April 2015



# Conservation and Management of Dyfed's Metal Mining Sites

*Wooden launder remains revealed and archaeologically recorded at Fron Goch mine as a result of remdiation works being undertaken in 2012*

Prepared by Dyfed Archaeological Trust

For Cadw

REGISTERED ORGANISATION IfA

ymddiriedolaeth archaeolegol DYFED archaeological trust

**DYFED ARCHAEOLOGICAL TRUST**

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# Conservation and Management of Dyfed's Metal Mining Sites

Gan / By

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Cadw

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## Valuing our metal mining heritage

## 1.0 Summary

This report sets out an assessment and analysis of the changing conservation and management concerns regarding the surviving physical remains of historic metal mining in Ceredigion, Carmarthenshire and Pembrokeshire.

This work has grown out of the Upland Ceredigion metal mine survey undertaken in 1992/3 by Robert Protheroe Jones as part of the Uplands Survey funded by the Royal Commission on the Ancient and Historic Monuments of Wales, his subsequent expansion of the survey to cover Carmarthenshire and Pembrokeshire in 2010 and the re-survey of Ceredigion mines which started in 2011. This information has been the basis of historic environment information and management advice provided by the Dyfed Archaeological Trust to a variety of decision makers.

The report considers changing perceptions of value, threats and management opportunities and the current tools available for protection and improving management for the future.

This study was originally conceived as a chapter in the full publication of the results of the Upland Ceredigion Metal Mine Survey. Due to unexpected delays in the completion of the re-survey of mine sites it has been decided to produce it as a standalone grey literature report which can be incorporated into the full publication at a later date.

## 2.0 Project Background

In 1992, as part of the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) funded upland survey, the Dyfed Archaeological Trust (DAT) were commissioned to undertake an assessment and condition survey of upland Ceredigion historic metal mines. During 1992 and 1993, Robert Protheroe Jones (RPJ) on behalf of DAT identified over 219 separate historic metal mine sites within this area. Research was undertaken and visits made to all the 120 sites where more than trivial production had occurred. Where features were visible 1st or 2nd edition OS mapping was used as a base map and annotated to identify and describe surviving visible features.

Information from this study was integrated into the Dyfed Sites and Monuments Record at the time (now the Historic Environment Record - HER), with a single digital record for each individual mine being created. This cross referenced with the full results of the survey which were available as a single copy of the paper based annotated maps held within the HER and another copy held by the RCAHMW in the National Monuments Record in Aberystwyth.

In 2009, the PLWM project, managed by Ceredigion County Council and funded by the European Agricultural Fund for Rural Development, Countryside Council for Wales and Cadw, supported the digitisation of the annotated maps and the detailed integration of each individual feature description into the digital database of the

HER. The aim of this was to increase the public accessibility of the survey results. Individual HER entries have now been created for an additional 1,958 metal mine features.

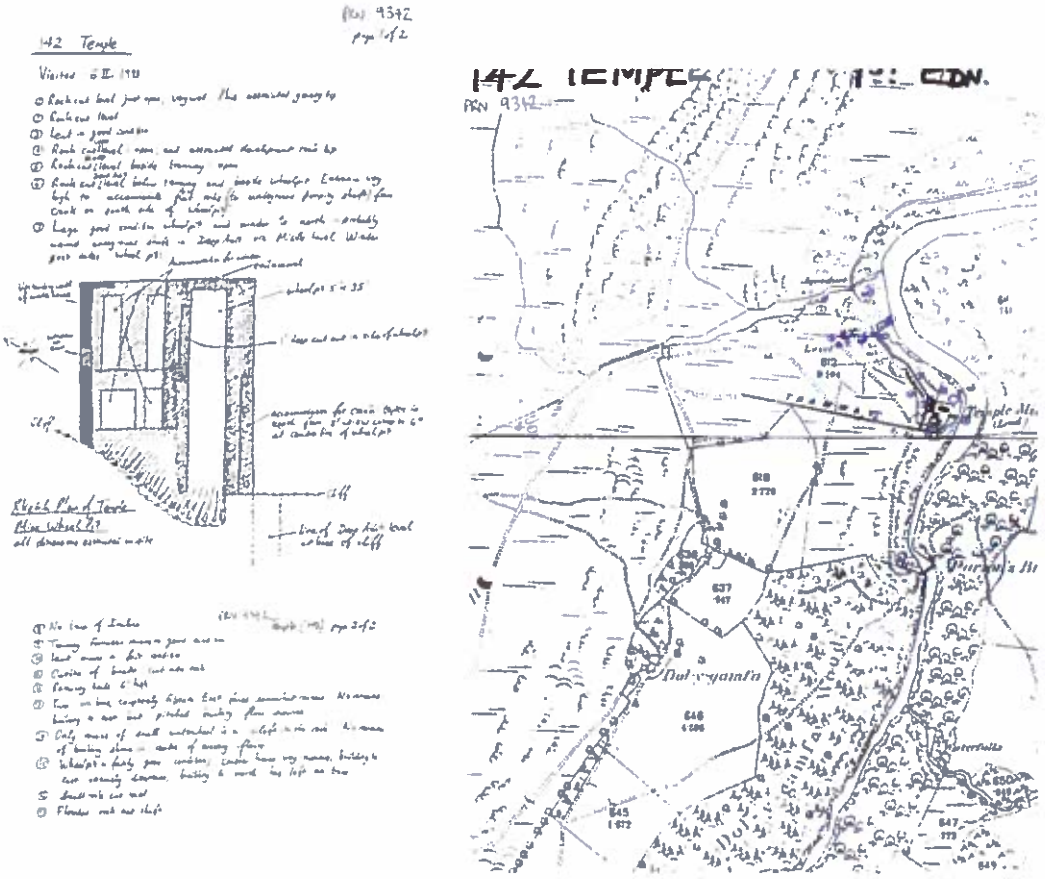


*Figure 1 Robert Protheroe Jones' 1990s survey map and annotations for Temple mine*

Following agreement by RCAHMW to support publication of a metal mine survey of south-west Wales an assessment and survey of sites within Carmarthenshire and Pembrokeshire, to complete a comprehensive study of the historic metal mine sites of the Dyfed region, alongside the re-survey of Ceredigion metal mine sites was started by RPJ in 2010.

With grant aid from Cadw approximately 200 new HER records were created for metal mine features in Carmarthenshire and Pembrokeshire in 2010/11. With the launch of Archwilio, the public on-line access to the Historic Environment Records for Wales, all of the individual HER records became available on-line.


*Figure 2 Screen shot of Archwilio showing Bryndyfi mine site records*

During 2011/12 and 2012/13 further grant aid was provided by Cadw to integrate the results of the updated survey of the mine sites being undertaken into the HER and to digitise and integrate the photographs taken as part of the 1992/3 survey.All of the 1992/3 survey results, along with digital copies of the annotated survey maps and example site photos, are now attached to individual mine records within the HER and therefore made accessible through Archwilio.

## 3.0 Conservation and Management of Metal Mine Sites - Changing Social attitudes

The history of the care and management of metal mining sites is linked with the public perception of their value, both generally to society and at a personal level to land owners.

### *3.1 Abandonment*

With falling lead prices in the 1870s and then zinc in the 1920s the mining of metal ore in Wales as a profitable industry had come to an end and mines were abandoned. This loss of economic and social opportunity resulted in the movement of skilled workers to other areas where their skills were still needed, such as the coal fields of South Wales. In much of the ore fields of upland Ceredigion the return to an agricultural economy resulted in significant depopulation, with agricultural decline also contributing to population loss, and many of the buildings and structures of the mines being abandoned.

© Beamish Museum
*Figure 3 Cwmystwyth dressing mills 1912*

### *3.2 Removal*

Despite some re-working of waste tips and re-use of buildings for other industrial or agricultural activities, the public attitude to the mines was either one of disinterest or they were seen as the remains and reminders of a dangerous and thankfully ended industry. From the 1970s public awareness of the pollution resulting from old mines rose and a desire to clean and clear the environment of these dangerous scars grew.

*(copyright Simon Hughes)*
*Figure 4 Goginan mine 1984*

*3.3 Protection and Conservation*

The increasing time since the closing of the mines enabled a changing perspective on their value as part of a lost industrial past. As a result of the research, investigation and recording of mining heritage by groups and individual industrial archaeologists they began to be seen as an important part of the heritage of Wales, of both national and international significance. Alongside the historical interest, the nature conservation significance of these sites also began to be appreciated, many being designated for the rare metalophyte populations which they support. [e.g. SSSI Mwyngloddfa Nant-Y-Cagl (Eaglebrook Mine)]

(copyright FCW)

*Figure 5 Rare metalophyte lychen at Eaglebrook mine*

*3.4 Interpretation, Presentation and Promotion*

Local communities are increasingly concerned to ensure that their history and heritage is not lost and forgotten. They feel the need to record and pass on to next generations what makes them who they are, and what provides that local identity and sense of place of where they live. Alongside this, tourism has become increasingly important to the economy of the area and the local distinctiveness, provided by the region's mining heritage, is recognised as a unique selling point and important economic asset. Increasing numbers of sites and features associated with metal mining are being interpreted and information about them presented for the public.

