CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES

CORE MANAGEMENT PLAN

INCLUDING CONSERVATION OBJECTIVES

FOR

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC

Version: 1

Date: March 2008

Approved by: Mike Willis

More detailed maps of management units can be provided on request.
A Welsh version of all or part of this document can be made available on request.

Cyngor Cefn Gwlad Cymru
Countryside Council for Wales

NATURA 2000

Ramsar

Llywodraeth Cynulliad Cymru
Welsh Assembly Government
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CONTENTS

PREFACE

This document provides the main elements of CCW's management plan for the site named. It sets out what needs to be achieved on the site, the results of monitoring and advice on the action required. This document is made available through CCW's 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 web site.

One of the key functions of this document is to provide CCW's statement of the Conservation Objectives for the relevant Natura 2000 site(s). This is required to implement the Conservation (Natural Habitats, &c.) Regulations 1994, as amended (Section 4). As a matter of Welsh Assembly 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.

Many of the mine workings included in this site have been surveyed and shown either to be used by bats or to be of importance to bats during the winter when these animals hibernate. The entrances of mines used by bats should be maintained in a suitable condition to allow the mines to be used as hibernation sites.

All the available areas of heavy-metal-rich mine spoil should support a range of the rare and scarce mosses and lichens found at these sites. These areas should be kept open to maintain this feature and to enhance further growth of lower plants.

The populations of forked spleenwort and alpine penny-cress are the largest in East Gwynedd, although still relatively small and localised, and they often occur together with an isolated, inland population of sea campion. All of these plants are adapted to live on metal-rich mine spoil and old mine buildings, and their growth will be encouraged wherever possible to increase their range.

Two areas have been included in the site for their geological importance. One of these areas is a disused sulphur mine at Cae Coch. This part of the site is of interest for the growth of specialist bacteria on the un-mined minerals within the underground mine workings. The other area, Sarnau, has been selected for the scattered volcanic rock exposures showing evidence of volcanic activity. We aim to maintain these areas and where possible enhance the condition of the geological exposures.

2. SITE DESCRIPTION

2.1 Area and Designations Covered by this Plan

Grid reference: SH 795 578

Unitary authority: Conwy

Area (hectares): 39.75

Designations covered: Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines Special Area of Conservation (SAC) is notified as one SSSI – Mwyngloddiau a Chreigiau Gwydyr SSSI.

Detailed maps of the designated sites are available through CCW's web site:
http://www.ccw.gov.uk/interactive-maps/protected-areas-map.aspx

For a summary map showing the coverage of this document see attached Unit Map.

2.2 Outline Description

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC is located in the Gwydyr Forest between the Conwy and Llugwy valleys north west of Betws y Coed and west of Llanrwst. It comprises scattered areas of mine workings and polluted waste, which have been left behind as a legacy of the lead, zinc and iron mining industry which peaked in the late 1800s in this area. The waste is a hostile environment to most plants, but various metallophytes species have adapted to grow on the metal rich rocks and spoil. The metal rich rocks and spoil fall into the European habitat "Calaminarian grasslands of the *Violetalia calaminariae*", which in Europe is characterised by *Viola calaminaria*. The aforementioned species is not found in the UK, but several of the other associated metallophytes races are found at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC, i.e. *Asplenium septentrionale*, *Ditrichum plumbicola*, *Thlaspi caerulescens*, and *Silene vulgaris*. The extensive mine systems beneath the surface provide hibernation roosts to several species of bats, including the lesser horseshoe bat *Rhinolophus hipposideros*. The constant temperature of the deep mines is ideal for hibernating bats and the adjoining habitats are good feeding areas. The mines are too dangerous to explore and map, but the Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC includes the adit entrances to the mines in order to protect the lesser horseshoe bat.

2.3 Outline of Past and Current Management

Mining took place in the Gwydyr Forest during the Nineteenth Century, up until the First World War, although at some sites mining continued through to the 1960s. Much of the area surrounding the mines was planted with trees by the Forestry Commission in the 1940s and '50s and these plantations now form the Gwydyr Forest park. The mines in the Forestry Commission land have had little or no management since mining ceased. Similarly, the mines, which are on private land have received very little management, but are more likely to be grazed where they are situated on farmland.

Several of the mines in the site have been reclaimed, most notably Hafna mine, Parc mine and Cyffty mine. These sites have been landscaped and in the case of Hafna and Parc mines, have been covered by soil or geotextile matting. The Forestry Commission has also carried out engineering works on a large number of shafts and adits to cap and grille them to prevent access by the public. In most cases this has been done using "bat friendly grilles", although some old grilles remain which are not suitable for bats.

2.4 Management Units

The plan area 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 the locations of the SAC boundary. The site is extremely fragmented and composed of many small areas of designated mine spoil or mine entrances, thus, lumping together these areas was impractical from a management perspective.

Table 1 confirms the relationships between the management units and the designations covered:

Table 1. Management unit number and designations covered within each management unit.

Mwyngloddiau a Chreigiau Gwydyr SSSI				
Unit number	**SAC**	**SSSI**	**CCW owned**	**Other**
1	✓	✓		Private ownership
2	✓	✓		Private ownership
3	✓	✓		Private ownership
4	✓	✓		Forestry Commission
5	✓	✓		Forestry Commission
6	✓	✓		Private ownership
7	✓	✓		Forestry Commission
8	✓	✓		Forestry Commission
9	✓	✓		Forestry Commission
10	✓	✓		Private ownership
11	✓	✓		Part Forestry Commission, part private ownership
12	✓	✓		Forestry Commission
13	✓	✓		Forestry Commission
14	✓	✓		Part Forestry Commission, part private ownership
15	✓	✓		Forestry Commission
16	✓	✓		Forestry Commission
17	✓	✓		Forestry Commission
18	✓	✓		Part Forestry Commission, part Snowdonia National Park
19	✓	✓		Forestry Commission
20	✓	✓		Forestry Commission
21	✓	✓		Forestry Commission
22	✓	✓		Forestry Commission
23	✓	✓		Forestry Commission
24	✓	✓		Forestry Commission
25	✓	✓		Part Forestry Commission, part private ownership
26	✓	✓		Forestry Commission
27	✓	✓		Part Forestry Commission, part private ownership
28	✓	✓		Private ownership
29	✓	✓		Forestry Commission
30	✓	✓		Private ownership
31	✓	✓		Forestry Commission
32	✓	✓		Forestry Commission
33	✓	✓		Forestry Commission
34	✓	✓		Forestry Commission
35	✓	✓		Forestry Commission
36	✓	✓		Private ownership
37	✓	✓		Forestry Commission
38	✓	✓		Private ownership
39	✓	✓		Private ownership
40	✓	✓		Private ownership
41	✓	✓		Part Forestry Commission, part private ownership
42	✓	✓		Private ownership
43	✓	✓		Private ownership
44	✓	✓		Private ownership

