

## Submission of Evidence Form – National Development Framework

Name

Rhondda Cynon Taf countryside team

Contact details

Sardis House, Sardis Road, Pontypridd

Date

2nd March 2017

Title of evidence

**Biodiversity of the south Wales valleys**

Summary of evidence

The valleys are of particular importance for Biodiversity in a Wales-wide context because of

- The extent of semi natural habitat (fig 2 and 3)
- The diversity of semi natural habitat types (fig 4)
- The co-incidence of semi-natural habitat extent and diversity (fig 5)
- The habitat connectivity provided at a landscape scale (eg figs 6-9 and ref 1)
- The emerging evidence of the importance of coal and mineral spoil for biodiversity (ref 2) and
- The proximity of people and biodiversity (ref 3 and 4)

Evidence is also submitted with regard to

- the positive role of planning in protecting and enhancing biodiversity, promoting ecosystems resilience whilst enabling development in appropriate locations (fig 1) and
- the integration of all the well-being goals in the consideration of regeneration (ref 5)

Summary of key issues/conclusions

Planning has a key role in integrating biodiversity conservation and enhancement with regeneration.

Why have you submitted this evidence?

Land-use Planning has a very important role in the protection and enhancement of biodiversity across Wales, in particular, in areas of high development pressure. National, Strategic, Local and Place Plans must have regard to biodiversity both in the protection of important sites and in the conservation, mitigation and enhancement of biodiversity through the

development management process. An example, from the 'Celebrating Success' document is appended (Fig 1). Further details of individual development schemes are available on request.

In the past, the industrial valleys of south Wales were often considered to be of little biodiversity value and did not receive the survey and research effort afforded to other areas of Wales, in particular the National Parks and coast. Since the advent of the Biodiversity Action Planning process (arising from international commitments), a more systematic approach to biodiversity conservation has been applied in Wales. As a result, the Wales Biodiversity Partnership, together with Local Biodiversity Action Plan Partnerships (and their successor organisations) has developed an evidence base to support targeted action for priority habitats and species. The evidence presented here suggests that, in a Wales wide context, the Valleys are of particular importance for biodiversity conservation.

A unique combination of factors is responsible for the wealth of Valleys biodiversity. The interaction of local climate, varied geology and topography, low intensity agriculture and a rich industrial history are all key contributors. The resulting landscape has relatively dense linear settlements on the valley floor and lower slopes, extensive pastoral agriculture, and in the uplands common land and forestry (much of which is 'open access'), with the 'ffridd' or 'coed cae' on the steeper valley sides. In addition to the extent of semi-natural habitat and the diversity of natural habitat types, this landscape provides important connectivity. Connectivity provides benefits to species which require more than one habitat, or large areas of habitat in order to complete their life cycle. Connectivity also allows species to adjust to external pressures such as climate change (Ref 1).

Two examples of the importance of this connectivity are illustrative:

- The ffridd or coed cae is of particular importance for connectivity because it contains complex mosaics of woodland, scrub, heath, acid grassland, colliery and mineral spoil, wet flushes, cliffs and scree. It extends from the border vale in the south to the Brecon Beacons National Park in the north, valley long, habitat rich networks which, within each valley, also provide connectivity between the valley floor and the hills above.

- The second example relates to a particular habitat and a dependant species: rhos pasture and the marsh fritillary butterfly. Rhos pasture is a feature of the northern and southern edges of the coalfield, roughly following the lines of the M4 and Heads of the Valleys Road Corridors. In areas of high development pressure, protecting a network of these marshy grasslands sufficient to support the rare and endangered marsh fritillary butterfly is challenging. The butterfly depends upon a habitat at a landscape scale and connectivity between sites is of critical importance for the long-term survival of this weak flying insect. Figures 6 & 7 show the 'priority' habitat identified by the Wales Grassland group which includes core rhos pasture areas, and figures 8 & 9 show the land in management control through Council and other public or sympathetic ownership, planning agreement areas and Sites of Special Scientific Interest (SSSI).