(copyright Spirit of the Miners)

*Figure 6 Interpretation panels on site at Pontceunant Power House*

## 4.0 Changing Threats and Opportunities

These changing social attitudes have resulted in a variety of changing threats to the physical remains of the sites. Alongside these is the ever present process of natural decay, the inevitable collapse of the vertical towards the horizontal.

Unless maintained, and kept weather proof, the individual features within sites will deteriorate, often to the point of catastrophic collapse. The neglect of buildings, resulting in ingress of water into walls and the washing out of lime mortar, eventually results in the collapse of masonry structures. Both above and below ground rotting timber and rusting iron results in structural collapse. Abandonment of sites also results in their colonisation with scrub and trees.

*Figure 7 Scrubbed over buddles at Bryndyfi mine 2006*

Following abandonment of underground workings more recent reworking of waste tips has had a significant impact on these otherwise stable elements of historic mine sites. Spoil tips have also frequently been exploited as a convenient source of stone for road and track construction.

Situated away from prying eyes many mine shafts, adits and opencasts have been used as convenient dumping areas for a variety of agricultural and domestic refuse. Although probably not as widespread due to the remote nature of many of the sites the salvaging of materials including building stone and easily accessible metal fixtures and fittings as scrap has also taken place.

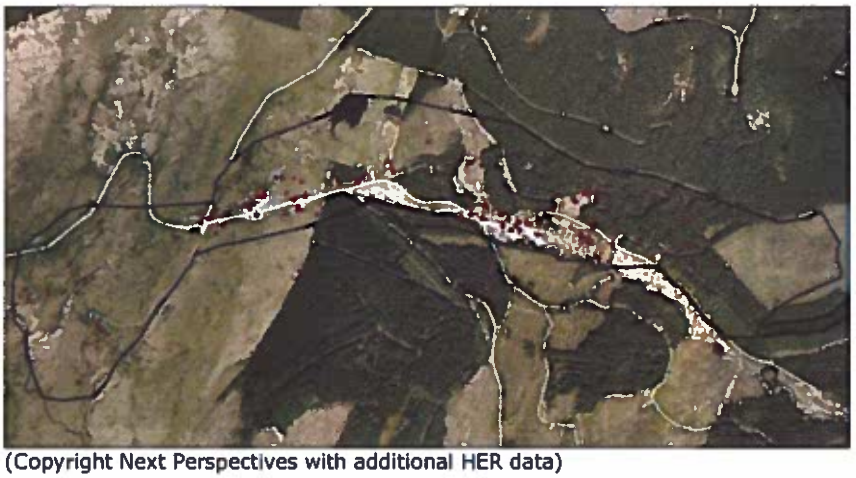
Of greater impact has been the demolition of "dangerous" structures. Concerns over public health and safety and corporate liability has resulted in mine buildings, particularly adjacent to public roads, being targeted for demolition in order to reduce risk and liability to responsible bodies. During the 1990s a number of significant structures were demolished. For example Old Place (Barracks) at Cwmystwyth.

*Figure 8 Cwmystwyth barracks c. 1987*

*Figure 9 Cwmystwyth barracks 1992/3*

*4.1 Afforestation*

Following the First World War tree planting was encouraged to ensure future self sufficiency in timber and large areas of upland Ceredigion were covered by coniferous forestry. In many areas both the preparatory ploughing and the construction of access tracks and forest rides during planting damaged mining sites. While mine buildings and structures were not necessarily planted on directly the surrounding metal mining and ore processing landscapes were scarred by cultivation and then swallowed up and hidden beneath blankets of trees.



(Copyright Next Perspectives with additional HER data)

*Figure 10 Esgair Fraith mine with afforested areas*

*4.2 Pollution Remediation*

The mining and processing of ores has resulted in greatly increased exposure of humans and animals to contaminants through water, soil, or from food grown on contaminated land. This is not a new problem. In the early 19th century landowners complained that local rivers were almost barren of fish, and cattle died from drinking polluted water.

The local authority is obliged to remove or reduce the risk of pollution to people, animals and the environment. Local authority remediation schemes in the region include works at Goginan in the late 1980s, at Cwmsymlog in 1981 where work was carried out to prevent wind-blown contamination; at Bwlch Mine, Cwmerfyn in the mid 1990s where following archaeological recording tip material was placed over surviving dressing floors and landscaped; and at Ystrad Einion and Cwmbrwyno where fine tailings were encapsulated.


(copyright Simon Hughes)

*Figure 11 Remediation works at Cwmbrwyno mine 1998*

Ceredigion County Council's Contaminated Land Inspection Strategy document is available on the web at: www.ceredigion.gov.uk

The scale and character of some of these late 20th century remediation schemes have been criticised. For instance the Environment Agency stated:

> "A major criticism of early reclamation schemes is that they were designed almost exclusively as civil engineering projects, with a monolithic approach to the site using large-scale material movement and hard engineering solutions. In many cases the design of the project has been extended from limited areas of acute concern (e.g. eroding tailings tips) to areas of the site of relatively little pollution potential (e.g. stable waste rock tips, workings, standing structures). The projects have used a limited hard landscaping palette, replacing diverse habitats and landscape features with areas of uniform improved pasture grasses and concrete features. This style of reclamation of spoil tips often produces a curiously ugly and sterile-looking landscape (as at the Goginan mine, the west part of Cwmsymlog), which can

look much less well integrated with the local landscape than the original workings." [Environment Agency, 2002]

*4.2.1 Metal Mines Strategy for Wales*

The Metal Mines Strategy for Wales initially produced in 2002 identified the top 50 metal mines posing a risk to the Welsh environment.

The specific objectives of this piece of work were to:

- Bring together the site specific views of various stakeholders in one document;
- Identify sites with differing stakeholder views or concerns;
- Revisit the Agency's priority list such that better informed decisions can be made regarding the prioritisation of sites.

Issues were raised by stakeholders in four topic areas:-

- Archaeological or historical
- Mineralogical
- Biological
- Other issues (aesthetic landscape)

The 50 mine sites were grouped depending on whether issues identified converged or diverged and in summary a total of 31 out of the 50 mine sites fell within groups where it was considered that there was the potential to achieve a consensus of opinion, on the best environmental course of action. From these 31 a prioritised list was produced, identifying metal mines where there was a need to investigate possible remedies to deal with pollution. The top five sites on this list were: Parys Mountain, Anglesey; Dylife, Powys; Fron Goch and Wemyss; Cwm Ystwyth; and Cwm Rheidol – the last three all in Ceredigion.

Due to the lack of centralised funding for remediation at these sites mines are being addressed individually as opportunities arise. For example at Cwm Rheidol rather than looking at large scale works, efforts were spent to understand the processes and mechanisms of pollution in order to focus limited actions to address specific issues and problems in relation to water flow and percolation.

*4.3 Health and Safety*

A major concern for landowners regarding historic metal mining sites has been the danger to life and limb of people and stock through accessing underground works either deliberately, or accidentally by falling into open shafts and other workings. As well as known entrances, there is also the constant danger of underground workings opening up unexpectedly under the feet of farmers or walkers. The responsibilities of landowners for accidents occurring on their land has driven some landowners to fence off or cap shafts and block or grille other ways in to underground workings such as adits. These actions can disturb or destroy important historic features and deposits if done without due consideration.

As the owners of large areas of mineral rights in Ceredigion the Crown Estates, concerned to ensure that there is no public access to dangerous areas of mines,

have fenced off shafts, and blocked or grilled adits, seeking to prevent all access. This lack of access to historic underground workings has concerned a number of special interest groups who wish to continue to study and record these sites.

*4.4 Tourism*

The heritage tourism potential of the mines was recognised in the early 1970s. A particularly successful venture was the formation in 1973-4 of the Llwernog Silver-Lead Museum at Llwyernog near Ponterwyd (Walker 1998).

The Llywernog Mine has recently re-opened after major refurbishment as a themed attraction known as the Silver Mountain Experience. The new attraction will include a longer and more dramatic themed underground tour, new cafe and retail shop, a water-play area for children with panning and gem jigging, woods full of myths & legend, and a completely redesigned mining heritage and green energy zone.

Increasing use of tracks and other public rights of way for off-roading by users of recreational vehicles as a hobby has resulted in damage and erosion to sites. Forestry Commission Wales undertook work on sites to block access points and discourage vehicle use on unsuitable routes across historic mine sites. The increase in off-roading has also been seen as a tourism opportunity and has resulted in proposals for further encouragement of off-road vehicles in the Cambrian Mountains.