3. THE SPECIAL FEATURES

3.1 Confirmation of Special Features

Table 2. Confirmation of special features at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Designated feature	***Relationships, nomenclature etc***	***Conservation Objective in part 4***
SAC features		
Annex I habitats that are a primary reason for selection of this site 1. Calaminarian grasslands of the *Violetalia calaminariae* (6130).	Referred to as "calaminarian grassland" throughout this document.	1
Annex II species present as a qualifying feature, but not a primary reason for site selection 2. Lesser horseshoe bat *Rhinolophus hipposideros* (1303).		2
SPA features		
Not applicable		
Ramsar features		
Not applicable		
SSSI features		
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).		
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).		
5. Nationally rare and scarce lower plants.	Synonymous with the calaminarian grassland where *Ditrichum plumbicola* and nationally rare and scarce lichens occur.	1
6. Heavy-metal tolerant vascular plants.	Synonymous with the calaminarian grassland where *Asplenium septentrionale, Thlaspi caerulescens,* and *Silene vulgaris* occur.	1
7. Hibernating bat species.	Includes Annex II feature Lesser horseshoe bat *Rhinolophus hipposideros.*	2
8. Acidic basin mire and swamp.		

3.2 Special Features and Management Units

This section sets out the relationship between the special 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 special 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' 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.

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

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

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

The tables below set out the relationship between the special features and management units identified in this plan:

Background information on Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

The site includes a series of scattered disused lead and zinc mines with spoil-heaps of varying extent, set among extensive conifer plantations and some agricultural land. The calaminarian assemblage of Gwydyr Forest includes forked spleenwort *Asplenium septentrionale* and alpine penny-cress *Thlaspi caerulescens*, together with several lichen taxa, but it is especially notable for the local frequency of the near-endemic moss *Ditrichum plumbicola*. The history of mining in the Gwydyr region has created a large number of tunnels and caverns, which are used by bats during the winter, when they hibernate. Although the extent of the mine systems is very large, there is limited access to the mines as the majority of entrances have been capped or grilled for safety reasons.

Table 3a. Special features and management units at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC	Management unit									
	1	2	3	4	5	6	7	8	9	10
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SAC features										
1. Calaminarian grassland.	**KH**	✘	**KH**	**KH**	**KH**	**KH**	**KH**	**KH**	**KH**	**KH**
2. Lesser horseshoe bat.	✘	**KS**	✘	✘	✘	✘	✘	✘	✘	✘
SSSI features										
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
5. Nationally rare and scarce lower plants.	**sym**	✘	**sym**	**sym**	**sym**	**sym**	**sym**	**sym**	**sym**	✘
6. Heavy-metal tolerant vascular plants.	**KS**	✘	✘	✘	✘	**KS**	✘	✘	✘	**KS**
7. Hibernating bat species.	✘	**sym**	**?**	**?**	**?**	✘	**?**	✘	**?**	✘
8. Acidic basin mire and swamp.	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘

Table 3b. Special features and management units at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC	Management unit									
	11	12	13	14	15	16	17	18	19	20
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SAC features										
1. Calaminarian grassland.	**KH**	**KH**	**KH**	**KH**	**KH**	✘	**KH**	**KH**	✘	**KH**
2. Lesser horseshoe bat.	✘	✘	✘	**KS**	✘	**KS**	**KS**	**KS**	**KS**	✘
SSSI features										
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).	✘	✔	✘	✘	✘	✘	✘	✘	✘	✔
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
5. Nationally rare and scarce lower plants.	**sym**	**sym**	**sym**	**sym**	**sym**	✘	**sym**	**sym**	✘	**sym**
6. Heavy-metal tolerant vascular plants.	✘	✘	**KS**	**sym**	**KS**	✘	**sym**	**sym**	✘	✘
7. Hibernating bat species.	**KS**	**KS**	✘	**sym**	✘	**sym**	**sym**	**sym**	**sym**	**KS**
8. Acidic basin mire and swamp.	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘

Table 3c. Special features and management units at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC	Management unit									
	21	22	23	24	25	26	27	28	29	30
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SAC features										
1. Calaminarian grassland.	✘	✘	✘	✘	**KH**	**KH**	**KH**	**KH**	**KH**	**KH**
2. Lesser horseshoe bat.	**KS**	**KS**	**KS**	**KS**	**KS**	✘	✘	✘	✘	✘
SSSI features										
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).	**sym**	✘	✘	✘	✘	✘	✘	**sym**	**sym**	**sym**
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
5. Nationally rare and scarce lower plants.	✘	✘	✘	✘	**?**	**?**	**KS**	**KS**	**KS**	**KS**
6. Heavy-metal tolerant vascular plants.	✘	✘	✘	✘	**?**	**?**	✘	✘	✘	✘
7. Hibernating bat species.	**sym**	**sym**	**sym**	**sym**	**sym**	✘	✘	✘	**?**	✘
8. Acidic basin mire and swamp.	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘

Table 3d. Special features and management units at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC	Management unit									
	31	32	33	34	35	36	37	38	39	40
SAC	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SSSI	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
SAC features										
1. Calaminarian grassland.	**KH**	**KH**	**KH**	✘	**KH**	**KH**	**KH**	**KH**	**KH**	**KH**
2. Lesser horseshoe bat.	✘	✘	✘	**KS**	✘	✘	✘	✘	✘	**KS**
SSSI features										
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
5. Nationally rare and scarce lower plants.	**KS**	**KS**	**KS**	**KS**	**KS**	**KS**	**sym**	**KS**	**KS**	**sym**
6. Heavy-metal tolerant vascular plants.	✘	✘	✘	✘	✘	✘	**KS**	✘	✘	✘
7. Hibernating bat species.	✘	✘	✘	**sym**	✘	**KS**	✘	✘	✘	**sym**
8. Acidic basin mire and swamp.	✘	✘	✘	✘	✘	✘	**sym**	✘	✘	✘

Table 3e. Special features and management units at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC	**Management unit**			
	41	**42**	**43**	**44**
SAC	✔	✔	✔	✔
SSSI	✔	✔	✔	✔
SAC features				
1. Calaminarian grassland.	**KH**	✘	**KH**	**KH**
2. Lesser horseshoe bat.	**KS**	**KS**	✘	✘
SSSI features				
3. Outcrops of Ordovician Igneous rock (Sarnau GCR).	✘	✘	✘	✘
4. Mineral-bearing mine spoil and associated bacteria (Cae Coch Mine GCR).	✘	✘	✘	✘
5. Nationally rare and scarce lower plants.	**sym**	✘	**KS**	**KS**
6. Heavy-metal tolerant vascular plants.	**sym**	✘	✘	✘
7. Hibernating bat species.	**sym**	**sym**	✘	✘
8. Acidic basin mire and swamp.	✘	✘	✘	✘

Management units, 2, 16, 19, 21 – 24, 34 and 42 are important for the lesser horseshoe bat only, and management at these units should aim to maintain the entrance integrity at each location in a favourable condition.

