:

Due to the exceedance of the minimum value of the nutrient nitrogen critical load range the *current threat* is **high**. The cause of this exceedance is due to nitrogen deposition from offsite sources. Measures to improve air quality have not yet been fully implemented, making the *future threat* to be **high** and the feature not able to recover if measures are not in place to reduce atmospheric pollution to target levels.

Therefore, overall conservation status for the feature within the site is deemed to be **un-favourable**.

Management Requirements of Feature 5

Grazing

The previous history of light to moderate cattle grazing has been an important factor in determining the present character of the meadow vegetation. Therefore, a suitable grazing regime should be maintained in units 506, 507 & 510 using cattle and/or ponies and some sheep.

Grazing fen meadow areas in spring and late summer/autumn prevents overwhelming domination by rushes and purple moor-grass, maintains the diversity of plant species and prevents the spread of scrub. Grazing pressure should be sufficient to maintain a varied habitat structure in the fen meadow areas (with some areas less than 10 cm high for at least part of each year) but not be too heavy, as this could lead to the loss of sensitive plants, and could cause poaching damage in places, leading to invasion by weeds.

Water level management

Maintain a fairly high water table throughout most of the year whilst avoiding regular flooding, by protecting natural springs and inflow ditches and carefully maintaining ditches within the meadow areas of units 506, 507 & 510, as necessary. Ditch cleaning may have to be done by hand. It should not over-deepen the channel and dredgings should not be dumped in areas with sensitive vegetation.

Mowing

In the absence of sufficient grazing by the correct type of stock, mowing in late summer might be a useful method of preventing overwhelming domination of the fen meadow areas by coarse vegetation such as rushes and purple moor-grass. Ideally cuttings should be removed. Patches of tall vegetation should be retained to for the benefit of wetland invertebrates.

Pollution control

Nutrient run-off from agriculturally improved land and via drains from farmyards and roads could be damaging. Ideally fertiliser should not be spread in fields immediately adjacent to site boundary or next to watercourses in the site catchment area. Road and farmyard drains should not discharge into watercourses that feed directly into the site. It may be desirable to divert contaminated drainage water around the site or create ponds where nutrients can be intercepted.

Atmospheric pollution to be maintained below target thresholds.

5.6 Status and Management Requirements of Feature 6: Fen (including swamp and transition mire vegetation)

Status of Feature 6

The condition of this feature within the site is considered to be **unfavourable, recovering** (August 2012).

Although the overall extent of transition fen vegetation appears to be increasing in units 506 & 507. Results from transition mire plot sampling in 2012 indicated that too much scrub was still present in unit 506.

There are ongoing programmes of scrub control within the transition mire zone and rush control within the swamp zone on the common, so recovery has been assumed.

Water levels and quality are measured on a regular basis and are generally within set limits. Therefore, overall conservation status for the feature within the site is deemed to be **favourable**.

Management Requirements of Feature 6

Grazing

Maintain a suitable grazing regime on the common (unit 506) and Portway meadows (unit 507) using cattle and ponies during the drier months, so that, ideally, there is sufficient grazing pressure to prevent tree and shrub re-generation and a build-up of dead vegetation.

Grazing pressure should not be high enough to suppress the growth of tall swamp plants in the wetter areas or cause widespread poaching. Temporary fencing or other barriers may be needed on the common to encourage stock to graze particular areas and prevent them falling into deep water.

Rush cutting

Past incursions of nutrient-rich water into the swamp zone at the south-west end of the common (unit 506) have led to the establishment of dense stands of soft rush. An ongoing programme of cutting and removal here should eventually reduce the soil nutrient status and hence the vigour of the rush growth, allowing other wetland plants to re-establish themselves.

Water level management

See 5.2 above.

Tree/scrub control

Continue to manage willow and birch in the swamp areas, as necessary, by cutting and removal or chemical treatment through injection. Sufficient scrub should be retained to provide shelter and breeding habitat for wetland invertebrates and birds.

Pollution control

Prevent water pollution from nutrient run-off (see 5.5 below).

5.7 Status and Management Requirements of Feature 7: Marshy Grassland (and associated habitats)

Status of Feature 7

The condition of this feature within the site is considered to be **favourable, unclassified** (2009).

The extent and distribution of marshy grassland habitat appears to have been maintained, although some scrub encroachment appears occurring in units 508 & 509. Although no systematic sampling has taken place, compliance monitoring visits indicate that the full range of habitat types are present, including small sedge/brown moss flushes and transitions to drier un-improved neutral grassland as mapped, and that the habitat quality is generally acceptable.

Although three of the units containing marshy grassland vegetation are currently (2013) subject to agreements that ensure appropriate agricultural management and other factors affecting the feature are under control, the future management of grazing on the common (unit 506) and Dol-y-cannau (unit 508) is uncertain. Consequently, overall conservation status for the marshy grassland within the site is deemed to be **un-favourable**.

Management Requirements of Feature 7

Grazing

Maintain a suitable grazing regime in units 507, 509 & 510 and re-establish grazing through agreements in units 506 & 508 (see also 5.5 above). Grazing levels set should not compromise key SAC habitats present in any of these units.

Water level management

Maintain a fairly high water table throughout most of the year whilst avoiding regular flooding, by protecting natural springs and inflow ditches and carefully maintaining ditches within units 506 – 510, as necessary (see also 5.5 above).

Mowing

In the absence of sufficient grazing by the correct type of stock, mowing in late summer might be a useful method of preventing overwhelming domination of some marshy grassland areas by coarse vegetation such as rushes and purple moor-grass (see 5.5 above). However, extensive areas of tall vegetation should be retained for the benefit of wetland invertebrates.

Scrub control

It may be necessary to cut and remove scrub that is encroaching into the open areas of units 3 & 4.

Pollution control

See 5.5 above.

5.8 Status and Management Requirements of Feature 8: Bladderwort

Status of Feature 8

The condition of this feature within the site is **Unknown** (2013).

No recent monitoring data for this species is available although surveillance in 2006 found 200 scattered locations within the key area of unit 506, indicating favourable condition.

Conservation status is assumed to be favourable because current management practices in swamp zone on the common (unit 506) are considered likely to maintain the population in the long term.

Management Requirements of Feature 8

Grazing

See 5.2 above.

Rush cutting

See 5.2 above.

Water level management

See 5.2 above.

Tree/scrub control

See 5.2 above.

Pollution control

See 5.2 above.

5.9 Status and Management Requirements of Feature 9: Peatland invertebrate assemblage 2

Status of Feature 9

The condition of this feature within the site is considered to be **un-favourable, unclassified** (2007).

Baseline monitoring against the provisional conservation objective for wetland invertebrates indicated that populations of key species that feed on wetland plants and live on bare mud/peat were in unfavourable condition, although species

associated with bog/fen ground layer and open water habitat appeared to be thriving. However, the amount of bare or sparsely vegetated sediment along a transect at the south-western end of the common (unit 506) was sufficient to support the key species for this habitat. There are no comparable data available to estimate any trends in the population status of key species.

Conservation status for the wetland invertebrate assemblage is assumed to be unfavourable (2013) until such time as a grazing regime on the common has been agreed that will maintain sufficient poached areas.

Management Requirements of Feature 9

Grazing

See 5.2 above.

Rush cutting

See 5.2 above.

Water level management

See 5.2 above.

Tree/scrub control

See 5.1 & 5.2 above.

Pollution control

See 5.2 above.

5.10 Status and Management Requirements of Feature 10: Scarce blue-tailed damselfly *Ischnura pumilio*

Status of Feature 10

The condition of this feature within the site is **Unknown** (2013).