The extensive below ground tunnels and shafts of the mines have also been a draw for cavers and mine enthusiasts although their interest has been discouraged by landowners and other authorities due to the significant dangers of underground exploration.

(copyright G.Levin)

*Figure 12 Within the mines tools, machinery and evidence of daily life survives*

*4.5 Agricultural Diversification*
The encouragement of agricultural diversification to support the rural economy in west Wales has resulted in a variety of grants being made available for business development. Tourism is recognised as a significant economic driver and grants have been available to encourage farmers to provide B&B for tourists. Local heritage attractions are an important part of local distinctiveness and sense of place.

More recent grants supporting agricultural diversification are those for renewable energy developments. In particular micro hydro power generation. These schemes have in some cases sought to use the water management features from historic mine sites.

Welsh Government has made a significant commitment to the creation of 100,000 hectares of new woodland across Wales by 2030. The main funding tool to achieve this is Glastir, the new agri-environment scheme. Although definable archaeological features will be protected from planting this level of new woodland creation could have a considerable impact on the landscapes of Wales, and in particular on the setting of historic mines.

*4.6 Community Regeneration*
"Spirit of the Miners" was a community regeneration project that set out to create an identity for northern Ceredigion using the legacy of metal mining as a theme for regeneration. The project mainly focused on the human, social and community aspects of mining culture. In short, the very reason why many of the upland villages exist. As well as supporting some conservation projects the Spirit of the Miners worked with communities to raise awareness of the region's metal mining heritage and its potential to support economic regeneration.

## 5.0 Changing Condition

There are a series of sources which can be used to assess changing condition of metal mines over time. Of particular use are:

- 2nd edition OS Mapping
- Mine surveys from 1960s and 1970s by David Bick and others (e.g. see Bick 1975 and 1976).
- RPJ survey of 1990s
- RPJ resurvey 2010-12

The condition information available from the 2nd edition OS mapping dating to *c.*1905 provides a useful starting point from which to assess the condition for those sites which were either still in use or recently abandoned at the beginning of the 20th century.

The 1990s survey provides another fixed point in terms of condition data. The mechanisms which have resulted in the identified changes in condition over this *c.* 100 year period are not always evident.

The analysis of the completed resurvey upland Ceredigion data will provide a detailed understanding of the rate of change, the mechanisms of change, the success or otherwise of the use of statutory designations and other management tools to protect and improve site management over the past *c.*20 years . With detailed analysis it will also be possible to compare the results of different management tools.

Analysis of particular types of mine site features will also be achieveable and consideration of whether particular aspects of sites are suffering higher levels of erosion and damage than others can be undertaken. For example:

Above ground features

- Waste dumps
  - Removal - Recycling/reuse e.g. as for road stone
- Buildings
  - Natural deterioration and decay
  - Demolition
    - H&S justification
    - Re-use of building materials
  - Conversion
- Processing areas
  - Pollution alleviation
- Leats, roads, tramways
  - Erosion
  - Re-use as access tracks
- Reservoirs
  - Peat bog formation
  - Draining and breaching of dams – H&S justification

Below ground

- Types of change
  - Natural decay and deterioration
  - filling with water
  - tunnel collapse

## 6.0 Multiple Values

All metal mining sites will have a variety of values. These include "use" values such as their value as educational, economic and community resources, as well as their intrinsic values - e.g. wildlife, historic and cultural significance of a site.

### *6.1 Mineral Conservation Value*

Unsurprisingly, the geological and mineral importance of mining sites can be very high and nationally important exposures can be protected under a statutory designation. Geological Conservation Review sites (GCRs) are notified as Sites of Special Scientific Interest (SSSIs). There are ten such sites in the Central Wales Orefield. Regionally Important Geodiversity sites (RIGs) have been selected for educational, scientific, aesthetic or historical reasons. They are not protected by

law, but rely on sympathetic management by landowners and tenants. Thirty-six such sites have been designated in the Central Wales Orefield.

*6.2 Nature Conservation Value*

Overgrown metal mine sites provide important habitats for plant and animal species. The damp and shady conditions at the entrances to adits, provide ideal conditions for ferns, including the rare forked spleenwort (Alsplenium septentrolne). Mine-water and spoil tips provide extreme conditions for life, but also little competition from un-adapted species. This allows unusual communities of 'metalophyte' plant species to develop, including: Alpine pennycress (Thalspi alpestre); Common Bent Grass (Agrostis capillans); Sea Campion (Silene maritiana); Lead Moss (Ditrichum plumbicola) and Metallophyte lichens. Adits and mineshafts also provide important roosts for a variety of bat species including Long Eared, Whiskered, Brandts, Natters, Dawbertons, Lesser Horseshoe and Greater Horseshoe bats. Some of these are species which are protected in their own right and several mine sites are afforded statutory legal protection by the wildlife and countryside act as SSSIs.

*6.3 Cultural/Folkloric Value*

Mining heritage also survives in the traditions and memories of the people that live and work in Ceredigion today. It is important to record this surviving knowledge and encourage continuing cultural traditions to be passed on to the younger generations. For instance miners believed that ore could be discovered with the assistance of 'knockers' or underground spirits similar to the Cornish 'piskie' or the Irish 'leprechaun'. Lewis Morgan wrote in around 1744:

> "our knockers... have a language which we don't as yet thoroughly understand, but as we understand dumb men by motions, tho'we hope to come to it by and by:we only know they are our very good friends, and have actually discover'd us hidden treasures.."

Technically, the sounds heard underground and attributed to the 'knockers' were caused by stresses released in the rock once the ore was removed. However, the 'knockers' were the miners' friends being left food and drink to increase the chances of good ore finds.

*6.4 Heritage Value*

The surviving remains of West Wales' historic mining are now recognised as an important part of Wales' unique mining heritage. Individual sites are of national importance and collectively are of international significance.

*Figure 13 Well preserved buddles revealed and archaeologically recorded during remediation works at Fron Goch mine 2012*

## 7.0 Heritage Management Tools

*7.1 Statutory Designation*

There are a variety of tools available to assist in the protection and management of metal mine sites. The most powerful of which is the designation of a site as a Scheduled Ancient Monument (SAM). There are a total of 14 mine sites in Dyfed currently designated at least in part as SAMs specifically identified as mining sites of national importance. A further three buildings and structures are Listed Buildings and protected under the Town and Country Planning Acts. As well as providing a formal protection process these designations help to highlight the historic and archaeological importance of these sites more broadly.

This recognition of their significance and has resulted in a combined effort to secure improved management on these sites and all of the case studies where positive conservation works have been achieved presented here have taken place on SAMs or Listed structures.

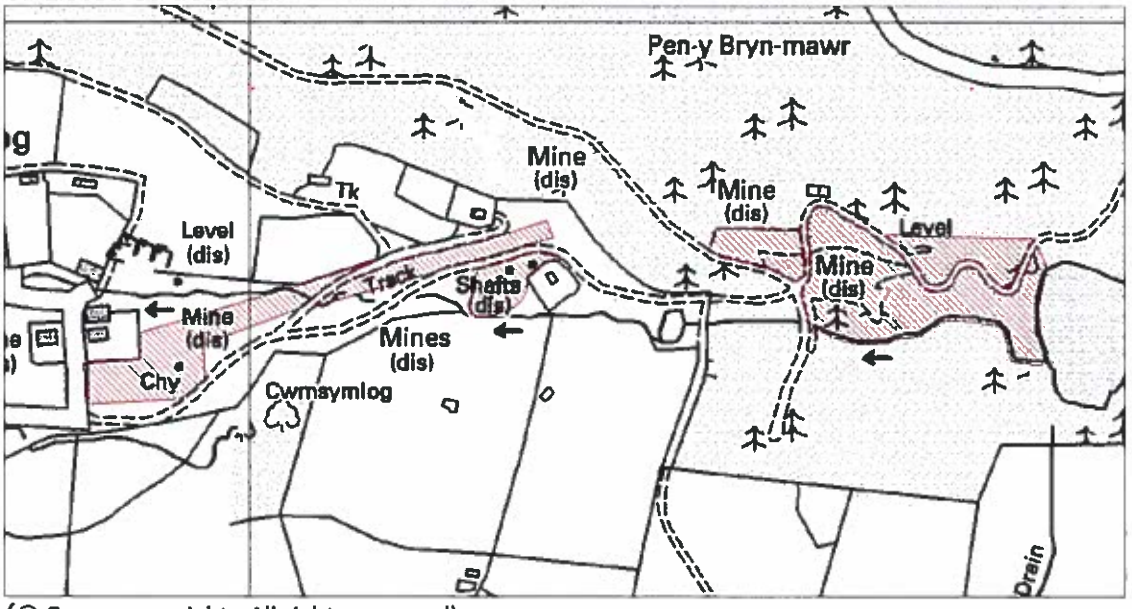





*Figure 14 Map extract showing Cwmsymlog and Blaen Cwmsymlog scheduled areas*

*7.2 The Planning Process*

For those sites which are not designated the planning process provides a level of protection against damage by actions which require planning consent. For example in Ceredigion the Unitary Development Plan (Ceredigion Unitary Development Plan 2001-2016) has a specific policy relating to land reclamation and metal mines. The overall aim of this policy is to prevent the indiscriminate tidying up of these sites and their loss of nature conservation, scientific or archaeological interest:

> ENVP3.3 Metal Mines
> Land reclamation, capping or works associated with the restoration or the development of derelict metal mines will only be permitted where:
> 1. There is no significant adverse effect on nature conservation, scientific or archaeological interest of the site;
> 2. The works will not result in pollution of either groundwater or surface waters;
> 3. There is no loss of visual amenity;
> 4. There is a significant risk of harm to the public, certain ecological systems or risk of pollution of controlled waters from the land in its current state and works are required to alleviate the risk;
> 5. Adequate and acceptable arrangements have been made for the survey of the site, and the recording and reservation of any features, and or items of interest.