Recent detailed local survey work has highlighted the diversity and

importance of an iconic coalfield habitat with regard to pollinators. An apprentice, based at the National Museum of Wales and initially funded by The Esmee Fairbairn Foundation, has undertaken a survey of invertebrates on 5 colliery spoil sites. To date, 85 different bee species have been identified. Half of these species are of conservation concern (localised, nationally scarce, UK BAP and Wales s7 species). The evidence suggests that colliery spoil is an important wildlife habitat and acts as a refuge for a range of rare and scarce invertebrates that are rapidly declining in the wider countryside. Their free draining nature, thin nutrient poor soils and varied topography, aspect, substrate composition, hydrology and pH are responsible for this high biodiversity value, helping to create a great diversity of micro-habitats (ref 2).

How should this evidence inform the development of the NDF?

The Valleys is an area of Wales where regeneration is a key priority. Biodiversity is one of the assets of the area and there is now extensive evidence to support this. It is important that both attributes are recognised in the National Planning Framework. Policies to promote regeneration should be integrated with biodiversity not traded one against the other. The letter from the Future Generations Commissioner regarding the City Deal (ref 5) illustrates the need for new approaches. Public survey work for the Well-being Assessment for CwmTaf (ref 3) and for the NRW Rhondda Pilot (ref 4) highlighted the importance of the natural environment to people's well being. The landscape and its wildlife have been identified as an important asset for the future.

How does this evidence and any actions it recommends help achieve the 7 well-being goals?

The recent legislative changes in Wales have re-emphasised the importance of biodiversity for ecosystem services, environmental resilience and integrated natural resource management. The Well-being of Future Generations Act includes an environmental resilience goal and the Environment Act includes an enhanced Biodiversity Duty for all public bodies (s6): **“to seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing, promote the resilience of ecosystems so far as consistent with the proper exercise of those functions”**. As mentioned above, the CwmTaf Well-being Assessment has highlighted the quality of the natural environment as an asset and its importance to people's well being. Planning has a strong track record of addressing issues such as health, prosperity, community, equality, culture, language and environment in an integrated way. 'Planning and Biodiversity' (Fig 1) provides some recent examples of this and the Commissioners City Deal letter (ref 5) some pointers for the future.

Why is the evidence of national significance?

Biodiversity across Wales is an important consideration for the National

Development Framework. In areas of high development pressure and in areas where regeneration is a key concern, the protection and enhancement of biodiversity should be integrated with development proposals and should pay due regard to the value of extensive, diverse and connected habitats for environmental resilience.

Do you agree for your evidence to be made public? (Only evidence that can be made public will inform the development of the NDF)