No recent monitoring data for this species is available although surveillance in 2003 along a transect in swamp zone on the common (unit 506) indicated that the population was in unfavourable, recovering condition.

Conservation status is assumed to be favourable because current management practices in swamp zone on the common are considered likely to restore/maintain the population in the long term.

Management Requirements of Feature 10

Grazing

See 5.2 above.

Rush cutting

See 5.2 above.

Water level management

Maintain the open water in shallow pools created in the swamp zone by periodic hand clearance of silt and vegetation and maintain water levels and (see 5.2 above). Water levels in unit 506 should not be maintained at a height that would adversely affect the fen meadow areas.

Tree/scrub control

See 5.2 above.

Pollution control

See 5.2 above.

6. ACTION PLAN: SUMMARY

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

Unit Number	Database Number	Unit Name	Summary of Conservation Management Issues	Action needed ?
1	000506	Rhos Goch Common NNR	<p>Cattle are no longer be available to graze the common. An agreement with the Commoners Association is in place to establish a suitable grazing regime using ponies.</p> <p>There are still issues relating to atmospheric pollution from diffuse and point sources that need to be addressed by Natural Resources Wales, Welsh Government and Environment Agency (England).</p> <p>The main boundary ditches at the south-western end of the common and pools created in the marshy grassland need periodic cleaning to maintain water levels.</p> <p>Invasive scrub in the fen/swamp zone and open raised mire areas should be controlled by stem injection as part of Natural Resources Wales's annual management programme.</p> <p>Re-introduce grazing to the mire dome in order to control invasive trees and shrubs?</p>	Yes
2	000507	Portway Meadows	A suitable grazing regime is being maintained via a Natural Resources for Wales management agreement (2012 -2017).	No
3	000508	Dol-y-cannau	This holding has been split. Part is buffer land where consent for grazing management without inputs is required. The remainder is un-managed and the needs new fencing against the common.	Yes
4	000509	Upper Llanshiver	A suitable grazing regime to be maintained via a Natural Resources for Wales management agreement (2015 - 2020).	Yes
5	000510	Cefn-y-blaen	Suitable management will continue under a Glastir Entry contract until 31 December 2016.	No

6.2 Ongoing management

Rhos Goch Common NNR (Unit 506)

Grazing management by ponies. Annual cutting of rushes from the south-west end of the common (to expand to pony grazing area). Dredging of the south-eastern boundary ditch, adjacent to the golf course and Llanshiver Farm. Control of trees and scrub encroaching onto open areas of transition mire/fen by stem injection (see above).

Portway Meadows (Unit 507)

Grazing management by cattle (see above).

Dol-y-cannau (Unit 508)

Suitable grazing management without inputs on part (see above).

Upper Llanshiver (Unit 509)

Grazing management under agreement (see above).

Cefn-y-blaen (Unit 510)

Grazing management under a Glastir contract (see above).

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	The 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 Natura 2000 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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9. APPENDIX: PERFORMANCE INDICATORS

These performance indicators 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.

These performance indicators should NOT be used as a substitute for the conservation objectives, including in particular for the purposes of assessing plans and projects. The assessment of plans and projects should be made in view of the conservation objectives set out in section 4.

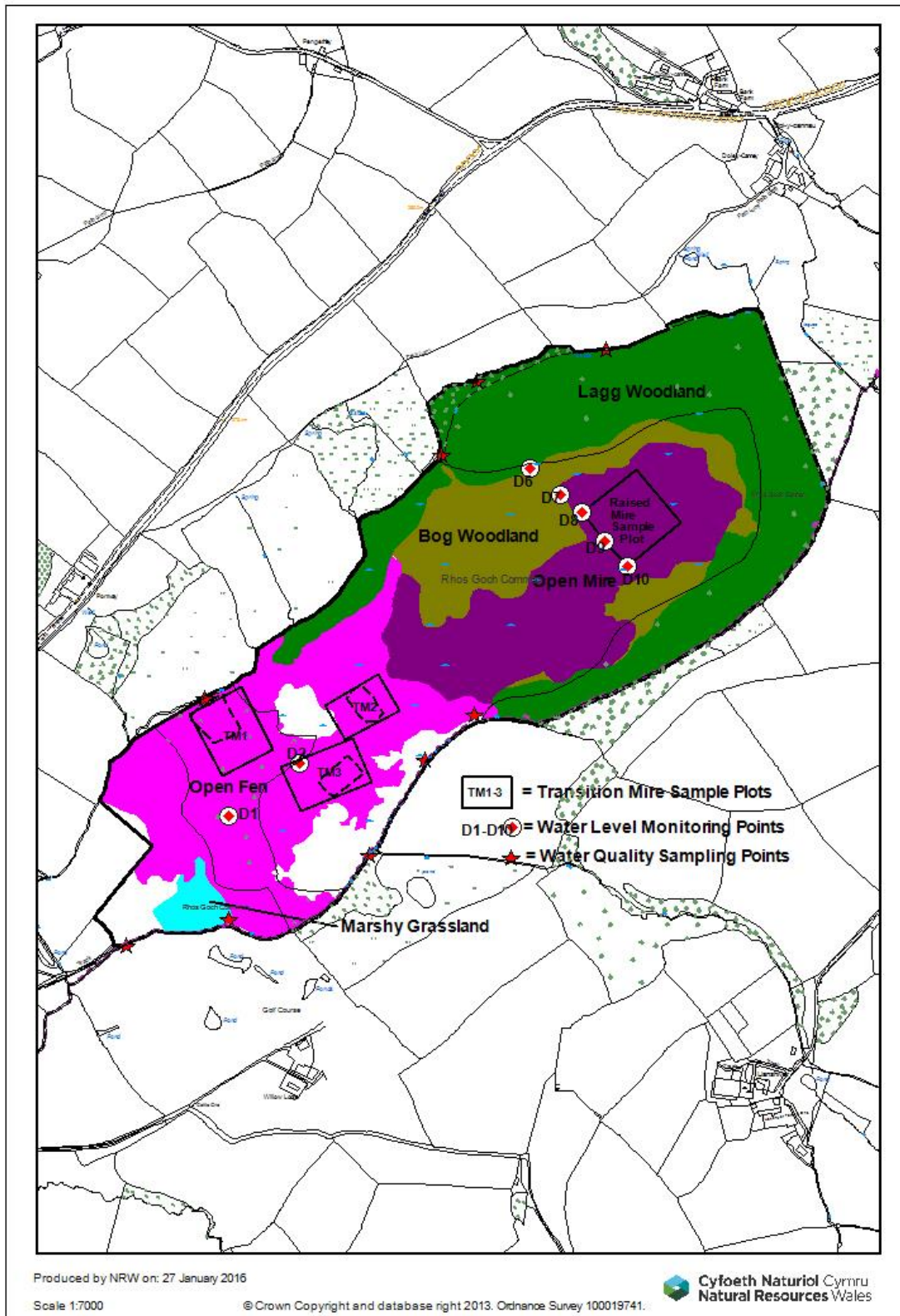
9.1 Appendix 1.1 - Performance indicators for Feature 1: Lowland raised mire - Active raised bogs (EU Habitat Code: 7110)

Performance indicators for feature condition		
Attribute	Specified limits	Comments
A1. Extent	At least 8.5 ha of open raised mire (as mapped) in unit 506, AND No patches of bracken greater than 25 m ² within the open mire areas, AND Less 10% tree cover overall within the open mire area.	The maximum extent of raised mire habitat is constrained by hydrological conditions. Limits are based on the extent mapped in 2007 and 2006 aerial photography. Bracken can be an indication of surface drying and any more than minimal cover can shade out the bog vegetation. Birch and willow expansion could result in increased water loss and a further drying of the bog surface and so bog woodland should not be allowed to develop except in the areas of the mire edge identified on map 2 below).
Sampling approach:	To be measured using comparative aerial photography and walk over survey.	
A2. Habitat Structure	At least 30 % of plot samples comprise bog pool/ bog moss lawn vegetation (areas in pools and on hummock sides that are not dominated by <i>Calluna vulgaris</i> , <i>Eriophorum vaginatum</i> or <i>Molinia caerulea</i>).	Bog pools are an important feature of the raised mire. They contain a lot of bog moss, which is an important component of 'active' raised mire.