As recognised archaeological sites, recorded within the regional Historic Environment Record, historic mine sites are also protected through local planning authority Unitary Development Plans' archaeological and historic landscape policies (Carmarthenshire County Council, Unitary Development Plan, adopted July 2006).

For example:

> BE2 - Archaeological Sites
> It is the policy of Carmarthenshire County Council that developments or works which would adversely affect the preservation, archaeological potential, amenity, historic value or the setting of sites of local or regional archaeological importance will not be permitted. Exceptions will only be made where the planning authority, in considering the relative importance of the remains and the likely effect of and need for the proposal, is satisfied that:
>
> (i)the adverse impacts are minimised; and
> (ii)the need for the proposal outweighs any likely harm.
>
> The council will seek where possible to preserve the remains in situ. Where preservation in situ is not practicable the council may require excavation and recording of the archaeological remains.

*7.3 Non-statutory Designations*

A further tool for highlighting the importance of the historic environment in Wales is the non-statutory Register of Landscapes of Historic Interest in Wales (CCW, Cadw, ICOMOS UK, 1998). The main purpose of the Register is to provide information for those taking decisions about landscapes; managers, planners and developers. By describing clearly what makes an historic landscape special, how it has evolved over the centuries and what is characteristic of that landscape the Register aims to help ensure that changes and new developments can be accommodated in ways that will cause the least harm to the historic character of the land.

Historic metal mines are recognised as being an important characteristic of the Upland Ceredigion Registered Landscape of Outstanding Historic Interest in Wales (CCW, Cadw, ICOMOS UK, 1998)

> "The impact of these mines on the historic landscape is considerable: there are very few historic landscape areas that do not contain some physical evidence of mining, and many possess considerable remains. Spoil heaps are the most common, and in many instances the most obvious and dramatic, remains associated with lead mines, but other structures are also often present: engine houses, processing plants, crusher houses, wheel pits, dressing floors, shafts and levels, and inclines and tramways. Because of the industry's extraordinary reliance on waterpower, leats, dams and reservoirs are ever-present in Ceredigion's upland landscape. An account of mining remains is provided in each of the relevant historic landscape area descriptions.
>
> The success or not of the metal mining industry had a direct affect upon population levels and a concomitant effect on the settlement pattern, transport infrastructure and limits of cultivation and enclosure in this upland area of Ceredigion. Aitchison and Carter (1998, 8) have noted that in three parishes in north Ceredigion, a rapid rise in population in the second half of the 19th century, followed by an equally rapid fall, can be directly attributed to an increased production of lead ore and subsequent exhaustion of veins and mine closure. A graph of 19th century lead ore production from Ceredigion mirrors that of population. Abandoned cottages, houses and a retreat of cultivation from marginal areas are some of the effects of the changing fortunes of the lead mining industry that have embedded themselves in the historic landscape". (Murphy 1999).

Welsh Government planning guidance requires the consideration of the impact of proposed development on historic landscapes.

> "Information on the historic landscapes in the second part of the Register should be taken into account by local planning authorities in considering the implications of developments which are of such a scale that they would have a more than local impact on an area on the Register (see para 6.4.9)." (Planning Policy Wales, Nov 2012, Chapter 6, Paragraph 6.2.25)

### *7.4 Historic Landscape Characterisation*

Each of the Registered Historic Landscapes (HLCs) has been assessed and anlaysed in order to produce an historic landscape characterisation. This involves the examination of historic processes that have shaped and moulded the present-day landscape. Components that make up the landscape such as field boundary types, field shapes, buildings, settlement patterns, parks and gardens, roads and railways, industry, and archaeological sites are all taken into consideration during characterisation. By analysing all components it is possible to divide the landscape into historic landscape character areas. Each area comprises components that are distinct from its neighbours.

Upland Ceredigion includes a number of individual character areas whose landscape character and essential historic landscape components are predominantly associated with historic metal mining.

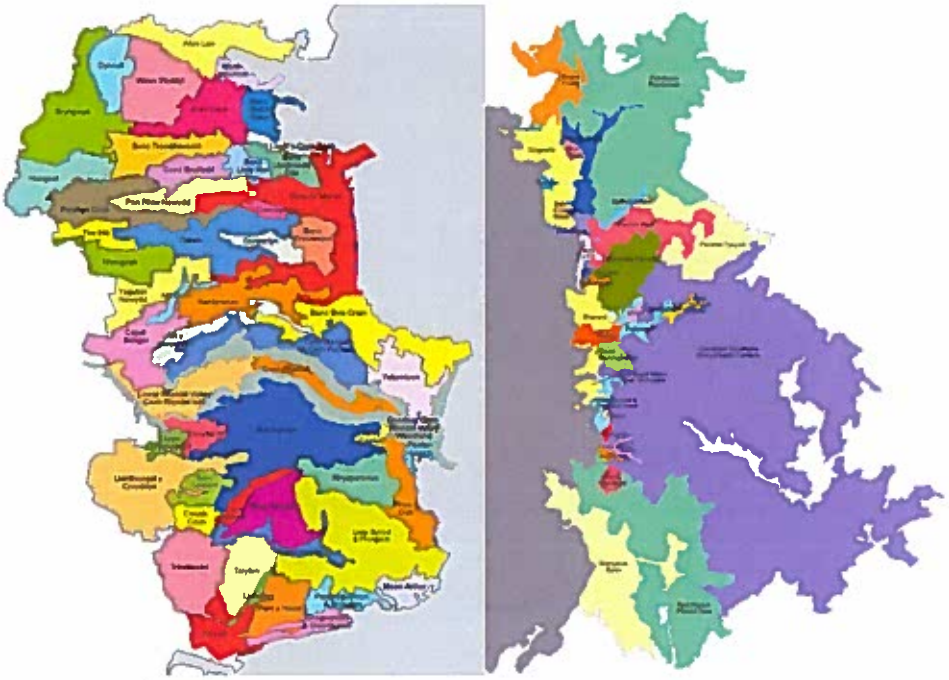
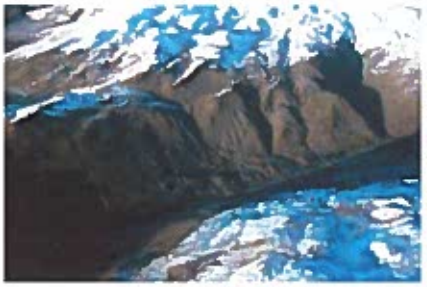
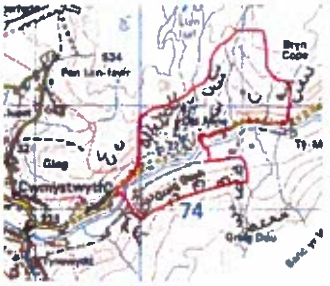


*Figure 15 Map of Historic Landscape Character areas for parts of Upland Ceredigion historic landscape*

**Cwmystwyth – Historic Landscape Character Area**






**Summary**
Cwmystwyth is an old industrial landscape. The remains of metal mining are spread across the floor and sides of the steep-sided, craggy valley of the Ystwyth.

**Historic Background**
This historic landscape area has been defined by the mining industry. Archaeological excavations have demonstrated that opencast copper mining was undertaken here in the Bronze Age (Timberlake 1995), and lead has been mined here since at least Roman times (Bick 1974, 19-23; Hughes 1981). Metal was probably worked under the control of Strata Florida Abbey in the Middle Ages as this area lay within Cwmystwyth Grange. In the 18th century prospecting for lodes by scouring the surface of the ground by a sudden rush of water - hushing - was practised, and the channels and reservoirs of this process can still be seen. Metal mining in the 18th and 19th centuries has bequeathed a bewildering array of remains, an industrial archaeologist's paradise, including: tips, shafts, tramways, inclines, open-casts, crusher houses and other buildings. In the late 19th century the search for blende resulted in the construction of a large crusher house - the rusting remains of which have only recently been swept away - and other installations. Work finally ceased at Cwmystwyth in 1921.