Management units 1, 3 – 13, 15, 20, 26 – 33, 35 – 39, 43 and 44 are important for calaminarian grassland only, and management at these units should aim to maintain the calaminarian grassland in a favourable condition.

Management units 14, 17, 18, 25, 40 and 41 are important for both the lesser horseshoe bat and calaminarian grassland. There should be no conflict between the management to maintain entrance integrity for the bats and maintain the calaminarian grassland in favourable condition at these sites. However, the occurrence of both SAC features at these management units must be borne in mind before undertaking any management, which may have an adverse effect on the other feature.

4. CONSERVATION OBJECTIVES

Background to Conservation Objectives:

a. Outline of the legal context and purpose of conservation objectives.

Conservation objectives are required by the 1992 'Habitats' Directive (92/43/EEC). The aim of the Habitats Directives is the maintenance, or where appropriate the restoration of the 'favourable conservation status' of habitats and species features for which SACs and SPAs are designated (see Box 1).

In the broadest terms, 'favourable conservation status' means a feature is in satisfactory condition and all the things needed to keep it that way are in place for the foreseeable future. CCW considers that the concept of favourable conservation status provides a practical and legally robust basis for conservation objectives for Natura 2000 and Ramsar sites.

Box 1
Favourable conservation status 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."

Achieving these objectives requires appropriate management and the control of factors that may cause deterioration of habitats or significant disturbance to species.

As well as the overall function of communication, Conservation objectives have a number of specific roles:

- Conservation planning and management.

  The conservation objectives guide management of sites, to maintain or restore the habitats and species in favourable condition.

- Assessing plans and projects.

  Article 6(3) of the 'Habitats' Directive requires appropriate assessment of proposed plans and projects against 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. This role for testing plans and projects also applies to the review of existing decisions and consents.

- Monitoring and reporting.

  The conservation objectives provide the basis for assessing the condition of a feature and the status of factors that affect it. CCW uses 'performance indicators' within the conservation objectives, as the basis for monitoring and reporting. Performance indicators are selected to provide useful information about the condition of a feature and the factors that affect it.

The conservation objectives in this document reflect CCW's 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 CCW in light of new knowledge.

b. Format of the conservation objectives

There is one conservation objective for each feature listed in part 3. Each conservation objective is a composite statement representing a site-specific description of what is considered to be the favourable conservation status of the feature. These statements apply to a whole feature as it occurs within the whole plan area, although section 3.2 sets out their relevance to individual management units.

Each conservation objective consists of the following two elements:

1. Vision for the feature
2. Performance indicators

As a result of the general practice developed and agreed within the UK Conservation Agencies, conservation objectives include performance indicators, the selection of which should be informed by JNCC guidance on Common Standards Monitoring[1].

There is a critical need for clarity over the role of performance indicators within the conservation objectives. **A conservation objective, because it includes the vision for the feature, has meaning and substance independently of the performance indicators, and is more than the sum of the performance indicators**. The performance indicators are simply what make the conservation objectives measurable, and are thus part of, not a substitute for, the conservation objectives. Any feature attribute identified in the performance indicators should be represented in the vision for the feature, but not all elements of the vision for the feature will necessarily have corresponding performance indicators.

As well as describing the aspirations for the condition of the feature, the Vision section of each conservation objective contains a statement that the factors necessary to maintain those desired conditions are under control. Subject to technical, practical and resource constraints, factors which have an important influence on the condition of the feature are identified in the performance indicators.

[1] Web link: http://www.jncc.gov.uk/page-2199

4.1 Conservation Objective for Feature 1: Calaminarian grasslands of the *Violetalia calaminariae* (EU Habitat Code: 6130).

Vision for feature 1

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The area of calaminarian grassland must be stable (based on the extent at the time of SAC notification), or increasing in the long term, and will occur in all management units (where previously recorded see Table 4).

- The remainder of the management units not highlighted for calaminarian grassland will be maintained in a favourable condition for lesser horseshoe bat.

- The calaminarian grassland can be described as either "calaminarian grassland with *Ditrichum plumbicola*" or "calaminarian grassland (metal spoil) without *Ditrichum plumbicola*".

    - Calaminarian grassland with *D. plumbicola* will be defined as a characteristically sparse and species poor vegetation type. The substrate varies from fine scree, through fine clay to fine silt like spoil. The substrate is rich in heavy metals (notably lead and zinc) resulting in a paucity of taxa within the habitat. Mosses and liverwort (e.g. *Polytrichum piliferum*, *Jungermanniana gracillima*, *Weissia controversa*, *Dicranella heteromalla*, *Pholia nutans* and *Cephaloziella* spp.) are often the only taxa found in association with *D. plumbicola*.

    - Calaminarian grassland (metal spoil) without *D. plumbicola* is characterised by lichen encrusted (often *Stereocaulon* species), heavy metal rich, mine spoil. Between the blocks of spoil where humus accumulates, lower and higher plants with some degree of heavy metal toxicity tolerance grow. Mosses and liverworts often dominate the vegetation, however, in areas with greater depths of humus, pteridophytes and angiosperms can dominate. The metallophytes *Asplenium septentrionale* (Forked Spleenwort), *Silene uniflora* (Sea Campion) and *Thlaspi caerulescens* (Alpine Penny-cress) are often found in association with other higher plants on the mine spoil.

- Broadleaf, coniferous, exotic and scrub species should be absent from the calaminarian grassland stands, because the above plants will shade out the slower growing moss and lichen species, and in time will smother the lower plants with litter material.

- A 10m buffer, clear of coniferous vegetation, will be maintained around the stands of calaminarian grassland with *D. plumbicola*.

- Disturbance through human impact and recreation will be absent from the calaminarian grassland.

- All factors affecting the achievement of these conditions are under control.