Sampling approach:	To be measured using plot sampling (see A3 below).	
A3. Habitat Quality	At least 60% of the plot samples are lowland raised mire in good condition (see definition below) AND No seed-bearing Scots pine, other mature conifers or rhododendron in open mire area	Habitat quality includes both positive and negative indicators, in accordance with JNCC CSM guidance. Positive indicator plants include species capable of contributing to future peat accumulation. Negative indicators chosen reflect threats from drying, shading and poaching.
Sampling approach:	To be sampled at regular points on a grid within one sample plot (see map 1 in section 2 above) in unit 506 (assessed in 1 m radius samples), plus walk over survey for seed bearing non-native trees.	
A4. Indicators of local distinctiveness	Presence of <i>Osmunda regalis</i> in at least 3 plot samples	Royal fern is a distinctive component of the raised mire habitat at Rhos Goch.
Sampling approach:	To be sampled at regular points on a grid within one sample plot (see above).	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Levels	<i>Upper limit:</i> n/a <i>Lower limit :</i> level higher than 257.5m above sea level for at least 40% of the year for three in every five consecutive years	Levels set initially may need periodic review, especially once the bog grows significantly, or if long-term surveillance indicates the need for a more appropriate level.
Sampling approach:	To be measured at dipwell 9 – see map 2, on an annual basis.	
F2. Air Quality/Atmospheric Deposition	<i>Upper limits:</i> Critical Levels for NO _x (as NO ₂) = 30µg/m ³ NH ₃ = 1µg/m ³ SO ₂ = 20µg/m ³ O ₃ = 3000 ppb.hr Critical Loads for Nitrogen Total N = 5 – 10 kgN/ha/yr Critical Loads for Acid maxCL _{min} N = 0.321 keq/ha/yr maxCL _{max} N = 0.688 keq/ha/yr maxCL _{max} S = 0.367 keq/ha/yr <i>Lower limits:</i> N/A	These are derived using empirical evidence of damage, if available. These have been set under CLRTAP, WHO, AQ Directives. Critical levels are concentrations of oxides of nitrogen, ammonia, sulphur dioxide and ozone which, if exceeded, could directly damage the vegetation. Critical loads are based on average annual deposition of Nitrogen and Sulphur that may cause vegetation damage through eutrophication and acidification.
Sampling approach:	To be measured periodically using diffusion tubes at a single location close to the bog and predicted using APIS modelling	

Quality attribute definitions		
Lowland raised mire - Active raised bogs (EU Habitat Code: 7110)		Vegetation conforming to NVC types: M2, M4, M15 & Nodum 19 <i>Vaccinium oxycoccus-Sphagnum recurvum</i> community, assessed within a radius of 1m from a sample point.
Lowland raised mire in good condition To be assessed within 1m radius of a sample point	Positive indicator species	Vegetation with at least three of: <i>Calluna vulgaris</i> , <i>Vaccinium myrtillus</i> , <i>Erica tetralix</i> , <i>Eriophorum</i> spp., <i>Sphagnum capillifolium/papillosum</i> and <i>Cladonia</i> lichens, AND Total cover of these typical plants exceeds 25%, OR Bog pool/moss lawn vegetation with at least 20% cover of <i>Sphagnum</i> spp.
	Indicators of negative change - undesirable non-woody species	Less than 50% cover of <i>Molinia caerulea</i> AND <i>Polytrichum</i> spp. at no more than 20% cover AND Less than 20% cover of <i>Phragmites australis</i> and/or <i>Juncus</i> spp.
	Indicators of negative change, woody species	Trees and shrubs >0.4m tall are absent
	Cover of exposed, bare peat	<5% cover

Map 2: Management unit 506, showing key habitats, vegetation sampling plots and water level and water quality sampling points



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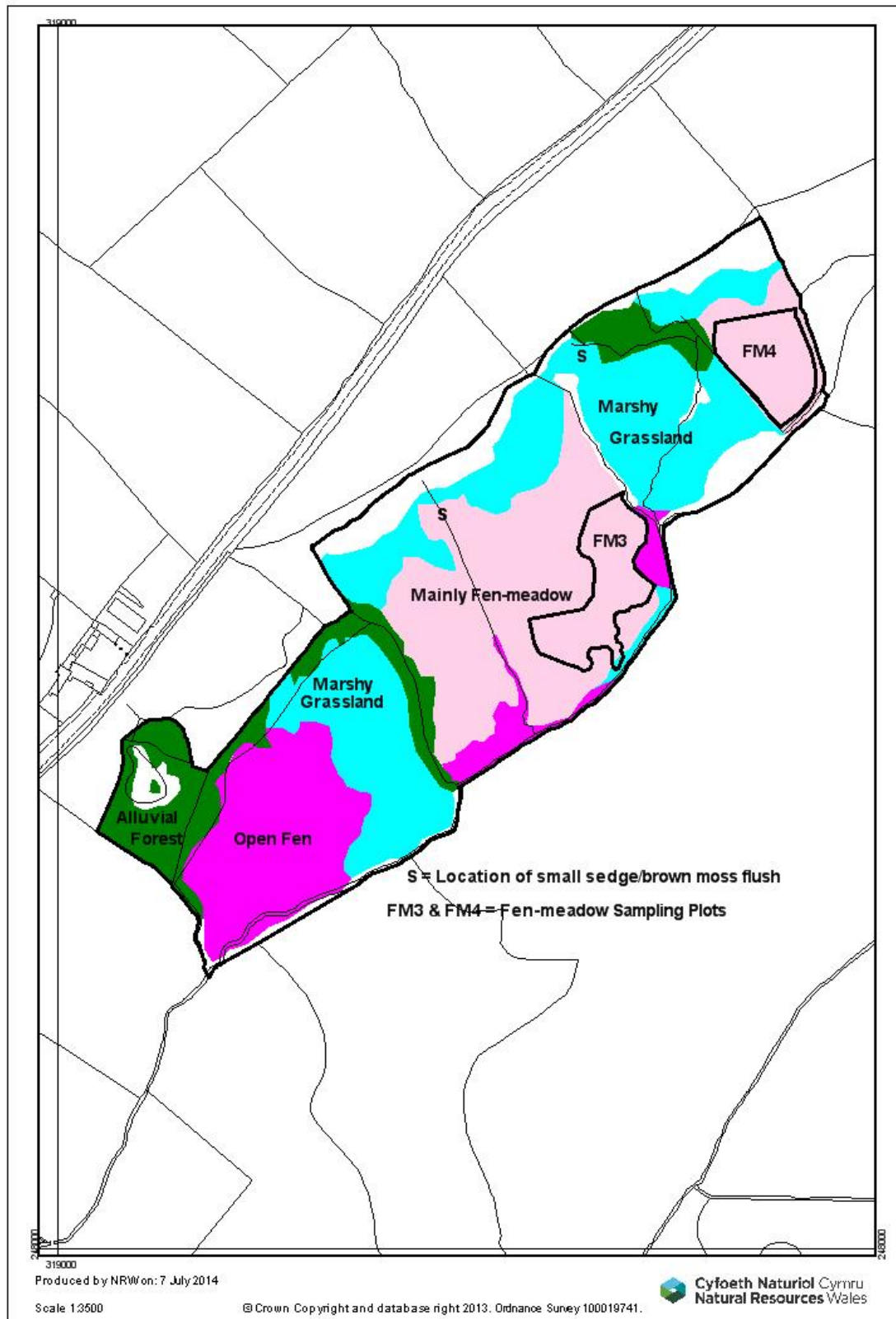
9.2 Appendix 1.2 - Performance indicators for Feature 2: Transition mires and quaking bogs (EU Habitat Code: 7410)