**Description and essential historic landscape components**
This area, which is entirely defined by industrial archaeology, lies across the valley sides and the valley floor of the Ystwyth. The valley here has a deep U-shaped profile, with the floor at 300m and the sides rising to over 500m. The sides are craggy, even cliff-like on the northern side. Many scree slopes are more likely to be a result of mining than a natural process. Mining remains are everywhere. These are varied and most are of a robust character. Remains of stone built structures in this area – domestic and industrial are scattered across the landscape. Many are in a perilous condition.

Recorded archaeology comprises remains directly associated with the metal mining industry, including finds of Roman date, or remains indirectly associated with the industry such as abandoned worker cottages.

This is a well-defined area comprising the industrial archaeology of the metal mining industry. To the north and south lies high, unenclosed moorland, and to the east and west the enclosed and settled valley floor of the Ystwyth is found.

*Figure 16 Cwmystwyth Historic Landscape Character Area Description*

## *7.5 Agri-environmental Schemes*

### 7.5.1 Tir Gofal

This agri-environmental scheme was introduced in 1999 as a scheme which aimed to integrate whole farm environmental and agricultural management under a single agreement. Administered by the Countryside Council for Wales (CCW) on behalf of Welsh Assembly Government later passing to Welsh Government. The last Tir Gofal agreements will end in 2014.

The Tir Gofal scheme included a whole farm payment to support the farm in meeting a basic and standardised code of management practice. To meet this, farmers needed to follow the whole farm code which aimed to protect landscape, wildlife and historic environment features and provide new access to the public. To meet these obligations historic landscape features had not be damaged or destroyed. Traditional buildings had to be maintained in a weatherproof condition.

Initial information and advice, from the Welsh Archaeological Trusts (WATs), regarding the known historic environment of the farm from desk-based sources was provided to all farmers going into the scheme. In Dyfed, initial desk based studies undertaken for farms included remains from 145 lead, silver, zinc or copper mines. This ensured that, for all of the identified mines, farmers at least knew these to be features that were valued by the scheme

For *c.* 20% of all farms going in to the scheme a farm visit was undertaken by the WATs in order to record detailed condition information in order to be able to provide specific management advice for individual features. The management advice for these farms included 54 mine sites and detailed and specific management recommendations were provided for historic metal mine features on 17 farms. [See Case Study No.5 - Tir Gofal recommendations for Bryndyfi Mine]

*7.5.2 Better Woodlands for Wales*
The Better Woodlands for Wales (BWW) forestry grant scheme was introduced in 2004 by the Forestry Commission Wales to place a greater emphasis on good quality woodland management. The scheme was launched in 2006 and replaced the existing Woodland Grant Scheme and the New Native Woodland Planting Scheme. The scheme is in operation across the whole of Wales, offering grants especially designed for Welsh woodlands, based upon an approved long term management plans. The four Welsh Archaeological Trusts have been responsible for the provision of historic environment management planning advice within the scheme, and the Trusts have been consulted on every application to the scheme whether for management of existing woodland or areas of new planting. Information and management advice has been provided on 22 lead, silver, zinc or copper mines in Dyfed contained within BWW management areas.

*7.5.3 Glastir*
Glastir is a new Sustainable Land Management Scheme for Wales, which in 2013, replaces the four existing agri-environment schemes of Tir Gofal, Tir Cynnal, Tir Mynydd and Organic Farming Scheme/Organic Farming Conversion Scheme. Glastir is a 5 year whole farm sustainable land management scheme available to farmers and land managers across Wales.

In order to inform the new scheme the Welsh Archaeological Trusts, with support from Cadw, used HER data to map the extent, where possible, of archaeological sites and features. Due to the detailed information available from the 1990s survey in Dyfed it was possible to map the extent of all 120 of the recorded metal mine sites.

Glastir Entry
A whole farm land management scheme open to application from all farmers and land managers throughout Wales, Glastir Entry, is designed to provide support for the delivery of environmental benefits that meet today's challenges and priorities. Successful applicants will make a commitment to deliver environmental goods for five years under a legally binding contract.

Under this element, there will be a set of compulsory requirements which will apply to all land entered into the contract, which includes the protection of identified Historic Environment Features (HEFs).

Glastir Advanced
Glastir Advanced requires each farmer entering the scheme to deliver environmental benefits through positive management of identified targeted environmental issues. Where Historic Environment Features (HEF) are present on a farm going in to this aspect of the scheme the farmer will be required to deliver at least one positive management benefit for the HEFs on the farm. Through the scheme pro-active HEF management opportunities are identified by the Welsh Archaeological Trusts for *c.* 40% of farms across Wales.

In the first round of Glastir Advanced (2013) of the 35 positive management opportunities identified for farms in Dyfed three were specifically for metal mine sites, including Glog-fach/ Glog-fawr mines, Penlanfach mine and Erglodd Magazine.

[See Case Study No 6 Management actions identified in Penlanfach Metal Mine HEF management report]

## 8.0 Practical Considerations for Protection/Conservation

Intervention at mine sites, however well intentioned, can cause further damage, increase pollution risks and severely affect their archaeological and historical value. Many sites are now relatively stable and best left undisturbed. General considerations for the management of mine sites might include:-

- Avoid sub-soiling, pan-busting, stone clearing or drainage operations
- Plan vehicle tracks away from visible or potentially buried remains
- Do not plant trees on sites

Sympathetic management can make mine structures safe and ensure their survival for the future. Specialist advice should always be obtained before undertaking any consolidation work on mine sites but the following could be considered.

- Remove trees and vegetation on walls (prevent re-growth but leave roots)
- Control scrub by cutting at ground level and treating stumps with herbicide.
- Remove dumped rubbish, but leave collapsed stonework.
- Cap and re-point walls using lime mortar (cement can cause further damage)

## 9.0 Recent Conservation Examples

*Ceredigion*

The extensive reclamation schemes of the 1980s and 1990s, e.g. Cwmbrwyno, resulted in significant impacts to the historic resource with relatively limited archaeological investigation and recording being achieved before and during the works. Such reclamation and remediation schemes preceded the Environment Agency's Metal Mine Strategy. This Strategy has a far more integrated approach, and recognising the various values of the sites has resulted in more focussed and limited intervention resulting in much reduced impact on archaeological remains and in some case improved protection of previously threatened features.

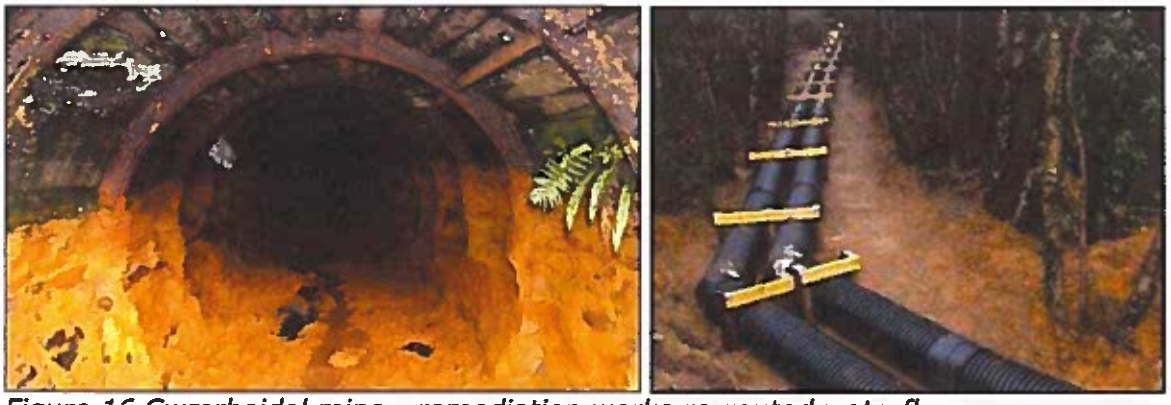


*Figure 16 Cwmrheidol mine - remediation works re-routed waterflow*

Some specific projects, such as The Spirit of the Miners, have been able to access European funding and through this have been able to support conservation projects which were in turn run by local businesses, communities or special interest groups. These included the gunpowder magazine at Llywernog museum. See also case study 3 - Cwmsymlog chimney.