Performance indicators for Feature 1.

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

Table 4. Performance indicators for calaminarian grassland at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Performance indicators for feature condition (2004)		
Attribute	***Attribute rationale and comments***	***Specified limits***
A1. Extent of calaminarian grassland.	Lower limit is based on the extent at the time of SAC notification being 6.82% of the total site area	Upper limit: None specified Lower limit: 2.71 ha
A2. Condition of the calaminarian grassland – sample target.	For the calaminarian grassland to be in favourable condition on the SAC each of the management units outlined for calaminarian grassland is required to have either good quality calaminarian grassland with *D. plumbicola* or good quality calaminarian grassland (metal spoil) without *D. plumbicola*. Furthermore, there is a requirement of the presence of *D. plumbicola* (to be confirmed by contracted experts) at each of the known locations 1 in every 6 years.	Where calaminarian grassland is the Key Habitat in the following management units; 1, 3 – 15, 17, 20, 25 – 33, 35 – 41, 43 – 44. Sample target for calaminarian grassland. Upper limit: None specified Lower limit: **Calaminarian grassland with *Ditrichum plumbicola***: 100% of the *D. plumbicola* stands have "good quality" *D. plumbicola* habitat and *D. plumbicola* is present at each previously recorded stand 1 in every 6 years. **Calaminarian grassland (metal spoil) without *Ditrichum plumbicola***: 100% of the metal spoil stands have "good quality" metal spoil vegetation.

A3. Condition of the calaminarian grassland – "good quality" calaminarian grassland habitat	**Calaminarian grassland with *Ditrichum plumbicola***: 1. Fine grade substrate (fine spoil, clay or silt). 2. <10% cover of *Campylopus introflexus*. 3. >50% of the assessment area (see SAC Monitoring PI table) is free of algae, acrocarpous mosses and angiosperm litter. 4. Pleurocarpous mosses are absent. 5. Broadleaf and coniferous seedlings of any height are absent. 6. Exotic species are absent. 7. Conifers >30cm in height within 10m of the stand are absent. 8. Evidence of disturbance is absent.	The definition of good quality calaminarian grassland habitat has been based on the CSM attributes for this feature. However, due to the unusual nature of the calaminarian grassland at this site the attributes have been modified somewhat according to site-specific requirements. **Calaminarian grassland with *Ditrichum plumbicola***: The majority of the attributes aim to give information regarding the micro-condition of the habitat, e.g. *Campylopus introflexus* signifies the availability of organic substrates, which are not conducive to colonization by *D. plumbicola*. For more information see Creer (2004) SAC monitoring report.
	Calaminarian grassland (metal spoil) without *Ditrichum plumbicola*: 1. >50% cover of lichen species. **OR** At least one of the following species is present (where previously recorded) *Asplenium septentrionale*, *Silene uniflora* and *Thlaspi caerulescens*. 2. Tree and scrub species >50cm in height are absent. 3. Evidence of excessive or significant disturbance is absent.	**Calaminarian grassland (metal spoil) without *Ditrichum plumbicola***: The attributes are more general for this calaminarian grassland type. The attributes aim to give information regarding the overall condition of the habitat. However, where the rarer metallophytes have been recorded i.e. *Asplenium septentrionale*, *Silene uniflora* and *Thlaspi caerulescens*, these should continue to be present, with the populations stable or increasing.
Performance indicators for factors affecting the feature (2004)		
Factor	***Factor rationale and comments***	***Operational limits***
F1. Disturbance (human impact and recreation)	The type of disturbance to the feature can vary, from the effect of mountain and BMX bikes, scrambler and quad bikes, radio controlled cars and 4x4 vehicles, to tipping of waste material on the mine spoil and the removal of mine spoil material. Any type of human disturbance should be recorded, because there will be an effect to the fragile calaminarian grassland.	Evidence of disturbance is absent within stands of calaminarian grassland with and without *Ditrichum plumbicola*.

F2. Broadleaf, coniferous, exotic and scrub species encroachment	Encroachment of any higher plant species is undesirable on the calaminarian grassland stands. The encroaching species will shade out the slower growing moss and lichen species, and in time will smother the lower plants with litter material. There is a further requirement for conifers (>30cm in height) to be absent from within 10m of the calaminarian grassland with *D. plumbicola* stands. The removal of conifers will arrest the current shading and accumulation of litter onto the *D. plumbicola* stands.	**Calaminarian grassland with *Ditrichum plumbicola***: 1. Broadleaf and coniferous seedlings of any height are absent. 2. Exotic species are absent. 3. Conifers >30cm in height within 10m of the stand are absent **Calaminarian grassland (metal spoil) without *Ditrichum plumbicola*:** Tree and scrub species >50cm in height are absent.

4.2 Conservation Objective for Feature 2: Lesser horseshoe bat *Rhinolophus hipposideros* (EU Habitat Code 1303).

Vision for feature 2

The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:

- The site will support a sustainable population of lesser horseshoe bats in the Gwydyr Forest area.
- The population will viable in the long term, acknowledging the population fluctuations of the species.
- The natural range of lesser horseshoe bats is neither being reduced nor is likely to be reduced for the foreseeable future.
- Mines on the site will be in optimal condition to support the populations.
- Sufficient foraging habitat is available, in which factors such as disturbance, interruption to flight lines, and mortality from predation or vehicle collision, changes in habitat management that would reduce the available food source are not at levels which could cause any decline in population size or range.
- There is a sufficiently large area of suitable habitat surrounding the roosts to support the bat population, including continuous networks of sheltered broadleaved and coniferous woodland, and tree lines, connecting the various roosts with areas of insect rich grassland and open water.
- Management of the surrounding habitats is of the appropriate type and sufficiently secure to ensure there is likely to be no reduction in population size or range, nor any decline in the extent or quality of breeding, foraging or hibernating habitat.
- All factors affecting the achievement of the foregoing conditions are under control.

Performance indicators for Feature 2

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

Table 5. Performance indicators for lesser horseshoe bat at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC.

Performance indicators for factors affecting the feature		
Attribute	***Attribute rationale and comments***	***Specified limits***
A1. Extent (bats)	The fundamental objective of the site is to maintain, and if possible increase, the population of lesser horseshoe bats.	Upper limit: None specified Lower limit: • Evidence of lesser horseshoe bat *Rhinolophus hipposideros* use is found in at least 6 mine entrances. • Bat activity is recorded at 4 mine entrances. • > 10 bats are exiting or entering the target mine entrance (Management unit 42 – Cilcennus) for > 20% of nighttime recording.