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Extent	Present as a broad band of vegetation within the open fen area in unit 506, extending to at least 7ha, and as small patches within the open fen areas in unit 507.	The total extent of this vegetation will be constrained by its strict environmental requirements. Lower limits are based on the extent mapped in 1997 & 2007. Other key SAC habitats in units 506 and 507 should not encroach significantly on the transition mire areas (see maps 2 & 3).
Sampling approach:	To be measured using comparative aerial photography, plot sampling (see below) and walk over survey.	
Sampling approach:	To be measured using plot sampling (see below) and walk over survey	
A2. Habitat Quality	At least 50% of samples in plot TM1 and 70% in plots TM2 & TM3 are in good condition (definition below).	Provided that the vegetation fits at least one set of attributes given for the transition mire, it is considered likely that the important communities of the transition will still exist on the site. The amount of each community is not important.
Sampling approach:	To be sampled at regular points on grid within three fen plots (see map 2) in unit 506 containing mainly transition mire vegetation (assessed in 2 m radius of a sample point).	
Performance indicators for factors affecting the feature		
<i>Factor</i>	<i>Operational Limits</i>	<i>Comments</i>
F1. Water Levels	<i>Upper limit:</i> At summer minimum, levels should not exceed 256.3m above sea level for at least 2 out of 5 consecutive years. <i>Lower limit:</i> At winter maximum, levels should be at least 256.5m above sea level each year.	Levels set initially may need periodic review if long-term surveillance indicates the need for a more appropriate level.
Sampling approach:	To be measured at dipwells 1 & 2 – see map 2, on an annual basis.	
F2. Water Quality	<i>Upper limit:</i> Conductivity of 450 micro-Siemens. <i>Lower limit :</i> n/a	Long term measurements indicate that the “natural” conductivity does not exceed this level.
Sampling approach:	To be measured at major inflows – see map 2.	
F3. Air Quality/Atmospheric	As appendix 1.1 above, except	See appendix 1.1 above

Deposition	Critical Loads for Nitrogen Total N = 10 – 15 kgN/ha/yr	
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Quality attribute definitions		
Transition mire		Vegetation characterised by poor-fen indicator plants such as <i>Carex rostrata</i> , <i>Sphagnum squarrosum</i> , <i>Aulacomnium palustre</i> , <i>Calliergon</i> spp., <i>Eriophorum angustifolium</i> , <i>Equisetum fluviatile</i> , <i>Menyanthes trifoliata</i> and <i>Potentilla palustris</i> , assessed within a radius of 2m from a sample point.
Transition mire in good condition To be assessed within 2m radius of a sample point	Positive indicator species	EITHER <i>Carex rostrata</i> at cover of at least 10% and/or <i>Sphagnum squarrosum</i> , <i>Aulacomnium palustre</i> and <i>Calliergon</i> spp. at cover of at least 50%; ericoids absent, OR <i>Sphagnum</i> spp., <i>Carex rostrata</i> and <i>Eriophorum angustifolium</i> at cover of at least 50% OR The cover of the following species, alone or in combination, is at least 30%: <i>Carex rostrata</i> ; <i>Eleocharis palustris</i> ; <i>Equisetum fluviatile</i> ; <i>Mentha aquatica</i> ; <i>Menyanthes trifoliata</i> ; <i>Potamogeton polygonifolius</i> ; <i>Potentilla palustris</i> .
	Indicators of negative change - undesirable non-woody species	No <i>Impatiens glandulifera</i> , <i>Reynoutria japonica</i> , <i>Crassula helmsii</i> or other invasive alien plants present, AND <i>Phragmites australis</i> at less than 25% cover, AND Less than 20% cover of <i>Molinia caerulea</i> , AND Less than 20 % cover of large sedges (<i>Carex acutiformis</i> , <i>C. paniculata</i> and <i>C. riparia</i>) or floating sweet-grass, AND <i>Galium aparine</i> and <i>Urtica dioica</i> are absent.
	Indicators of negative change, woody species	Trees and shrubs >0.4m tall are absent.
	Cover of exposed, bare peat	Less than 5% cover.
	Cover of dead vegetation litter	Less than 25% cover.

Map 3: Management unit 507, showing key habitats and vegetation sampling plots



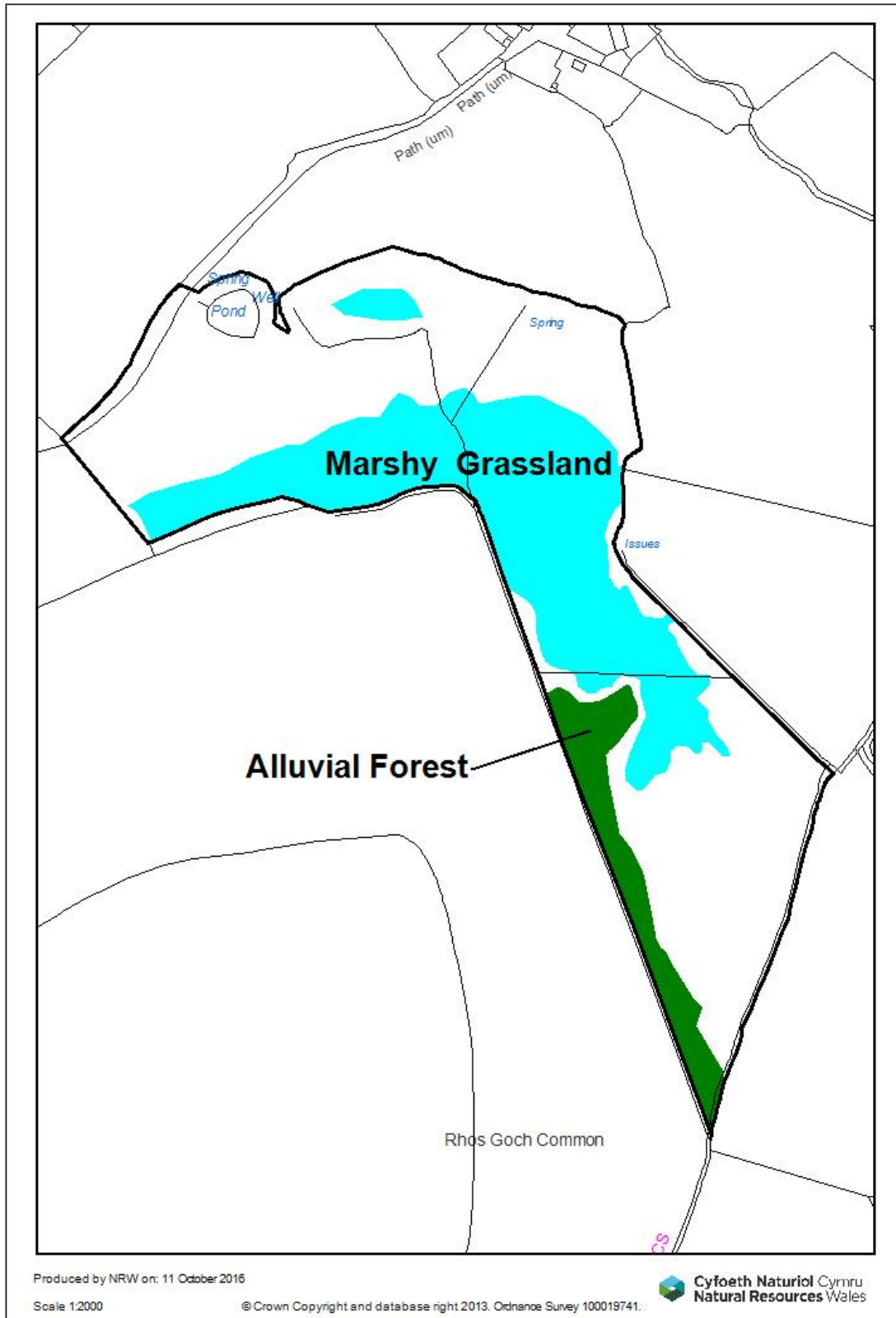
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9.3 Appendix 1.3 - Performance indicators for Feature 3: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) (EU Habitat Code: 91E0)