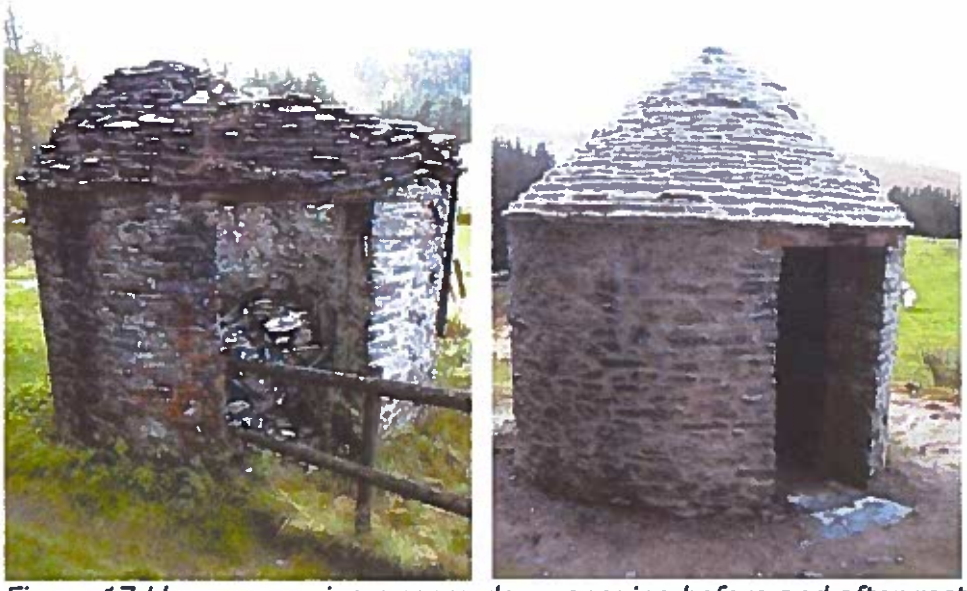


*Figure 17 Llywernog mine gunpowder magazine before and after restoration as part of Spirit of the Miners Project.*

*Pembrokeshire*

Opportunities for alternative re-use have also been found. An example of this is at Llanfyrnach Engine House, Llanfyrnach, Pembrokeshire. Here the listed grade II engine house was converted into a domestic dwelling in 2008.

*Figure 18 Llanfyrnach Engine House 2008*

*Wales wide*
Elsewhere in Wales there are examples of positive conservation resulting from reclamation works on historic mine sites.

At Minera the old mineral waste heaps were recognised to pose a potential health hazard due to high levels of heavy metals as well as the danger of the old shafts. Originally approved in the early 1970s by Welsh Development Agency the 20 hectares of land was acquired by Wrexham Borough Council and the scheme details finalised and the first phase of work commenced in 1988, with the second phase completed in 1991. The works included movement and capping of contaminated material with extensive new landscaping. During the reclamation works extensive archaeological remains were revealed, archaeological recording took place as part of phase 2 works and it was possible to protect major parts of the mine. The discoveries lead to the establishment of the Minera Lead Mines Visitor attraction, with the reclaimed land forming a Country Park (Bennett 1995)

(copyright Wrexham Borough Council)
*Figure 19 Minera Engine House and Chimney following restoration*

A major grant from The Heritage Lottery Fund will be harnessed to conserve significant buildings at Parys Mountain, such as the iconic summit windmill and Cornish Beam Engine House, alongside funding from Cadw's Heritage Tourism Project. The restored structures will be conserved for future generations and interpreted for the public. Access on the mountain's heritage trail will be improved in the process by providing a shorter and spectacular route. The project will offer significant levels of participation from among the town's community in hands-on conservation and archaeological projects and acquiring heritage related skills. The project will involve local training Agency, Parys Training, and utilise the educational expertise of Coleg Menai and Bangor University (Copper Kingdom Project strikes gold 24/03/2011 http://www.hlf.org.uk/news/Pages/CopperKingdom.aspx#.UVrtpVd30dU)

## 10.0 Future Opportunities and Challenges

Over the next few years there are changes ahead which have the potential to have a detrimental impact on the survival and protection of the region's metal mining heritage. These changes, and our responses to them, need to be considered and where possible planned to include an understanding of the importance and vulnerable nature of these fragile resources.

### *10.1 Changing Climate*

The likely changes to the environment as a result of climate change are still uncertain but there is increasing evidence to suggest that the locations of optimal areas for particular habitats and individual species will shift.

A recent study has highlighted potential threats as a result of climate change to archaeological sites in upland environments as follows:

> "Some of the best preserved archaeological sites in Wales are located in upland environments and so by their very nature are sensitive to change. More frequent and intense storms will result in erosion of these sites, but the main threat could result from the opportunity offered by warmer mean temperatures and a longer growing season to push back the boundaries of farmland into the margins of this zone. This could bring archaeological sites into a more intense agricultural regime than they have previously experienced." (The Countryside and Community Research Institute, the Dyfed Archaeological Trust, and the Centre for Environmental Change and Quaternary Research, 2012)

### *10.2 European Directives*

Future changes to the Common Agricultural Policy are likely to impact on the agricultural regimes of the region. Not only the predicted greening requirements, where environmental benefits will be expected for basic agricultural support (this funding is currently in the form of the Single Farm Payment), but the lead up to any changes could result in farmers "improving" pasture, and thereby damaging archaeological remains, prior to the new rules coming in to force.

### *10.3 Welsh Government "Sustaining a Living Wales"*

An ecosystem services approach to environmental management is now being proposed by Welsh Government. The proposals which have been set out in the

consultation papers have so far not provided the level of detail necessary to understand the implications for the management of the historic environment. However the proposed new approach has so far failed to recognise the historic environment as an intrinsic part of the environment of Wales. It is vital that it is recognised as a fundamental supporting ecosystem service in the same way as Geodiversity.

## 11.0 Future Management

To achieve positive future management for metal mine sites it will be necessary to consider and ensure that the following issues are addressed.

### *11.1 Raising Interest and Understanding Amongst Landowners*

Metal mines sites need to be recognised and appreciated as local social and economic assets. If the landowners are not interested in the future of these sites they will continue to deteriorate. It has to be worthwhile for owners. To positively support the protection and conservation of such sites on their land they will need to feel supported both by the state and their community. Not only recognising the intrinsic value of the historic remains, but also recognising their potential to economically benefit an area through attracting tourists.

### *11.2 On-going Research*

Recording and investigation to improve our understanding of these sites is essential to ensure that limited resources for their conservation and management can be best spent. Maintaining accessibility – particularly underground - is also required

### *11.3 Broadbased Engagement in Decision Making*

Cadw's Conservation Principles for the sustainable management of the historic environment in Wales (Cadw 2011) recognise the multiple values of heritage assets as including communal value, as well as environmental value. They also recognise the historic environment as a shared resource.

It is important to recognise that decision making about the future of such sites must therefore ensure widespread involvement of a variety of interested stakeholders. These need to include the local community as well as special interest groups such as the Welsh Mines Society, Early Mines Research Group and Welsh Mines Preservation Trust, statutory bodies, etc.

### *11.4 Integrated Holistic Landscape Approach to Conservation*

Mine sites do not exist in isolation. They form part of an intricate network of communication and transportation routes alongside an extensive water management systems which often links and powered numerous mines and ore processing areas. Mines were also a fundamental part of a community and socially structured landscape which includes the settlements, places of worship, shops, etc of the mine workers and managers. It is the relationship between these elements which can often provide as much understanding of the way of life of the miners and their families as the mines themselves.

Conservation should therefore not only consider each element of these landscapes in isolation but also consider the significance of these other relationships and associated features. Joint working by statutory agencies is therefore an essential pre-requisite for such an approach but it is also vital for all aspects of the local community to be involved in this process.

## Sources


***Grey literature***

Murphy, K., 1999, Historic Landscape Characterisation Upland Ceredigion Registered Landscape of Outstanding Historic Interest in Wales

The Countryside and Community Research Institute, the Dyfed Archaeological Trust, and the Centre for Environmental Change and Quaternary Research, 2012, A Strategic Approach For Assessing And Addressing The Potential Impact Of Climate Change On The Historic Environment Of Wales

***Web published***

Ceredigion County Council, Ceredigion Unitary Development Plan 2001-2016

Copper Kingdom Project strikes gold 24/03/2011 http://www.hlf.org.uk/news/Pages/CopperKingdom.aspx#.UVrtpVd30dU

IMWA Symposium 2007: Water in Mining Environments, R. Cidu & F. Frau (Eds), 27th - 31st May 2007, Cagliari, Italy THE CWM RHEIDOL METAL MINES REMEDIATION PROJECT – PHASE 1 Paul Edwards and Hugh Potter *mwen.info/docs/imwa_2007/IMWA2007_Edwards.pdf*

Murphy, K., 1999, Historic Landscape Characterisation - Upland Ceredigion, Themes – Industry, Cambria Archaeology http://www.dyfedarchaeology.org.uk/HLC/uplandceredigion/_uplandceredigionhistorical.htm

Welsh Government, Nov 2012, Planning Policy Wales, Chapter 6, paragraph 6.2.25

***Published***

Bennett, J , 1995, Minera lead mines and quarries

Bick, D. 1976, Old Metal Mines of Wales : Part 1 Cardiganshire - South of Devil's Bridge,

Bick, D. 1975, Old Metal Mines of Wales : Part 2 Cardiganshire - Rheidol to Goginan,

Bick, D. 1976, Old Metal Mines of Wales : Part 3 Cardiganshire - North of Goginan,

Cadw, 2011, Conservation Principles for the sustainable management of the historic environment in Wales.