yes

Fig 1	'Biodiversity and Planning' p19 in Celebrating Success ( <a href="#">copy attached</a> ) <a href="http://www.biodiversitywales.org.uk/Nature-Recovery-Plan">http://www.biodiversitywales.org.uk/Nature-Recovery-Plan</a>
Fig 2	Table1.4 Summary of the Habitat extent for 22 priority habitats within Welsh Local Biodiversity Action Plan areas, p8 in 'Priority Habitats of Wales : a technical guide'. Editors: PS Jones, DP Stevens, TH Blackstock, CR Burrows, EA Howe (CCW/WAG/Biodiversity Wales 2003) <a href="#">copy attached</a>
Fig 3	The relative proportion of semi-natural habitat in Wales on a 1km square basis (Fig 2, p8 of ref 1 above) <a href="#">copy attached</a>
Fig 4	Diversity (Shannon Index) of semi-natural habitats on a 1km square basis for Wales (Fig 3, p9 of ref 1 above) <a href="#">copy attached</a>
Fig 5	Areas where high semi-natural habitat diversity and abundance co-incide (Fig 4, p10 of Ref 1 above) <a href="#">copy attached</a>
Fig 6	<a href="http://www.biodiversitywales.org.uk/Ecosystems-Species-Expert-Groups">http://www.biodiversitywales.org.uk/Ecosystems-Species-Expert-Groups</a> Priority habitat: South Wales Valleys Marshy Grasslands <a href="#">copy attached</a>
Fig 7	<a href="http://www.biodiversitywales.org.uk/Ecosystems-Species-Expert-Groups">http://www.biodiversitywales.org.uk/Ecosystems-Species-Expert-Groups</a> Priority habitat: Marshy Grasslands of south Glamorgan <a href="#">copy attached</a>
Fig 8	Biodiversity management sites in northern RCT (including S 106 planning agreements) <a href="#">copy attached</a>
Fig 9	Biodiversity management sites in southern RCT (including S 106 planning agreements) <a href="#">copy attached</a>
Ref 1	Ecological Connectivity in Wales: planning action to help terrestrial biodiversity respond to habitat fragmentation and climate change' J Latham, TH Blackstock and EA Howe published by CCW 2007, staff science report no 08/7/1 ( <a href="#">copy attached</a> )
Ref 2	Invertebrate survey of Clydach Vale Country Park, Liam T Olds 2017 ( <a href="#">copy attached</a> )
Ref 3	<a href="http://www.cwmatafhub.co.uk/project/105285">http://www.cwmatafhub.co.uk/project/105285</a>
Ref 4	<a href="http://naturalresources.wales/media/679634/rhondda_opportunitiesdoc_final_eng.pdf">http://naturalresources.wales/media/679634/rhondda_opportunitiesdoc_final_eng.pdf</a>
Ref 5	<a href="http://futuregenerations.wales/wp/wp-content/uploads/2016/12/20161212-City-deal-FinalEng.pdf">http://futuregenerations.wales/wp/wp-content/uploads/2016/12/20161212-City-deal-FinalEng.pdf</a> <a href="#">copy attached</a>



# Biodiversity and Planning

Ensuring that biodiversity is taken into account in the planning system in Rhondda Cynon Taf

**A prosperous  
Wales**

**A resilient  
Wales**

**A globally  
responsible  
Wales**

## Background

The Local Biodiversity Action Plan (LBAP) identified county planning as one of the key levers for action by the Local Authority. The LBAP was adopted as supplementary planning guidance at an early stage. When the Local Development Plan (LDP) was adopted in 2011 the substantive nature conservation policy was backed by Nature Conservation Supplementary Planning Guidance. Sites of Importance for Nature Conservation were included on the proposals map. The policy featured in the examination of the LDP and was endorsed by the Planning Inspector.

## Partnership

The LBAP partnership identified planning as one of the original site protection actions in the Local Biodiversity Action Plan. More recently, partners have become involved in management as well as site protection and specialist advice.

## Learning

Planning Officers have developed biodiversity negotiating skills and some developers are promoting biodiversity benefits. Local residents at one site have received training in wildlife recording and are contributing to the Local Record Centre.



Image © Alan Barnes

## Highlights

- The nature conservation policy has been used to ensure that developments avoid damaging habitats of nature conservation value. Planning conditions and Planning Agreements (such as S106) are used to protect important features and bring sites into biodiversity management. Biodiversity conservation is integrated with public open space, landscape, active travel, children's play, tree and water management considerations
- The Wildlife Trust received £1/4m from a housing S106 agreement to manage Brynna Woods and Llanharan Marsh for dormice and marsh fritillary
- Planning agreements for the major windfarm and other energy developments will see more than 1000ha of peatbog and heathland restored and brought into management, with the potential to reduce both wildfire and flood risk

## The Future

For the review of the LDP a map of the land brought into biodiversity management through the planning system is being prepared.

The multiple benefits for water and carbon storage, recreation, urban shade and shelter, children's play, landscape and active travel provided by this Green Infrastructure are being identified.