A2. Extent (entrances)	Lesser horseshoe bats must be able to enter and leave the roost freely. Lesser horseshoe bats must not be deterred from using the roost.	Upper limit: None specified. Lower limit: Entrances with 'entrance integrity' should be present in each of the following target areas (management units 14 and 16 – Hafna Lead mine, management unit 41 – Aberllyn mines, and management units 18 and 19, Snowdonia National Park and Parc Mine).
A3. Quality (entrances).	• All mine adits / shafts will have bat friendly grilles fitted with a gap, between horizontal bars, no less than 150mm apart. • It will be acceptable for vegetation to surround the outside of the grille frame to provide suitable conditions for lesser horseshoe bats, but no vegetation should be allowed to obstruct bat access through horizontal grilles. • FC need to liaise with CCW regarding thinning and removal of the conifer crop from around or nearby to any underground roost site in order to avoid disrupting flight lines and foraging areas of lesser horseshoe bats.	Upper limit: None specified. Lower limit: < 10 entrances fail to provide 'entrance integrity'. To pass, an entrance must satisfy all the following criteria: • Doors, gates, grilles and fences are intact and resistant to unauthorised access. • There is no unplanned new access. • Access route used by bats provides an uncluttered flight path in the mine entrance with a minimum size of 30cm x 30cm. • There is vegetation > 2m high within 15m of the entrance. • No artificial lights within 15m of the entrance.

Performance indicators for factors affecting the feature		
Factor	***Factor rationale and comments***	***Operational limits***
F1. Site security.	Derived from Common Standards Monitoring advice. It is essential to minimise disturbance within roosts and potential harm to bats	Upper limit: • Entrances are grilled and locked, and in sound condition and able to resist unauthorised access attempts. • Limited access is under the control of the Forestry Commission and other owner / occupiers. Lower limit: None specified

F2. Roost entrances.	Derived from Common Standards Monitoring advice. The bats must be able to enter and leave the roost freely.	Upper limit: • Existing entrances unobstructed. • No unplanned new entrances causing a change to ventilation. • No change in size sufficient to affect airflow and internal temperature. Lower limit: None specified.
F3. Disturbance (external and internal).	Derived from Common Standards Monitoring advice. It is essential to minimise disturbance within roosts and potential harm to bats. Lesser horseshoe bats must not be deterred from using the roost. All winter roost sites will need to be identified by suitable qualified / licensed people. Liaise with CCW / caving clubs. Recreational caving will be considered by the FC and CCW, as long as it can be managed to avoid any conflict with the bats using the mines.	Upper limit: • No un-authorised access occurring in any mines, on FC land, other than for surveying for roosting bats (qualified people only, and agreed with CCW). • Limited access is under the control of the Forestry Commission and other owner / occupiers. Lower limit: None specified
F4. Availability of bat fly-ways and feeding areas on surrounding land	Lesser horseshoe bats require sheltered unlit cover when leaving roosts to feed at night.	Upper limit: None set Lower limit: There should be a sufficiently large area of suitable habitat surrounding these roosts to support the bat population, including continuous networks of sheltered, coniferous and broadleaved woodland, tree lines and hedgerows connecting the roosts with areas of insect-rich grassland and open water.

5. ASSESSMENT OF CONSERVATION STATUS AND MANAGEMENT REQUIREMENTS

This part of the document provides:

- A summary of the assessment of the conservation status of each feature.
- A summary of the management issues that need to be addressed to maintain or restore each feature.

5.1 Conservation Status and Management Requirements of Feature 1: Calaminarian grasslands of the *Violetalia calaminariae* (EU Habitat Code: 6130).

Conservation Status of Feature 1

The calaminarian grassland was monitored in detail in the autumn of 2004 (Creer, 2004). The assessment of the chosen management units were that they were in an unfavourable condition, and from the 2004 data can give condition information for a number of the management units with calaminarian grassland as a feature (see Table 4).

A number of the calaminarian grassland management units (1, 6, 13, 15, 17, 18, 25 and 26) were not visited during the monitoring in 2004, and thus, have no condition assessment for the feature within those units. However, any management, which takes place at these management units, should aim to maintain the calaminarian grassland in a favourable condition.

Table 4. Overall monitoring results for Calaminarian grassland obtained in 2004 at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC (from Creer, 2004).

Management unit	*D. plumbicola* stand assessment	*D. plumbicola* 50cm x 50cm quadrat assessment	Metal spoil stand assessment	Metal spoil 50cm x 50cm quadrat assessment	Overall result (2004)
1	**No assessment**				
3	Pass	Fail	N/A	N/A	**Fail**
3	Pass	Fail	N/A	N/A	**Fail**
4	Fail	Pass	N/A	N/A	**Fail**
5	Fail	Pass	N/A	N/A	**Fail**
6	**No assessment**				
7	Fail	Fail	Fail	Pass	**Fail**
8	Fail	Fail	Fail	Pass	**Fail**
9	Fail	Fail	N/A	N/A	**Fail**
9	Fail	Fail	N/A	N/A	**Fail**
10	**No assessment**				
11	Pass	Fail	Pass	Fail	**Fail**
11	Pass	Pass	N/A	Pass	**Pass**
12	Fail	Pass	N/A	N/A	**Fail**
13	**No assessment**				
14	Fail	Fail	N/A	N/A	**Fail**
15	**No assessment**				
17	**No assessment**				
18	**No assessment**				
20	Fail	Fail	Fail	Pass	**Fail**
25	**No assessment**				
26	**No assessment**				
27	Pass	Pass	Pass	Pass	**Pass**
28	Pass	Pass	Pass	Pass	**Pass**
29	Fail	Fail	N/A	N/A	**Fail**
30	Pass	Pass	Pass	Fail	**Fail**
30	Pass	Pass	Pass	N/A	**Pass**
31	**No assessment**				
32	**No assessment**				
33	Fail	Pass	Fail	Pass	**Fail**

Management unit	*D. plumbicola* stand assessment	*D. plumbicola* 50cm x 50cm quadrat assessment	Metal spoil stand assessment	Metal spoil 50cm x 50cm quadrat assessment	Overall result (2004)
33	Fail	Fail	Fail	N/A	**Fail**
35	**No assessment**				
36	Pass	Fail	Fail	Fail	**Fail**
37	Fail	Pass	Fail	Pass	**Fail**
37	Fail	Pass	Fail	N/A	**Fail**
37	Fail	Pass	Fail	Pass	**Fail**
37	Fail	Pass	N/A	N/A	**Fail**
38	Fail	Pass	Fail	Pass	**Fail**
39	Fail	Pass	Fail	Pass	**Fail**
40	Fail	Fail	Fail	Fail	**Fail**
43	Fail	Fail	Fail	Fail	**Fail**
44	Fail	Fail	Fail	Fail	**Fail**

The condition of the calaminarian grassland is due to be assessed again in the summer of 2008, and it is anticipated that all of the above management units will be visited (pending health and safety considerations) and the vegetation assessed against the performance indicators listed in section 4.1. The 2008 monitoring will give both a condition assessment for the feature within each management unit and an assessment of the condition of the feature for the whole site.