CCW, Cadw, ICOMOS UK , 1998, Landscapes of Historic Interest in Wales, Part 2 of the Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales. Part 2.1: Landscapes of Outstanding Historic Interest. p12 Upland Ceredigion

Lewis, W J, 1998, Lead Mining in Cardiganshire. In: Cardiganshire County History, Vol. 3, Cardiganshire in Modern Times. Ed. G H Jenkins and I G Jones, p 181.

Walker, R F, 1998, Tourism in Cardiganshire, 1774-1974, In: Cardiganshire County History, Vol. 3, Cardiganshire in Modern Times. Ed. G H Jenkins and I G Jones, p 322.

# Appendices

## Appendix 1

**Later 20th century time line**
**Threats/opportunities – adapted from PLWM web-site - www.plwm.org.uk**

**1947** A modern waste processing plant is installed at Esgairmwyn to treat and rework the waste dumps.

**1949** Elenith Mining Co. are working at Esgairmwyn

**1950s** Afforestation over large areas of upland Ceredigion

**1953** The 50ft waterwheel at Llywernog is dynamited for scrap.

**Late 1960's** Cwmsymlog dumps reworked

**1974** Llywernog Silver-Lead Mine Museum opens in Ponterwyd.

**1976 -1980** Further investment and a final attempt to rework the waste dumps is made by the Elenith Mining Co. at Esgairmwyn

**1981** Reclamation work to prevent wind blown contamination is carried out at Cwmsymlog.

**1987** Brynyrafr Mine is swallowed up by the Nant yr Moch reservoir development.

**1990's** Elenith Mining carry out salvage at Esgairmwyn.

**1992** Dyfed County Council begins work to develop the Ystrad Einion lead mine site, which involves purchasing land from the former Led Zeppelin singer, Robert Plant.

**1998** Remediation scheme at Cwmbrwyno undertaken on behalf of Ceredigion County Council

**2002** Environment Agency publish the Metal Mines Strategy for Wales and begin investigations at Cwm Rheidol.

**2004** Spirit of the Miners project begins.

**2006** Clearance of rubbish and self seeded scrub and trees at Bryndyfi mine through Tir Gofal

**2012** Silver Mountain Experience

## Appendix 2

### Metal Mine sites designated as Scheduled Ancient Monuments in Dyfed

- Caesara CM 283
- Dolaucothi CM 208
- Nantymwyn CM215
- Cwmsymlog North CD 201
- Cwmystwyth/Copa Hill CD 145
- Blaencwmsymlog CD 201
- Bronfloyd CD 152
- Cwmsymlog CD 159
- Neuadd Llwyd CD 126
- Llywernog CD 158
- Great Darren CD 144
- Frongoch CD 146
- Castell CD 153
- Ystrad Einion CD 143
- Bwydrain Mine as part of Castell Bwy-drain Hillfort CD 121

## Appendix 3

### Metal Mine sites designated as Listed buildings and structures

- PRN 61156 Nantymwyn engine house Grade II
- PRN 19500 Chimney at Llancynfelin lead mine Grade II (82819)
- PRN 60503 Chimney at Llanfyrnach Mine Grade II

## Appendix 4

## Environment Agency – Metal Mines Strategy for Wales - Top 50 metal mine sites

| MINE NAME | GROUPING |
|---|---|
| ABBEY CONSOLS | 3A |
| ABERDAUNANT | 4 |
| ALLTYCRIB | 3A |
| BOG | 2 |
| BRONFLOYD | 3A |
| BRYNYRAFR | 4 |
| BWLCHGWYN | 3B |
| CAEGYNON | 2 |
| CASTELL | 3A |
| CWM RHEIDOL | 3A |
| CWMSYMLOG | 3A |
| CWMYSTWYTH | 3B |
| CYSTANOG | 4 |
| DAREN | 3A |
| DOLAUCOTHI (OGOFAU) | 4 |
| DYFNGWM | 4 |
| DYLIFE | 3B |
| ESGAIRFFRAITH | 3B |
| ESGAIRLLE | 2 |
| ESGAIRMWYN OLD | 4 |
| FRONGOCH | 3A |
| GEIRIONYDD MINE | 4 |
| GLOGFAWR | 3A |
| GOGINAN | 2 |
| GRAIGGOCH | 3A |
| GROGWYNION | 3B |
| GWYNFYNYDD | 4 |
| HAFAN | 3A |
| HENFWLCH | 3A |
| LEVEL FAWR | 3A |
| LLANFAIR | 1 |
| LLANFYRNACH | 3A |
| LLWYNTEIFY | 3B |
| LLYWERNOG | 2 |
| LOGAULAS | 3A |
| MYNYDDGORDDU | 4 |
| MINERA | 2 |
| NANTYCREIAU | 3B |
| NANTYMWYN | 4 |
| PARC | 4 |
| PARYS | 2 |
| PENRHIW | 3A |
| PENYCEFN | 4 |
| POWELL'S | 3A |
| RHEIDOL UNITED (ERWTOMAU) | 3A |
| RHEIDOL UNITED (GWAITH GOCH) | 3A |
| TEMPLE | 3A |
| TY'N-Y-FRON | 3A |
| WEMYSS | 3A |
| YSTUMTUEN | 3A |

**Group Interpretation**

1 No diverging issues - It appears that there are no diverging issues at this site, the Agency could therefore pursue the remediation relatively easily, but still taking into account intrinsic historic interests and still requiring a complete desk study and scope of works and possible impacts.

2 Converging issues - It appears that the Agency and one or more stakeholders have a shared interest in the remediation of the site and therefore it may be possible to develop a collaborative project. For example, there could be a combined interest to install a water clean-up scheme at the same time as the development of the site as a tourist attraction or the water remediation scheme could be extended to address issues of public health and safety.

3A Diverging issues - It appears that the Agency and the views of one or more stakeholders diverge at this site, however, it is considered that the differences could be resolved subject to careful negotiations and sympathetic design.

3B Diverging issues - It appears that the Agency and the views of one or more stakeholders diverge at this site, it is considered that the differences are so great that it would be extremely difficult to progress any remediation scheme. For example sites extensively designated as SSSI.

4 Further information - During the review of data it appears that these sites may not be presenting such an impact to the water environment as previously understood or data on sites outside the top 50 has come to light that indicates that they should be included within the top 50. Further monitoring and data review required.

# Case Studies

## Case Study 1 - Ystrad Einion Mine

### PRN 9179 Historic Environment Record entry

Ystrad Einion Reclamation Scheme - Scheduled Monument Consent for works including the stabilisation of the existing stone ruin, the capping of open mine shafts, the gating of levels, forming of steps and footpaths and erection of safety railings was granted by the Secretary of State, subject to certain conditions, on 29th April 1992. These included making a detailed photographic survey of all areas affected in advance of proposed works. Also, prior to capping of the slime pits, a detailed plan of the surviving earthworks was required to be made at 1:200 scale. All excavation work was to be monitored and recorded by the County Council's consultant archaeologist. The archaeological requirements were specified in more detail in a 'Brief for Archaeological Recording' subsequently issued by Cadw. In January 1993, Dyfed County Council invited Dyfed Archaeological Trust carry out the required archaeological work. Archaeological recording and monitoring work was carried out in August and September 1993. James, H 1993 - James, HJ & Phillips, DH , 1994, 39419 Ystrad Einion Lead Mine, Ceredigion. Report on Archaeological Recording by Dyfed Archaeological Trust during a Derelict Land Reclamation Scheme .
(http://www.herwales.co.uk/her/groups/DAT/media/DAT%20Reports/39419%20Ystrad%20Lead%20Mine,%20Ceredigion%20Arch.%20Recording.pdf)

RPJ 1992/3

## Case Study 2 - FCW safeguard rare metallophyte lichens at Eaglebrook Mine

**http://www.forestry.gov.uk/newsrele.nsf/WebPressReleases/E52442C8FFBC4F018025771F00334706**

**Forestry Commission Wales shows its mettle to safeguard rare lichens**

Forestry Commission Wales has come to the rescue of rare lichens growing on an abandoned metal mine in Ceredigion.

Eaglebrook Mine, by the Nant-y-Moch reservoir near Talybont, is the finest and only fully-verified place in Wales where the rare blue-green mineral, devilline, can be found.

But the "metaliferous" lichens that grow on the harsh acidic and metal-rich rocks where most other plants will not grow were being smothered by conifers growing over the old mine, which is a Site of Special Scientific Interest (SSSI).

The mixture of open, rocky ground and the slight shelter of the surrounding woodlands means that Eaglebrook Mine provides a perfect, undisturbed location for these rare lichens.

However, conifers from the woodlands have been seeding onto the mine spoil and were slowly colonising the site and shading out the bare scree areas where the lichens are growing.