Performance indicators for feature condition		
Attribute	Specified limits	Comments
A1. Extent	<p>Areas of woodland, including alluvial forest are approximately as shown on maps 1- 4, extending to approximately 11 ha in total, AND</p> <p>At least 40% of samples in the lagg and bog woodland zones of unit 506 (see map 1) are classed as alluvial forest (see definition below).</p>	<p>Some expansion of this type of woodland is acceptable provided that there is no significant encroachment into other key habitats. Increases in alluvial forest at the expense of bog woodland in unit 506 would be detectable through plot sampling where these habitats occur in a mosaic within the wooded lagg zone (see map 1). Lower limits based extent mapped in 2006.</p>
Sampling approach:	To be measured using comparative aerial photography and walkabout assessment (see below)	
A2.Habitat Structure	<p>100% canopy cover in not more than 90% of samples but some gaps are evident where trees have died, AND</p> <p>At least 70% canopy cover in 90% or more of samples, AND</p> <p>Some evidence of saplings and young trees/coppice re-growth, AND</p> <p>Standing and fallen dead wood with a minimum diameter locally exceeding 20cm and minimum length of 2m are independently present in at least 50% of samples.</p>	<p>It would be difficult to spot any small canopy gaps using aerial photography. This type of woodland does not generally have a pronounced understorey or many long-lived trees.</p> <p>Woody re-growth would be expected to occur randomly wherever there is sufficient daylight and would include suckers and layering by <i>Salix</i> spp.</p>
Sampling approach:	To be measured within wooded lagg zone of unit 506 (see map 2) using comparative aerial photography and walkabout assessment, with samples taken in a 20m radius of each stopping point.	
A3. Habitat Quality	In at least 90% of alluvial forest samples, <u>within a 6m radius of stopping points:</u>	Upper limits based on abundance of plants indicating high nutrient inputs, or surface

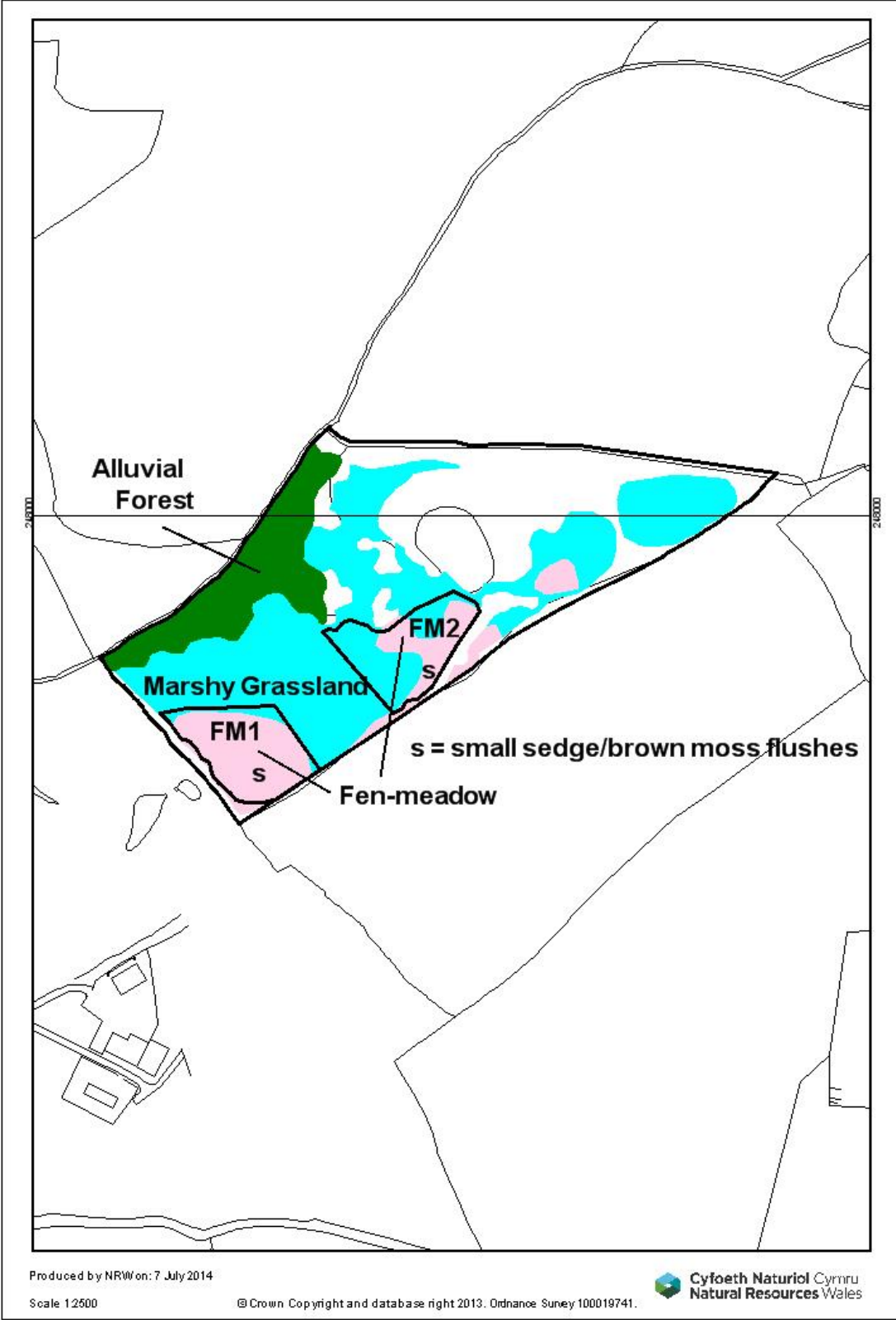
	<p>The ground cover of each of <i>Galium aparine</i> and <i>Pteridium aquilinum</i> does not exceed 10%, AND cover of each of <i>Ranunculus repens</i>, <i>Urtica dioica</i> and <i>Molinia caerulea</i> does not exceed 30%, AND <i>Rubus fruticosus</i> does not exceed 50%, AND <u>within a 20m radius of stopping points:</u> there are no seed bearing <i>Pinus sylvestris</i> and other non-native trees or shrubs and herbs are absent.</p>	<p>drying. Lower limits for plants that are “positive indicators” not set because they are assumed to be present if the woodland corresponds to the appropriate type (see definition below). Invasive non-native trees and shrubs, such as Scot’s pine and rhododendron, can suppress the native ground flora and contribute to surface drying.</p>
Sampling approach:	To be sampled within wooded lagg zone of unit 506 (see map 1).	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Quality	See appendix 1.2 above	
F2. Air Quality/Atmospheric Deposition	<p><i>Upper limits:</i> Critical Levels for NO_x (as NO₂) = 30µg/m³ NH₃ = 3µg/m³ SO₂ = 20µg/m³ O₃ = 3000 ppb.hr</p>	Feature not sensitive to nitrogen deposition nor acidic deposition.
Definition of alluvial forest	Woodland generally conforming to NVC types W2a, W5 or W7, with a canopy dominated by mixtures of <i>Alnus glutinosa</i> , <i>Betula</i> spp. and <i>Salix</i> spp. The ground flora may consist of a mixture of typical wetland plants but <i>Molinia caerulea</i> is not prominent and <i>Sphagnum</i> spp. and ericoids are rare or absent.	