**Table 1.4.** Summary table of habitat extent for 22 priority habitats within Welsh Local Biodiversity Action Plan areas. Lowland wood-pasture & parkland, cereal field margins, ancient and/or species-rich hedgerows and the three freshwater priority habitats are excluded because of the lack of comparable extent data. The woodland component of the total figure is based on the extent of semi-natural broadleaved woodland because of the lack of comparable data for the five priority woodland types within the component LBAP areas of Glamorgan and Gwent. Data for coastal & floodplain grazing marsh only relate to the grassland component of this priority type. 'P' denotes habitat presence where area data are unavailable.

Welsh LBAP Area	Upland oak-wood	Upland mixed oak-wood	Wet wood-land	Lowland broad-leaved woodland	Lowland mixed broad-leaved woodland	Lowland semi-natural broad-leaved woodland	Lowland meadows	Lowland calcareous grassland	Lowland dry acid grassland	Upland moor-grass & heath	Lowland heathland	Reedbed	Fen	Lowland raised bog	Coastal & floodplain grazing marsh	Upland heathland	Blanket bog	Upland calcareous grassland	Lowland permanent pasture	Maximum field & slope	Coastal riparian fringe	Lowland river	Salmonid	Total	LBAP Land area	% cover of priority habitats	
Anglesey	70	250	240	0	240	1000	44	86	410	1400	840	100	520	0	2900	0	0	0	1	570	6	1400	300	9600	74,608	13	
Snowdonia NP	6500	560	1000	0	160	8100	64	0.3	11,000	3800	3000	23	1400	94	4200	26,900	17,000	56	0	6	0	800	590	77,000	213,191	36	
Gwynedd	1110	290	860	0	180	2600	30	0	4800	3400	1400	35	610	0	3800	0	480	0	0	810	58	510	350	21,000	90,997	23	
Conwy	730	1300	100	0	130	2500	6	240	1100	350	590	28	300	0	2000	1700	1900	0	3	29	16	24	150	10,900	72,222	15	
Denbighshire	300	1700	220	0	300	2500	21	170	1100	72	410	0.5	71	0	3500	5500	1300	73	6	0	2	52	35	14,800	84,880	17	
Flintshire	340	920	140	0	230	1800	22	200	300	50	163	4	32	0	2500	230	0	0	0.8	0	0	49	710	6100	48,788	12	
Wrexham	230	430	160	0	170	1300	38	22	540	73	62	0	41	420	2400	2200	970	6	P	0	0	0	0	8100	49,680	16	