Left unchecked, the trees would shade out the lichens and other plants and smother the site, which is on Welsh Assembly Government-owned land managed by Forestry Commission Wales.

Nick Young, FC Wales Conservation and Heritage Manager, said, "Carefully removing the young self-seeded conifers from the open rocky areas will restore the right conditions for the lichens to thrive and also preserve an example of the industrial areas that once dotted the landscape.

"We manage Assembly Government woodlands to provide environmental benefits and by working with the Countryside Council for Wales to clear these trees we can preserve the SSSI and ensure part of our industrial heritage is not lost."

Karen Heppingstall, CCW Senior Conservation Officer for north Ceredigion, said, "We are very pleased to see the positive conservation work carried out by FC Wales on this SSSI.

"Regeneration of conifers on the mine spoil was threatening to shade out the rare and specialised lichens that grow there and would have ultimately concealed the rare minerals and industrial archaeological features."

## Case Study 3 - Spirit of the Miners - Cymsymlog Chimney Restoration Project

**http://www.spirit-of-the-miners.org.uk/cwmsymlogchimney.php**

The £81,000 project to consolidate and conserve the stone chimney as a lasting monument to the mining heritage of northern Ceredigion has been completed.

The project has been undertaken by Trefeurig Community Council. A grant was awarded from Spirit of the Miners worth around £42,000, match funded 50% with Cadw.

The work has taken some time to be completed - it has taken some 20 years to get the project completed but finally it has become a reality for the community. The work itself involved consolidating the chimney to the height it was before the work begun and not to its original height of 40 years ago. At that time the chimney was around 5 or 6 feet higher than its current height when it was struck by lightning.

The chimney was orignally built in 1855 by a Cornish firm. The characteristics of such mining techniques brought into the area by the Cornish miners can still be seen today. Cwmsymlog is a site of Special Scientific Interest due to the rare ferns and lichens that inhabit the site. These rare plants and lichens emerged because of the high concentrates of lead in the soil following mining activity. This site was the most productive silver and lead mine in Britain at one time during the 18th Century.

## Case study 4 - Spirit of the Miners - Improvement & Interpretation of Pont Ceunant Generating Station

**http://www.spirit-of-the-miners.org.uk/pont-ceunant.php**

The generating station is the last sizable remains of a phase of mining history in Ceredigion that involved the use of locally produced electricity to operate all the plant and machinery needed at a mineral mine, namely Frongoch. Unfortunately, due to it's location beside a public road it has become the target of flytipping that detracts from the aesthetics' of the building and at the same time there is no visible indication to the visiting public of the original purpose of the building.

The application was to assist in the removal of the rubbish, the installation of a decorative grille to prevent further tipping and to raise public awareness of the structure. As well as this an interpretation board to tell the story of the buildings existence and how it fitted in to the wider mining landscape of the areas was produced and installed. It is hoped that by making the visiting public aware of the importance of the structure this will lead to the building no longer being abused and will become more appreciated.

The clearance work was undertaken on site on June 8th with assistance from members of the Welsh mines Preservation Trust. The grille has now been put in place and the interpretation board is awaiting completion.

The decorative grille features a representation of a waterwheel with water flowing over it and lightning flashes, this signifies the transition from water power to the electric power that the building generated.

Thanks should be expressed to all those who travelled a great distance, in some cases, to volunteer their time and take part and also to Mr & Mrs Williams for their help

The project is a great example of various bodies and individuals including The Welsh Mines Preservation Trust, Ceredigion County Council, the Environment Agency and Mr & Mrs Williams the landowner working together to the benefit of Ceredigion's rich mining heritage.

## Case Study 5 - Tir Gofal management works

**Visited as part of a Tir Gofal Historic Environment (HE2) farm survey in 2003**
Report produced by Alice Pyper of Dyfed Archaeological Trust

**Cefn Gweiriog Farm 11/2793**
The farm includes Bryndyfi/ Neuadd-llwyd Lead Mine PRN 5445 **(SAM Cd126)**
Extensive and well preserved mine remains. Lead mine with two stone hoppers, ore crusher, wheel pit, buddles wheel pit, settling tanks.

**TG main management recommendations**
The old lead mining complex of Bryndyfi or Neuadd-llwyd presents a wonderful opportunity to promote public access and education. It is a discreet complex of structures which allow a readily understandable exploration of different processes involved in lead production. However, in its current condition the lead mine complex presents a significant safety concern to the farmer who has recently noticed an increased number of visitors to the mine. There are undoubtedly areas of the mine which are currently unstable and also open structures and mine shafts which are a hazard to the farmers own family, as well as visiting enthusiasts.

Bearing in mind the significance of the structures and its potential for providing insight into the l;ate 19th century mining industry, a programme of works to consolidate and make safe those areas of concern should be actively encouraged and promoted. This would undoubtedly be a sizeable programme, and would require the services of of a specialist who could provide advice on appropriate methods for stabilizing ruinous buildings; Cadw would be able to advise on this subject and should be consulted regarding any works undertaken within the scheduled area.

It is recognized that a programme of this nature would be a long term ventur. In the short term there are various measures which could be bundertaken which would help to delay further deterioration of these structures. These include general site clearance and controlling vefgetation growth, this would largely mean cutting ivy at its rootsw to prevent further growth, but allowing it to die in place.



BEFORE

**AFTER**

## Case Study 6 - Glastir Advanced Historic Environment Feature Management Report

**Example statements:-**

**Penlanfach Metal Mine -** UIDs: 311118 **PRN** 9155
Re survey of the site has identified that the condition has deteriorated between 1993 and 2011 due to scrub encroachment across the site.

**Management Issues**
The recent re-survey of the site (Protheroe-Jones 2011) and recent aerial photographs (Ordnance Survey Next Perspectives 2009) identify scrub encroachment as a significant issue at this site.

**Desired Management Outcome**
The removal of scrub will make the layout of this well preserved and typical small mine far more clearly discernible.

The management outcome is to maintain the different component features of this mine (shaft PRN97808, spoil tip PRN97809, engine shaft PRN97810) in a visible and stable condition under a low growing grass or vegetation cover with no breaks in the ground surface.

**Management Actions**
The following management actions are required in order to return this part of the mine to a stable and visible condition.
The growth of scrub and young trees is damaging to the long-term survival of built structural remains through the disruptive activity of root development, whilst also obscuring the visibility of the complex as a whole.

- Remove any young trees or scrub rowing out of the collar of shaft PRN97808 or wheel pit PNR97810 by cutting by hand. Do not pull up by the roots as this is potentially destabilising to masonry bonds.
- Cut scrub back which is situated between the three sites, and within an eight metre buffer of the outside edge of the sites. This will maintain the visual cohesiveness of the complex. See Map of Historic Features Highlighting any Management Issues for additional information.

## Case Study 7 - Tamar Valley Mining Heritage Project

http://www.tamarvalley.org.uk/projects/miningheritage/

The Tamar Valley Mining Heritage Project aims to celebrate and tell the story of the Tamar Valley's rich mining heritage through a new network of trails and paths. The Project has undertaken conservation work to a large area that contains mining remains and important wildlife habitats.

The new Tamar Trails take a journey along old transport systems such as canals, tramways and railways, and explore the mining history as well as our stunning natural landscapes.

It's an area of steep wooded valleys, a slow flowing river and overgrown riverbanks. Everywhere, you can see evidence of deep, dark mines and hard-working communities, which would have driven an entire industry in the area.

The Tamar Valley Mining Heritage Project is located in the heart of the World Heritage Site within the Devon side of the AONB. This landscape has a distinctly industrial legacy from the C19th mining boom. It forms part of a series of sites within the Cornish and West Devon Mining Landscape World Heritage Site.

It was copper mining that made the Tamar Valley internationally famous in the 19th and early 20th century. The whole of the Tamar Valley was transformed through mining and the work that followed, such as the construction of transport networks and quays. The mine chimneys now form part of the local scenery, as well as hidden quays, overgrown tracks, half-visible mine adits, and barren hillside spoil-tips – all waiting to be discovered.

The Project is a partnership funded by the Heritage Lottery Fund, Objective 2, South West Regional Development Agency, Devon County Council, West Devon Borough Council, Devon Rural Renaissance, South West Water, Tavistock Woodlands Estate as well as the Tamar Valley AONB itself. Started in 2007, the project will finish in 2011, and is a £7 million investment which will help sustain this rural area.

# Conservation and Management of Dyfed's Metal Mining Sites

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Paratowyd yr adroddiad hwn gan / This report has been prepared by Louise Austin

Swydd / Position: Head of Heritage Management

Llofnod / Signature ..... Dyddiad / Date

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by Ken Murphy
ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.
on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: Trust Director

Llofnod / Signature ..... Dyddiad / Date

Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau sydd gennych ar gynnwys neu strwythur yr adroddiad hwn

As part of our desire to provide a quality service we would welcome any comments you may have on the content or presentation of this report

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