Map 4: Management unit 508, showing key habitats



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Map 5: Management unit 510, showing key habitats



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9.4 Appendix 1.4 - Performance indicators for Feature 4: Bog woodland (EU Habitat Code: 91D0)

Performance indicators for feature condition		
Attribute	Specified limits	Comments
A1. Extent	<p>Areas of woodland in unit 506 are approximately as shown on map 1 in section 2, extending to least 10 ha in total, AND At least 50% of woodland samples in the lagg and bog woodland zones of unit 506 (see map 1) are classed as bog woodland (see definition below).</p>	<p>Some expansion of this type of woodland is acceptable provided that there is no significant encroachment into other key habitats, particularly the open raised mire.</p> <p>The minimum extent is based on extent mapped in 2006, which includes stands in the lagg zone that are in a mosaic with alluvial forest. Changes in proportion of the two woodland types within this area would be detectable through plot sampling.</p>
Sampling approach:	To be measured using comparative aerial photography and walkabout assessment (see below).	
A2. Habitat Structure	<p>Not more than 90% canopy cover in at least 90% of samples, AND 30% or more canopy cover or more in at least 70% of samples, AND Some evidence of saplings and young trees AND Presence standing and fallen dead wood with a minimum diameter locally exceeding 20cm and minimum length of 2m.in at least 50% of samples.</p>	<p>This type of woodland is generally very open. It often lacks a pronounced understorey and does not contain any long-lived trees.</p> <p>Woody re-growth would be expected to occur randomly wherever there is sufficient daylight.</p>
Sampling approach:	To be measured within mire edge and wooded lagg zones of unit 506 (see map 2) using comparative aerial photography and walkabout assessment, with samples taken in a 20m radius of each stopping point.	
A3. Habitat Quality	In at least 90% of bog	Upper limits based on

	<p>woodland samples, <u>within a 6m radius of each stopping point</u>:</p> <p><i>Urtica dioica</i>, <i>Galium aparine</i> and <i>Ranunculus repens</i> are absent, AND</p> <p>The ground cover of <i>Rubus fruticosus</i> does not exceed 10%, AND</p> <p>The ground cover of <i>Pteridium aquilinum</i> does not exceed 25%, AND</p> <p><u>within a 20m radius of each stopping point</u>:</p> <p>There are no seed bearing <i>Pinus sylvestris</i> and other non-native trees, shrubs and herbs are absent.</p>	<p>abundance of plants indicating high nutrient inputs, or surface drying. Lower limits for plants that are “positive indicators” not set because they are assumed to be present if the woodland corresponds to the appropriate type (see definition below). Invasive non-native trees and shrubs, such as Scot’s pine and rhododendron, can suppress the native ground flora and contribute to surface drying.</p>
Sampling approach:	To be sampled within the bog woodland/wooded lagg zone of unit 506 (see map 2).	
A4. Indicators of local distinctiveness	<i>Osmunda regalis</i> is present in at least 35% of samples from the bog woodland in unit 506.	This locally rare plant is a distinctive feature of the bog woodland fringe at Rhos Goch.
Sampling approach:	To be measured within mire edge and wooded lagg zones of unit 1 (see map 2) by plot sampling (see above) and walk over survey?	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Levels	See appendix 1.1 above.	
F2. Water Quality	See appendix 1.2 above.	
F3. Air Quality/Atmospheric Deposition	As appendix 1.1 above except NH ₃ : 3µg/m ³ .	

Definition of bog woodland	Woodland generally conforming to NVC types W2b, W4 or W5, with the canopy generally dominated by <i>Betula</i> spp. (mixed with <i>Salix</i> spp. and <i>Alnus glutinosa</i> in places). The ground flora is characterised by the prominence of acidic mire plants, such as <i>Sphagnum</i> spp., <i>Molinia caerulea</i> and ericoids, although <i>Phragmites australis</i> and <i>Carex paniculata</i> may still be locally abundant.
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9.5 Appendix 1.5 - Performance indicators for Feature 5: Fen-meadow - *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) (EU Habitat Code: 6410)

Performance indicators for feature condition		
Attribute	Specified limits	Comments
A1. Extent	At least 3 ha that is predominantly fen meadow in unit 507, with at least 70% of samples in plot FM3 & 80% of samples in plot FM4 (see below) conforming to NVC type M24, (see map 3), AND At least 50% of samples within plots FM1/2 in unit 510 conforming to NVC type M24 (see map 5), AND Small patches present within the marshy grassland in unit 506 (see map 1).	The fen meadow habitat often occurs in intimate mosaics with other marshy grassland and fen habitat and there are subtle gradations between these types. Areas that were formerly fen meadow may be capable of recovery given suitable management but the total extent of this vegetation will be constrained by its strict environmental requirements. Limits are based on the extent mapped in 1991, 1995 & 1997. Other key SAC habitats in units 507 and 510 should not encroach significantly on the fen meadow areas (see maps 3 & 5).
Sampling approach:	To be measured using comparative aerial photography, plot sampling (see below) and walk over survey.	
A2. Habitat Quality	At least 35% of samples from plots FM1/2 are fen meadow in good condition (definition below), AND At least 49% of samples from plot FM3 are fen meadow in good condition, AND At least 56% of samples from plot FM4 are fen meadow in good condition.	Limits set to define good quality fen meadow habitat. This vegetation may be intermixed with other types of marshy grassland within the sampling plots in units 507 & 510. Limits include sample points that were not recorded as fen meadow (see above).
Sampling approach:	To be sampled at regular points on grid within four sample plots (see maps 3 & 5) in units 507 & 510 containing mainly fen-meadow mire vegetation (assessed in 1x1m samples). All plots must pass.	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Quality	See appendix 1.2 above.	
F2. Water Levels	See appendix 1.2 above.	
F3. Air	As appendix 1.1 above	See also appendix 1.1

Quality/Atmospheric Deposition	except: $\text{NH}_3 = 3\mu\text{g}/\text{m}^3$ Critical Loads for Nitrogen Total N = 15 – 25 kgN/ha/yr Critical Loads for Acid $\text{maxCL}_{\text{minN}} = 0.366 \text{ keq}/\text{ha}/\text{yr}$ $\text{maxCL}_{\text{maxN}} = 1.830 \text{ keq}/\text{ha}/\text{yr}$ $\text{maxCL}_{\text{maxS}} = 0.860 \text{ keq}/\text{ha}/\text{yr}$ <i>Lower limits: N/A</i>	
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Quality attribute definitions