Powys	10,000	2300	1700	0	2200	16,700	160	21	5600	3600	810	23	280	53	9300	13,300	18,800	7	0	0	0	0	31	68,800	428,781	16	
Ceredigion	3700	1000	460	0	400	5700	150	0	2800	4200	820	66	340	49	7500	2500	8300	0	0	330	50	120	360	33,300	180,587	19	
Carmarthenshire	6300	1600	940	0	2600	11,700	170	3	1800	6600	400	66	340	1120	4700	33500	8300	0	0	0	0	0	1200	34,400	222,826	15	
Pembrokeshire	3000	1300	520	0	1800	6600	510	17	710	3200	1200	73	300	13	1000	2500	91	0	P	1400	4	560	260	18,300	161,458	11	
Brecon Beacons NP	2800	640	1200	290	700	5900	95	120	2300	2400	410	7	130	16	660	11,800	5300	470	42	0	0	0	0	29,700	134,518	22	
Swansea	-	-	-	-	-	1600	27	82	500	1300	900	61	290	0	540	580	42	0	0	230	0	4	480	1300	8000	41,984	19
Neath Port Talbot	-	-	-	-	-	2100	72	0	2000	1300	250	12	210	0	680	650	49	0	0	0.4	0	190	200	7800	45,051	17	
Bridgeford	-	-	-	-	-	810	28	32	370	660	160	4	25	0	200	510	53	0	0	<0.1	9	0.5	850	14	3700	25,444	15
Rhondda-Cynon-Taf	-	-	-	-	-	1700	44	0.2	1400	1500	480	0.8	130	9	130	980	850	0	0	0	0	0	0	7200	37,021	20	
Merthyr Tydfil	-	-	-	-	-	510	10	28	500	260	160	0	25	0	0	450	0.2	0	1	0	0	0	0	2000	33,876	8	
Vale of Glamorgan	-	-	-	-	-	1200	47	120	68	120	45	4	19	19	930	0	0	0	0	69	13	3	22	2700	14,905	9	
Cardiff	-	-	-	-	-	800	4	1	6	46	0.4	0.5	5	0	520	2	0	0	0	0.7	0	0	34	4400	27,676	16	
Caerphilly	-	-	-	-	-	1600	11	9	850	500	180	2	32	1.6	160	1000	30	0.7	0	0	0	0	0	4400	10,509	29	
Blanuau Gwent	-	-	-	-	-	290	0.7	4	820	160	160	0	42	0	0	1400	160	11	0	0	0	0	0	3000	12,439	19	
Torfaen	-	-	-	-	-	670	10	1	410	110	120	0	12	0	20	970	110	0	0	0	0	0	0	2400	73,456	10	
Monmouthshire	-	-	-	-	-	4300	120	12	75	79	17	0.3	34	0	2700	0	0	0	0	44	0	0	98	7500	21,772	23	
Newport	-	-	-	-	-	510	6	2	31	45	0.2	8	37	0	4200	0	0	0	0	29	0	0	130	5000	21,772	23	
Glamorgan (E LBAPs)	3200	3100	1200	690	1600	9800	240	260	5400	5500	2100	84	730	30	3200	3800	1000	30	-	310	17	1500	1600	35,700	224,552	16	
Gwent (E LBAPs)	640	2100	320	1500	1600	6400	140	24	1700	490	340	8	130	0	6900	2800	270	12	-	72	0	0	130	19,400	128,256	15	
Wales total	39,000	17,000	9000	4080	12,000	82,600	1700	1200	39,500	35,200	12,500	460	6200	1830	54,600	79,000	56,200	650	54	3500	110	6200	5800	387,300	2,115,359	18	