Management Requirements of Feature 1

The current status of the feature overall is unfavourable. The principle reasons for this (in some of the management units) are as follows;

- Encroachment from higher plants, including conifers and scrub,
- Smothering from conifer needles,
- Extraction of mine spoil,
- Recreation.

Habitat management

- *Livestock grazing*: Sections of the site are grazed where spoil heaps are located within larger areas of heath and rough grassland. Moderate grazing does not pose a threat to the interest of the site, as foraging and trampling effects on the plants tend to be minimal. However, any changes to the grazing would need to be examined.
- *Improvement*: There has been some improvement of an area of spoil in one location. With several inches of manure applied twice a year to mask the toxic effects of the spoil. A grass sward has been established and is used as sheep grazing. CCW have negotiated with the farmer to stop the applications, and give the field the chance to revert. There are adjoining unimproved areas as seed sources, and without the inputs, it is likely that it will not be many years before the effects on the substrate become apparent again. If this does not happen, then it may be necessary to strip the upper layer to achieve this.
- *Harvesting / replanting*: The Forestry Commission (FC) owned plantations are a managed resource, and the FC has a programme of harvesting and replanting the conifers within the plantation. This does require the use of heavy machinery, and liaison with the FC occurs to ensure that there is no damage to areas of importance during their routine operations. There are numerous tracks within the SAC, and the interest is fairly localised, so it is not normally a problem. The FC, as owners of the majority of the SAC, have been made aware of the interest (CCW SIB, 2002).

Conifer re-growth / Scrub encroachment

The FC acquired much of the land within the SAC from Lord Newborough in the 1920's, and afforestation first began then and continued until the mid-1950's. The FC now manage these plantations according to structured felling programme known as Forest Redesign Plans, which have been agreed with CCW staff. Conifers can tolerate low toxicity, and as a result natural regeneration does occur on cliffs and some less contaminated mine waste. Birch, gorse and heather can also encroach on these areas. This can be a problem if the trees begin to out-compete and shade-out more important plants. There are also areas where larch, have been planted on areas adjoining spoil, and the needles, which are shed annually, have began to smother the plants of interest. Where such problems have been identified, the FC are usually very happy to work with CCW to open up corridors and fell trees which threaten the interest. The other factor to which the conifers contribute is fragmentation. This is less easy to define or tackle, but essentially, the patches of spoil are separated by forest where they would have been originally been linked by fairly open areas. The transfer of plants between the isolated patches would have been difficult anyway, but is likely to be even more restricted now that the forest has been planted (CCW SIB, 2002).

Development / Reclamation

A number of reclamation schemes were carried out on mines in the 1980's and 1990's with Welsh Development Agency (WDA) funding, several of these reclamation schemes are within the SAC. With the WDA having a responsibility to safeguard the quality of water supplies, the Environment Agency (EA) were instrumental in getting such schemes approved. The schemes were primarily carried out to minimise pollution and make them safer for public access, but also to 'improve' the appearance of the tips within the landscape. However, the schemes were often disastrous from a conservation point of view, and at management units 14 (Hafna mine), 25 (Parc mine), and 27 (Cyffty mine), large areas of calaminarian grassland and supporting species (including *Thlaspi caerulescens*, *Silene uniflora*, and heavy metal-tolerant lichens and mosses, such as *Ditrichum plumbicola*), were lost under geotextile matting (durable matting seeded with vigorous grasses such as *Lolium perenne*). Additionally, the historic insensitive re-pointing of some mine buildings caused the loss of heavy metal- tolerant ferns, such as *Asplenium septentrionale*, and threatened holes and entrances used by bats (including the lesser horseshoe bat). Areas of spoil were re-profiled for aesthetic reasons or to provide parking areas, obliterating the existing vegetation. Some of the earlier schemes were the worst because of poor communication between partners and lack of supervision of contractors. Later schemes, including the one at management unit 41 (Aberllyn), were much better as full surveys were carried out in advance of the work and CCW was able to fund an on-site contractor to work with the contractors in areas sensitive to disturbance (CCW SIB, 2002).

Contamination / Water quality

The water from the mines does inevitably contaminate the local streams which flow from the area, although the levels tend to be within acceptable limits except possibly during periods of extremely high flow, when the erosion of tips exposes new, less leached spoil to the water. Levels of lead in the outflows may peak at these times due to the mobilisation of chemicals by the water. However, there are some farms whose water supply for livestock and sometimes domestic use comes from the mines by established right, and for that reason the water has to be monitored by the EA. The contaminated nature of the land is crucial to the interest of the site, and over-stabilising spoil can damage the interest of these areas, but is important that the levels of pollutants are maintained within acceptable levels in the interests of public health where applicable. A compromise would probably need to be sought if the quality of the water became an issue at any time (CCW SIB, 2002).

Extraction

There has been some speculation by some of the owners of the mines as to the possible uses of the mine spoil, in the same way that slate waste can be use for road-fill. It is unlikely that the mine spoil in the SAC could have a use due to levels of toxicity, which would be exacerbated by excavation, but CCW would have a duty to protect the spoil and the communities it supports from such developments. There is some local use of the waste to fill in pot-holes in farm tracks and CCW will need to identify where this is occurring, assess the potential for damage to the plant communities, and offer alternatives where this threatens the interest (CCW SIB, 2002).

Recreation

The FC plantation at Gwydyr Forest is not only a financially viable plantation; the FC also promotes it as an area for outdoor recreation. Walkers, bikers and riders are welcomed to use the numerous tracks in the forest and this does not in any way interfere with the interest of the site. However, there are some bikers - both mountain and motorbikes - using some of the areas of spoil as obstacle courses though creating ramps and jumps. Additionally, there are several Outdoor Recreation Centres in and around the area, which use the site for group activities, which has been a problem on the site in some cases. CCW and the FC and other owner / occupiers will need to tackle the problem in order to prevent any further damage. It is probably simply a case of education, as these areas are often viewed as waste ground, and treated as such. The FC and CCW will need inform the users of the interest of the areas, and hopefully, through interpretation will be able to stop the careless use of these areas. There is also localised camping, particularly by the army, on areas adjoining the spoil tips, but we are not aware of any problems associated with this activity (CCW SIB, 2002).