Fen-meadow		Vegetation conforming to NVC type M24, with mixtures of purple-moor grass and <i>Juncus acutiflorus</i> , accompanied by indicator plants, such as <i>Succisa pratensis</i> , <i>Cirsium dissectum</i> , <i>Carex pulicaris</i> and <i>C. hostiana</i> .
Fen-meadow in good condition	Positive indicator species	At least 3 (unit 510) or 5 (unit 507) of the typical plants listed below: Tormentil, devil's-bit scabious, meadow thistle, carnation/glaucous sedge, fen bedstraw, marsh valerian, flea sedge, quaking grass, cross-leaved heath, heath-spotted/marsh orchid (<i>Dactylorhiza</i> spp.) and tawny sedge.
	Indicators of negative change - undesirable non-woody species	No Indian balsam, Japanese knotweed, New Zealand pigmyweed or other invasive alien plants present, AND Less than 80% cover of purple moor-grass and/or large rushes, AND Less than 20 % combined cover of large sedges (<i>Carex acutiformis</i> , <i>C. paniculata</i> and <i>C. riparia</i>), common reed, tufted hair-grass and floating sweet-grass, AND Less than 20% combined cover of Yorkshire fog, rough meadow grass, creeping buttercup and white clover, AND Cleavers, nettles and large docks are absent.
	Indicators of negative change, woody species	Trees and shrubs >0.2 m tall are absent.
	Cover of exposed, bare peat/soil	Less than 10% cover.

	Cover of dead vegetation litter	Less than 25% cover.
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9.6 Appendix 1.6 - Performance indicators for Feature 6: Fen (including swamp and transition mire vegetation)

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Extent	<p><i>Upper limits:</i> Some expansion of open fen habitat is acceptable, provided that there is no significant reduction in the extent of other SAC habitat features in units 506 & 507, AND</p> <p>10% cover of <i>Salix</i> spp. and <i>Betula</i> spp. within the open fen areas of unit 506 and no clumps greater than 25m in their major dimension with gaps of at least 25m between clumps</p> <p><i>Lower limits:</i> Areas of open fen within units 506 & 507 are approximately as shown on maps 2 & 3, extending to approximately 13.8 ha in total,</p>	<p>Limits for extent of open fen are set so as to maintain/increase the extent of this habitat, particularly the transition mire, without impinging on the other important types of wetland habitat.</p> <p>The presence of willow and birch may lower the water table and reduce light levels, but scrub is important for breeding birds and wetland invertebrates.</p>
Sampling approach:	To be measured using comparative aerial photography and walk over survey.	
A2. Habitat components	<p><i>Upper limit:</i> n/a</p> <p><i>Lower limit:</i> No loss of component fen habitat types (see list below) from the site as a whole.</p>	The list includes the main fen types recorded at the site, with the exception of those that are thought to be indicative impacts arising from drainage and artificial eutrophication.
Sampling approach:	To be measured using walk over survey	
A3. Habitat Quality	Limits for transition mire in appendix 1.2 above must be met.	
Performance indicators for factors affecting the feature		
<i>Factor</i>	<i>Operational Limits</i>	<i>Comments</i>
F1. Water Levels	See appendix 1.2 above.	
F2. Air Quality/Atmospheric Deposition	As appendix 1.1 above, except NH ₃ = 3g/m ³	Vegetation conforming to NVC types S3, S7, S9b, S10a, S10b, S11, S12d & S19 not sensitive

	Critical Loads for Nitrogen N = 10 – 15 kgN/ha/yr	to nitrogen deposition or acid deposition.
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Habitat component definitions	
Transition mire	Vegetation conforming to NVC types: M4, M5, M6, S9b, S10b, S12d & S27, assessed within a radius of 2m from a sample point
Other fen (swamp) types	Vegetation conforming to NVC types: S3, S7, S10a, S11, S19 & M23

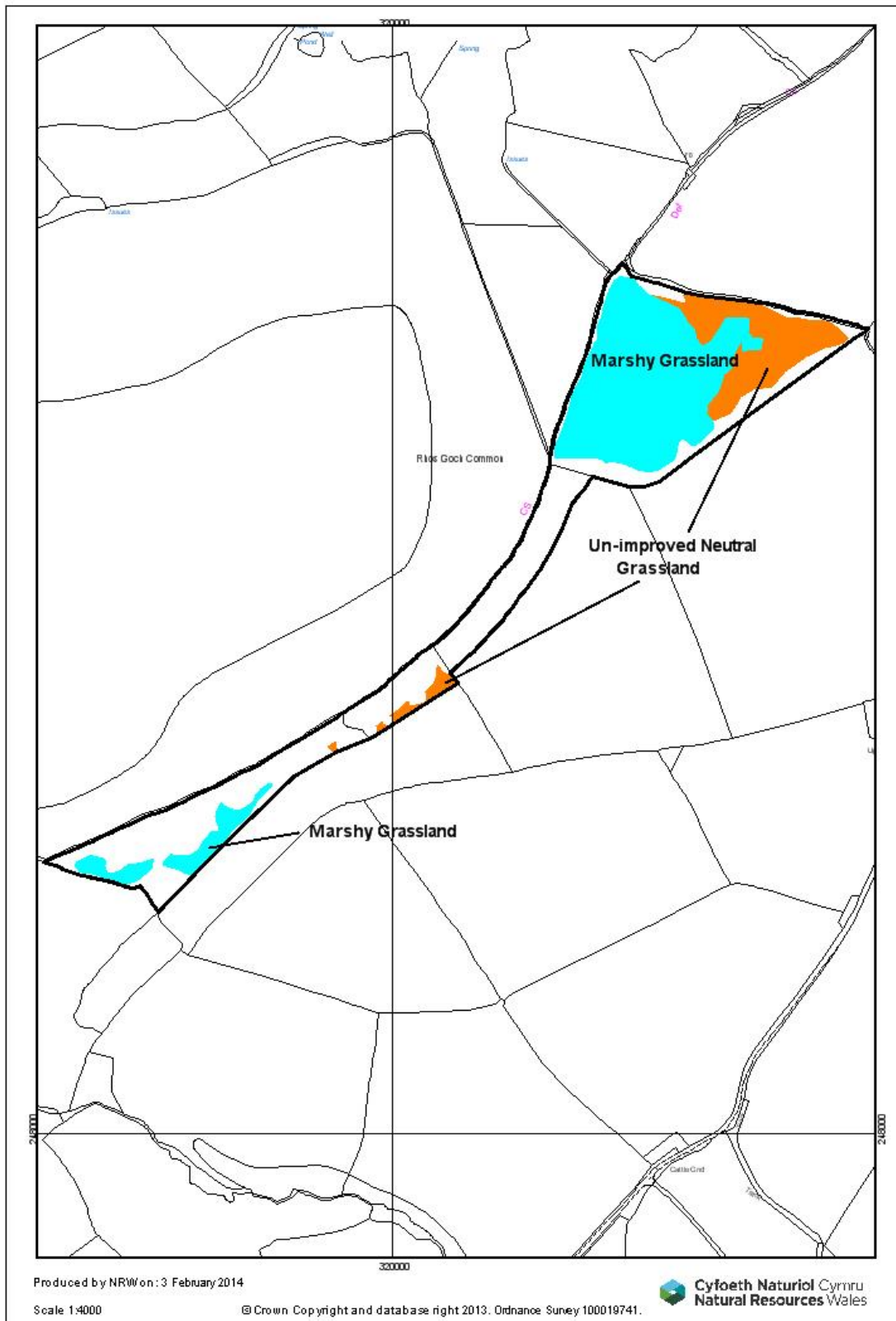
9.7 Appendix 1.7 - Performance indicators for Feature 7: Other Marshy Grassland (and associated habitats)