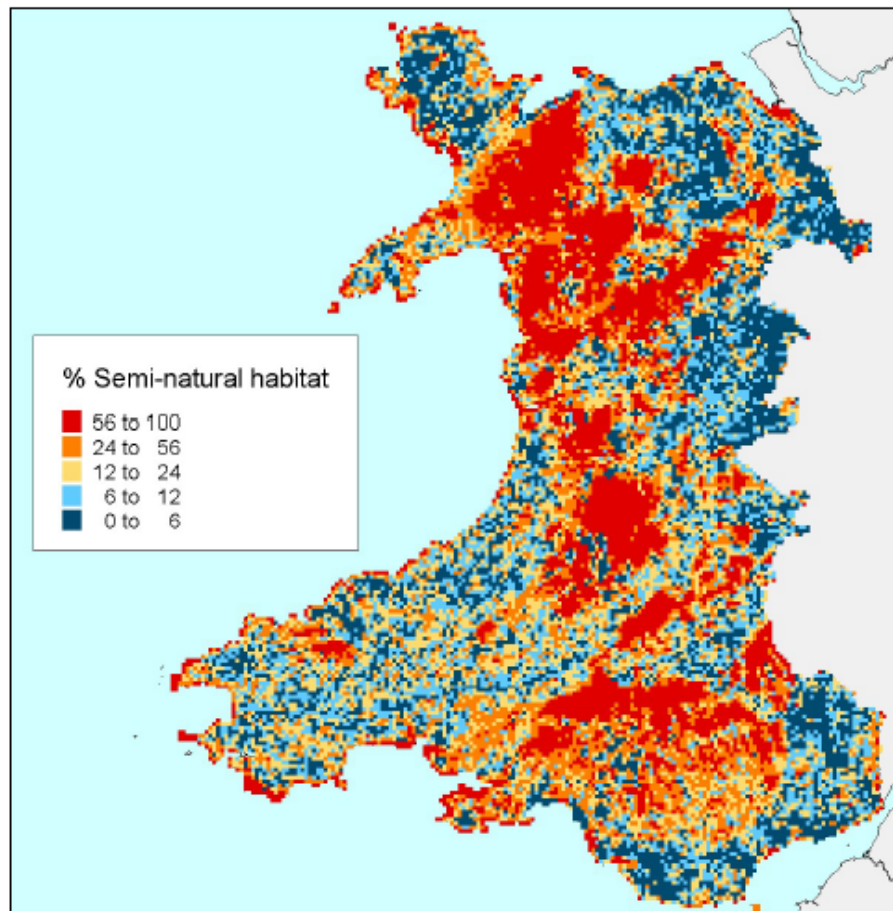


Figure 2. The relative proportion of semi-natural habitat in Wales on a 1km square basis.

Areas with high cover of semi-natural habitat are likely to have relatively high ecological connectivity. However, this is affected by habitat condition, which often may be poor. Also, areas of high semi-natural cover may be dominated by a few habitat types, therefore providing potential connectivity for a restricted range of biodiversity.

Areas with a high diversity of semi-natural habitat have potential for broader ecological connectivity (Figure 3). The pattern of semi-natural habitat diversity is similar to that of abundance, but concentrations of high diversity show up around the coast, the upland fringes (ffridd), and regions such as the south Wales valleys. Overall connectivity is likely to be particularly good where high values of semi-natural abundance and diversity coincide.

Figure 4 shows areas where high values of semi-natural abundance and diversity coincide. The uplands are still prominent, but the coastal and ffridd zones are emphasised. These are areas of high connectivity for a wide spectrum of biodiversity.