Heath and Safety

On both FC and privately owned land, there have been instances where mine entrances have been completely or partially blocked. This can range from complete capping with concrete, to the disposal of rubbish down open adits. To comply with UK and European conservation legislation obstruction of mine adits and shafts associated with bat roosts can only be undertaken using appropriately designed grilles (CCW SIB, 2002).

5.2 Conservation Status and Management Requirements of Feature 2: Lesser horseshoe bat *Rhinolophus hipposideros* (EU Habitat Code 1303).

Conservation Status of Feature 1

Objective assessment against the performance indicators has been undertaken for some of the known lesser horseshoe bat units in 2006, which provides preliminary baseline information on which to base the following judgement. **The feature within this site is considered to be in unfavourable condition (2006)**. The feature is deemed to be unfavourable due to the unmanaged access impacting on the mine entrance integrity (see Tables 5a and b).

Table 5a. Overall monitoring results for the lesser horseshoe bat obtained in 2006 at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC (from Lloyd, 2006).

Unit No.	Unit name	FC entrance name	Entrance location	Doors and grilles (comments)	Droppings outside mine entrance	Bat access open	Flight line suitable	Lights present	Entrance integrity (2006)
34	Forestry Commission 2	D'Ersby console	SH 7894 5936	Cut grill	Yes	Yes	Yes	Absent	Fail
41	Aberllyn Lead Mine 2	Air flow entrance	SH 7943 5801	Cut grill	Yes	Yes	Yes	Absent	Fail
18	Snowdonia National Park	Parc No. 3 mine	SH 7876 6015	Unlocked gate grill	No	Yes	Yes	Absent	Fail
25	Craig y Fuches-las 2	Solid girder grill	SH 7869 5980	Girder grill	No	No	Yes	Absent	Fail
14	Hafna Lead Mine 2	S11 behind chimney	SH 7802 6013	Cut grill	Yes	Yes	Yes	Absent	Fail
41	Aberllyn Lead Mine 2	Small intact grill	SH 7939 5812	Intact	Yes	Yes	Yes	Absent	Pass
23	Nant Bwlch yr Haearn 3	Shaft	SH 7815 5980	Intact	Yes	Yes	Yes	Absent	Pass
21	Nant Bwlch yr Haearn 1	E5 shaft	SH 7780 5960	Intact	Yes	Yes	Yes	Absent	Pass
16	Hafna Lead Mine 4	E4 adit near road	SH 7822 6010	Cut grill	Yes	Yes	Yes	Absent	Fail
14	Hafna Lead Mine 2	Hafna No. 3	SH 7803 6014	Intact	No	Yes	Yes	Absent	Fail
42	Cilcennus	Cilcennus mine	SH 8090 5819	Intact	Yes	Yes	Yes	Absent	Pass

Table 5b. Summary results from monitoring the lesser horseshoe bat obtained in 2006 at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC (from Lloyd, 2006).

Performance indicators (2006).	**Overall Pass / Fail (2006).**
Evidence of bat use is found at six mine entrances.	Pass
Bat activity is recorded at four mine entrances.	Pass
>10 bats are exiting or entering the mine entrance at management unit 42 (Cilcennus mine) for >20% of nighttime recording.	Pass
The presence of *Rhinolophus hipposideros* is recorded at one of the entrances.	Pass
Entrances with "entrance integrity" should be present in each target area (management units 14, 18 & 19 and 41 Hafna mines, Parc Mines and Aberllyn mines respectively).	Pass
<10 entrances fail to provide "entrance integrity".	Fail

Entrance integrity is the critical attribute within the performance indicators for the lesser horseshoe bat, and it is this attribute which is responsible for the unfavourable condition of the lesser horseshoe bat at Mwyngloddiau Fforest Gwydir / Gwydyr Forest Mines SAC in 2006.

Management Requirements of Feature 2

The current status of the feature overall is unfavourable. The principle reasons for this (in some of the management units) are as follows;

- Entrance integrity,
- Internal and external disturbance.

It is not possible to manage the mine system as a whole, however, it is important that the entrances to the adits and shafts are protected and maintained in a way that will encourage their use by the lesser horseshoe bats. Any alteration of the mine entrance would affect the airflow, which could also happen if the entrance became overgrown with vegetation such as brambles and tree seedlings. Management will be needed to clear vegetation away from mine entrances if they become obscured by vegetation (Wells, 2001).

Bats are very sensitive to disturbance, particularly when hibernating. The presence of people in a mine system can cause the ambient temperature to rise, resulting in bats awakening from hibernation and thus using up valuable fat reserves. Many of the mine systems within the SAC have been grilled and capped to prevent people from entering the tunnel systems. Where there are no grilles, it may be necessary to either grille entrances or to set up access schemes to control the number and frequency of visits (Wells, 2001). However, where grilles have been installed, they have frequently been cut in order to gain unauthorised access by some cavers. Damaged grilles should be replaced with lockable gates fitted to the existing grilles (Gould, 2007). There is a need for FC to better manage the access at these vulnerable entrances, and will necessitate working closely with CCW and the local caving groups who wish to use the site.

6. ACTION PLAN: SUMMARY

This section takes the management requirements outlined in Section 5 a stage further, assessing the specific management actions required on each management unit. This information is a summary of that held in CCW's Actions Database for sites, and the database will be used by CCW and partner organisations to plan future work to meet the Wales Environment Strategy targets for sites.