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Extent	<p><i>Upper limits:</i> No, expansion of this habitat at the expense of 'fen-meadow', AND <10% cover of <i>Salix</i> spp. and <i>Betula</i> spp. within the marshy grassland areas in units 506-510.</p> <p><i>Lower limits:</i> At least 0.6 ha of marshy grassland, including small patches of fen-meadow, in unit 506 (see map 2), AND At least 6 ha of marshy grassland (including fen-meadow) in unit 507, with small sedge/brown-moss flushes present (see map 3), AND At least 1.0 ha of marshy grassland in unit 508 (see map 4), AND At least 1.6 ha of marshy grassland and 0.6 ha of unimproved neutral grassland in unit 509 (see map 6), AND At least 1.7 ha of marshy grassland (including fen-</p>	<p>Areas that were formerly fen-meadow may be capable of recovery given suitable management but the total extent of this vegetation will be constrained by its strict environmental requirements. Lower limits are based on the extent mapped in 1991-1997.</p> <p>For feature definitions, see below.</p>

	meadow) in unit 510, with small sedge/brown-moss flushes present (see map 5).	
Sampling approach:	To be measured using comparative aerial photography and walk over survey.	
A2. Habitat Quality	<i>Upper limits: Impatiens glandulifera, Reynoutia japonica, Crassula helmsii</i> or other invasive alien plants present, AND <5% bare peat/mud in marshy grassland areas in units 506-510 (see maps).	Only attributes that can be assessed without plot sampling have been included here but habitat quality targets for fen-meadow (see appendix 1.5 above) must also be met for units 507 & 510).
Sampling approach:	To be measured using comparative aerial photography and walk over survey. All units must pass.	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Quality	See appendix 1.2 above.	
F2. Water Levels	See appendix 1.2 above.	
F2. Air Quality/Atmospheric Deposition	As appendix 1.1 except Critical loads for Nitrogen N = 15 – 25 kgN/ha/yr	

Definitions		
Marshy Grassland		Vegetation conforming to NVC types M23 (excluding swampy variants), M24 (fen-meadow), M25 and M25 with mixtures of <i>Molinia caerulea</i> , <i>Juncus</i> spp. and tall herbs, accompanied by a wide range of wetland indicator plants.
Small Sedge/Brown Moss Flushes		Short, fairly open vegetation generally conforming to NVC type M10.
Un-improved Grassland	Neutral	Vegetation conforming to NVC type MG5c, with a sward comprising bents and fescues and characteristic plants such as, <i>Centaurea nigra</i> , <i>Lotus corniculatus</i> , <i>Potentilla erecta</i> , <i>Stachys officinalis</i> and <i>Sucissa pratensis</i> .

Map 6: Management unit 509, showing key habitats



9.8 Appendix 1.8 - Performance indicators for Feature 8: Bladderwort

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Distribution	<i>Upper limit:</i> n/a <i>Lower limit:</i> As shown on map 7.	Should be present centred on this location.
Sampling approach:	Walk over survey.	
A2. Population Size	<i>Upper limit:</i> n/a <i>Lower limit:</i> 50 scattered locations found at least 5m apart within the area defined above.	Limits are difficult to determine. A different method of sampling might be needed if the clumps grow large and start to join together.
Sampling approach:	A one hour search by a single person at least once in every five-year period.	
A3. Habitat Quality	See limits for fen vegetation in unit 506 (appendix 1.2 above).	It important to maintain unshaded areas of standing water within the swamp zone in unit 1.
Performance indicators for factors affecting the feature		
<i>Factor</i>	<i>Operational Limits</i>	<i>Comments</i>
F1. Water Levels	See appendix 1.2 above.	
F2. Water Quality	See appendix 1.2 above.	

9.9 Appendix 1.9 - Performance indicators for Feature 9: Assemblage of wetland invertebrates

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Species Diversity	<i>Upper limit:</i> n/a <i>Lower limit:</i> At least 50% of the target wetland invertebrate taxa associated with each of four key habitats (see definitions below) are recorded in each sampling year (see below).	Target taxa and key habitats have been selected as readily identifiable indicators of the quality of the complete assemblage associated the full range of wetland habitats.
Sampling approach:	Two consecutive daily sample sessions during the period 15 May-15 June, comprising a 1 hour spot search, 15 minute sweep sample and 15 minute aquatic sample, plus two consecutive daily sample sessions during the period 15 July-15 August, comprising a 1 hour ground search and two 15 minute sweep samples. Six sampling areas covering the key habitats in unit 506 are shown on map 7.	
A2. Habitat Extent	<i>Upper limit:</i> See limits for the extent of trees and scrub in the open mire/fen areas of unit 506 (appendices 1.1 and 1.2	It is important to maintain the full range of wetland habitat types with varying amounts of tree cover in different areas.

	<p>above).</p> <p><i>Lower limits:</i> At least 25% of samples on a bare mud transect in unit 506 (see below) have suitable habitat,</p> <p>AND</p> <p>5% cover of willow and birch scrub with all points within 50m of a bush or clump within the fen areas of unit 506,</p> <p>AND</p> <p>The limits for different wetland habitats in appendices 1.1 - 1.6 are met.</p>	
Sampling approach:	Bare mud habitat quality to be assessed in 10cm radius samples every five paces along two transects through the swamp/marshy grassland transition (see map 7) at the end of the summer grazing period. Other attributes to be measured using comparative aerial photography and walk over survey.	
Habitat Quality:	<p><i>Upper limit:</i> n/a</p> <p><i>Lower limits:</i> Sedge tussocks present in the fen, scrub and lagg woodland in unit 506 (see map 7),</p> <p>AND</p> <p>The limits for different wetland habitats in appendices 1.1 - 1.6 are met.</p>	
Sampling approach:	To be measured using comparative aerial photography and walk over survey.	
Performance indicators for factors affecting the feature		
Factor	Operational Limits	Comments
F1. Water Levels	See appendix 1.2 above.	
F2. Water Quality	See appendix 1.2 above.	

9.10 Appendix 1.10 - Performance indicators for Feature 10: Scarce blue-tailed damselfly *Ischnura pumilio*

Performance indicators for feature condition		
<i>Attribute</i>	<i>Specified limits</i>	<i>Comments</i>
A1. Distribution	<p><i>Upper limit:</i> n/a</p> <p><i>Lower limit:</i> As shown on map 7.</p>	Should be present centred on this location.
Sampling approach:	See A2 below.	

A2. Population Size	<i>Upper limit:</i> n/a <i>Lower limit:</i> An annual population index of 10 (maximum number of adult males seen on one transect count)	It is difficult to define what constitutes a viable population for this species, but recorded adult males over the years suggests that in good summers the maximum number of males counted should approach at least ten individuals.
Sampling approach:	Transect consists of 100m of swamp drainage channels and pool edges in the vicinity of point D – see map 7.	
A3. Habitat quality	<i>Upper limits:</i> 75% tall vegetation, AND 50% bare mud/peat. <i>Lower limits:</i> 25% tall vegetation AND 20% bare mud/peat, AND Limits for habitat quality of fen vegetation in unit 506 (see appendix 1.2) must be met.	
Sampling approach:	Estimated along ditch edges and pool margins along the transect route (see A2 above).	
Performance indicators for factors affecting the feature		
<i>Factor</i>	<i>Operational Limits</i>	<i>Comments</i>
F1. Water Levels	See appendix 1.2 above.	
F2. Water Quality	See appendix 1.2 above.	

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