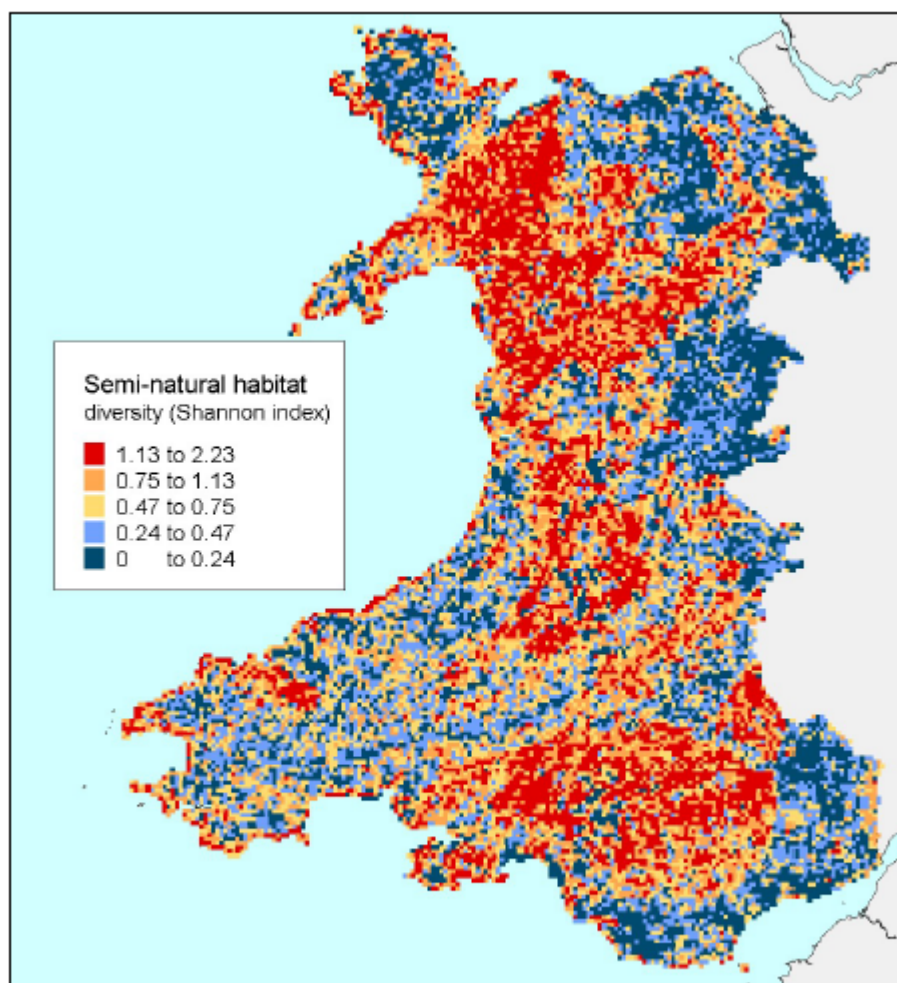


Figure 3. Diversity (Shannon index) of semi-natural habitats on a 1km square basis for Wales.

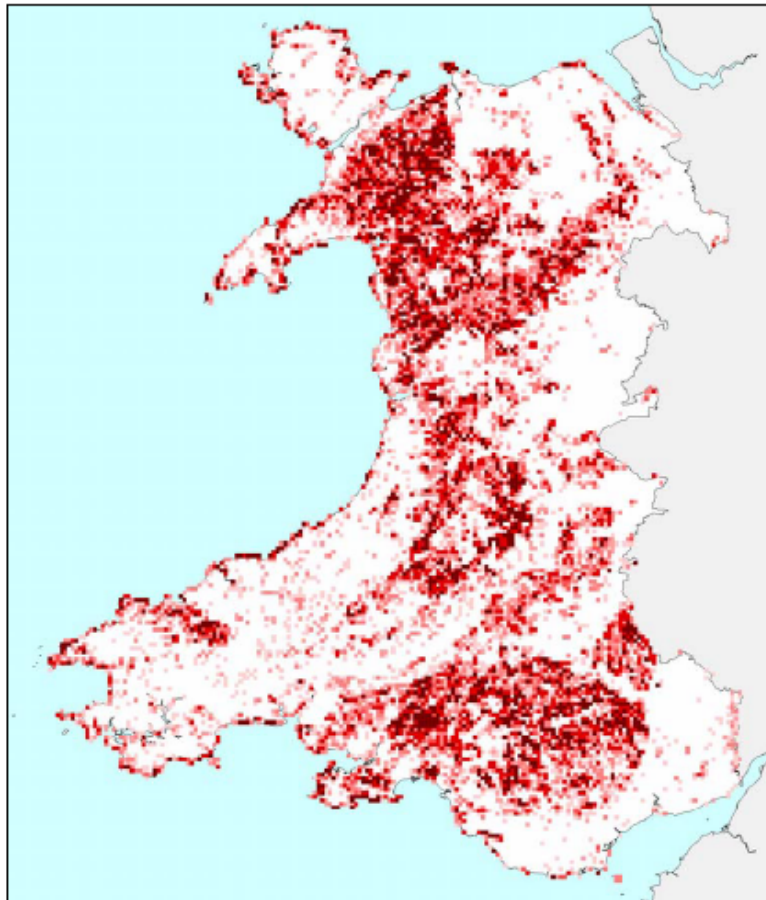


Figure 4. Areas where high semi-natural habitat diversity and abundance coincide. These are potentially important areas of ecological connectivity for a wide spectrum of biodiversity. Values increase with intensity of colour, where the darkest represents 1 km-squares with greater than 40% semi-natural habitat cover and a diversity index of greater than 1.5; white areas are those with less than 15% semi-natural habitat cover and diversity index less than 0.8. These values have been selected to emphasise regional variations. The relationships between abundance and diversity are complex and under further investigation.