Unit Number	CCW Database Number	Unit Name	Summary of Conservation Management Issues	Action needed?
01	001160	New Pandora Leadworks	Current condition of unit uncertain	No
02	001161	Ty Gwyn 1	Current condition of unit uncertain	No
03	001162	Ty Gwyn 2	Calaminarian grassland subject to ling (*Calluna vulgaris*) invasion.	Yes
04	001163	Geirionydd	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
05	001164	Pen y Ffridd Quarry 1	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
06	001165	Nant Gwydr	Current condition of unit uncertain	No
07	001166	Pen y Ffridd Quarry 2	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
08	001167	Pen y Ffridd Quarry 3	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
09	001168	Cefn Maenllwyd	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
10	001169	Glyn Farm	Damage to calaminarian grassland turf through recreational use of the mine spoil heaps by BMX and mountain biking and remote controlled car racing	Yes
11	001170	Penllan	Large-scale removal of the spoil heap at the southern end of the unit has occurred and threatens the population of *Ditrichum plumbicola*. Additionally, waste material has been dumped and covered with mine spoil, threatening the important lichen communities on the mine spoil.	Yes
12	001171	Pen y Gwaith	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
13	001172	Hafna Lead Mine 1	Current condition of unit uncertain.	No
14	001173	Hafna Lead Mine 2	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment. Need to repair damaged mine entrance grills. Need to monitor *Asplenium septentrionale* population	Yes
15	001174	Hafna Lead mine 3	Current condition of unit uncertain.	No
16	001175	Hafna Lead Mine 4	Mine entrance grilles have been damaged and are in need of repair.	Yes
17	001176	Hafna Lead Mine 5	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment. Damaged mine entrance grilles required repair to prevent access to bat roosts.	Yes

Unit Number	CCW Database Number	Unit Name	Summary of Conservation Management Issues	Action needed?
18	001177	Snowdonia National Park	Mine entrance grilles require repair to safeguard bat roost.	Yes
19	001178	Parc Lead Mine	Mine entrance grilles require repair to safeguard bat roost.	Yes
20	001179	Bryn Y Fawnog	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
21	001180	Nant Bwlchyrhaearn 1	Current condition of this unit is uncertain.	No
22	001181	Nant Bwlchyrhaearn 2	Current condition of this unit is uncertain.	No
23	001182	Nant Bwlchyrhaearn 3	Mine entrance grilles require repair to safeguard bat roost.	Yes
24	001183	Craig y Fuches-las 1	Current condition of this unit is uncertain	No
25	001184	Craig y Fuches-las 2	Current condition of this unit is uncertain	No
26	001185	Craig y Fuches-las 3	Current condition of this unit is uncertain	No
27	001186	Cyffty Mine	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
28	001187	Pencraig Uchaf	Current condition of this unit is uncertain	No
29	001188	Sarnau 1	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
30	001189	Pencraig Uchaf 1	Calaminarian grassland and *Ditrichum plumbicola* being adversely affected by encroaching ling (*Calluna vulgaris*).	Yes
31	001190	Sarnau 2	Current condition of this unit is uncertain	No
32	001192	Craig y Fuches-las 4	Current condition of this unit is uncertain	No
33	001193	Forest Enterprise 1	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
34	001194	Forest Enterprise 2	Mine entrance grilles require repair to safeguard bat roost.	Yes
35	001195	Forest Eneterprise 3	Current condition of this unit is uncertain	No
36	001196	Level near Capel Curig Training Camp	Population of *Ditrichum plumbicola* at risk from smothering by oak leaves. Need for localised woodland management.	Yes
37	001197	Coedmawr Pool Mine	Calaminarian grassland being adversely affected by smothering effect of conifer needles and scrub encroachment. Requirement to fell trees from proximity to spoil heaps and manage scrub in vicinity of *Asplenium septentrionale* populations.	Yes
38	001198	Castle Terrace 1	Calaminarian grassland and *Ditrichum plumbicola* being adversely affected by encroaching ling (*Calluna vulgaris*), coniferous and broadleaved species.	Yes
39	001199	Castle Terrace 2	Current condition of this unit is uncertain	No
40	001200	Aberllyn Lead Mine 1	Calaminaraian grassland threatened by encroaching *Ulex europaeus*.	Yes
41	001201	Aberllyn Lead Mine 2	Need to monitor *Asplenium septentrionale* population.	No
42	001202	Cilcennus	Current condition of this unit is uncertain	No

Unit Number	CCW Database Number	Unit Name	Summary of Conservation Management Issues	Action needed?
43	001203	Plas Muriau 1	Calaminarian grassland and *Ditrichum plumbicola* being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes
44	001204	Plas Muriau 2	Calaminarian grassland and *Ditrichum plumbicola* being adversely affected by smothering effect of conifer needles and scrub encroachment.	Yes

7. GLOSSARY

This glossary defines the 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 CCW and the UK nature conservation agencies. None of these definitions is legally definitive.

Action — A recognisable and individually described act, undertaking or **project** of any kind, specified in section 6 of a **Core Management Plan** or **Management Plan**, as being required for the **conservation management** of a site.

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

Common Standards Monitoring — A set of principles developed jointly by the UK 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.

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 assessment — The process of characterising the **condition** of a **feature** with particular reference to whether the aspirations for its condition, as expressed in its **conservation objective**, are being met.

Condition categories — The **condition** of **feature** can be categorised, following **condition assessment** as one of the following[2]:

Favourable: maintained;
Favourable: recovered;
Favourable: un-classified
Unfavourable: recovering;
Unfavourable: no change;
Unfavourable: declining;
Unfavourable: un-classified
Partially destroyed;
Destroyed.

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 **conservation status** of a **feature,** expressed as a **vision for the feature** and a series of **performance indicators**. The conservation objective

[2] See JNCC guidance on Common Standards Monitoring http://www.jncc.gov.uk/page-2272

	for a feature is thus a composite statement, and each feature has one conservation objective.
Conservation status	A description of the state of a **feature** that comprises both its **condition** and the state of the **factors** affecting or likely to affect it. Conservation status is thus a characterisation of both the current state of a feature and its future prospects.
Conservation status assessment	The process of characterising the **conservation status** of a **feature** with particular reference to whether the aspirations for it, as expressed in its **conservation objective**, are being met. The results of conservation status assessment can be summarised either as 'favourable' (i.e. conservation objectives are met) or unfavourable (i.e. conservation objectives are not met). However the value of conservation status assessment in terms of supporting decisions about **conservation management**, lies mainly in the details of the assessment of feature **condition**, **factors** and trend information derived from comparisons between current and previous conservation status assessments and condition assessments.
Core Management Plan	A CCW 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 **conservation management** can also be considered as factors.
Favourable condition	See **condition** and **condition assessment**
Favourable conservation status	See **conservation status** and **conservation status assessment.**[3]
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**
Key Feature	The habitat or species population within a **management unit** that is the primary focus of **conservation 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 **conservation 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

[3] A full definition of favourable conservation status is given in Section 4.

	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 **Common Standards Monitoring**, 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 their associated **specified limits**, together with **factors** and their associated **operational limits,** 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. Performance indicators are part of, not the same as, conservation objectives. See also **vision for the feature**.
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	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 CCW's 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 limit	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 for the feature	The expression, within a **conservation objective**, of the aspirations for the **feature** concerned. See also **performance indicators.**
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**.

8. REFERENCES

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