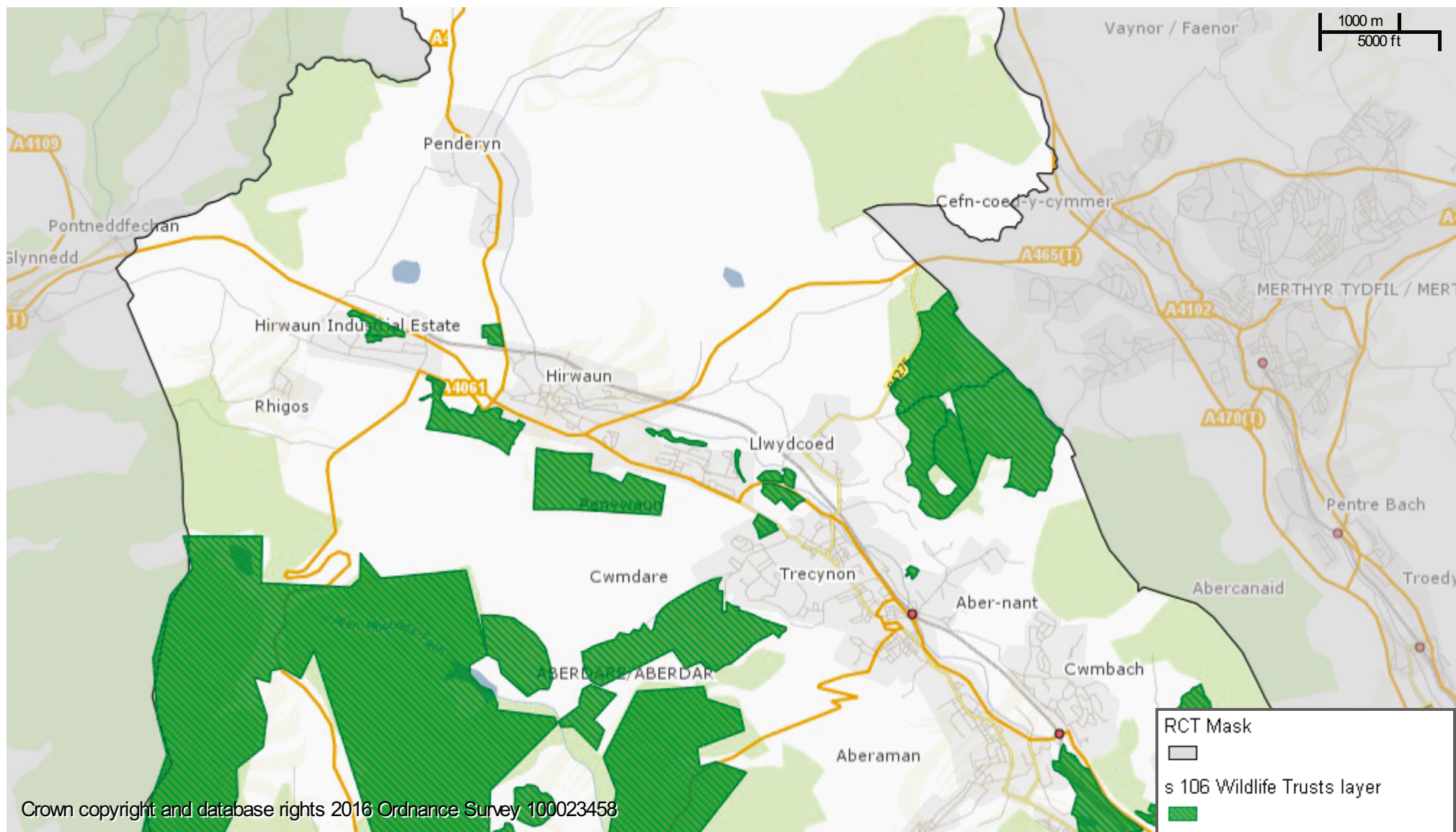
### 3.4 Habitat network models

CCW, in collaboration with Forestry Commission Wales and Forest Research, has developed maps of habitat networks. Instead of considering physically linked habitats as networks, the approach has been to consider *functional networks* that comprise patches of habitat that are able to interact by virtue of other intervening habitats through which many species can move (i.e., the permeability of the intervening landscape). For example, two woodland blocks may be considered to be part of a functional woodland network if they are separated by (say) a strip of unimproved









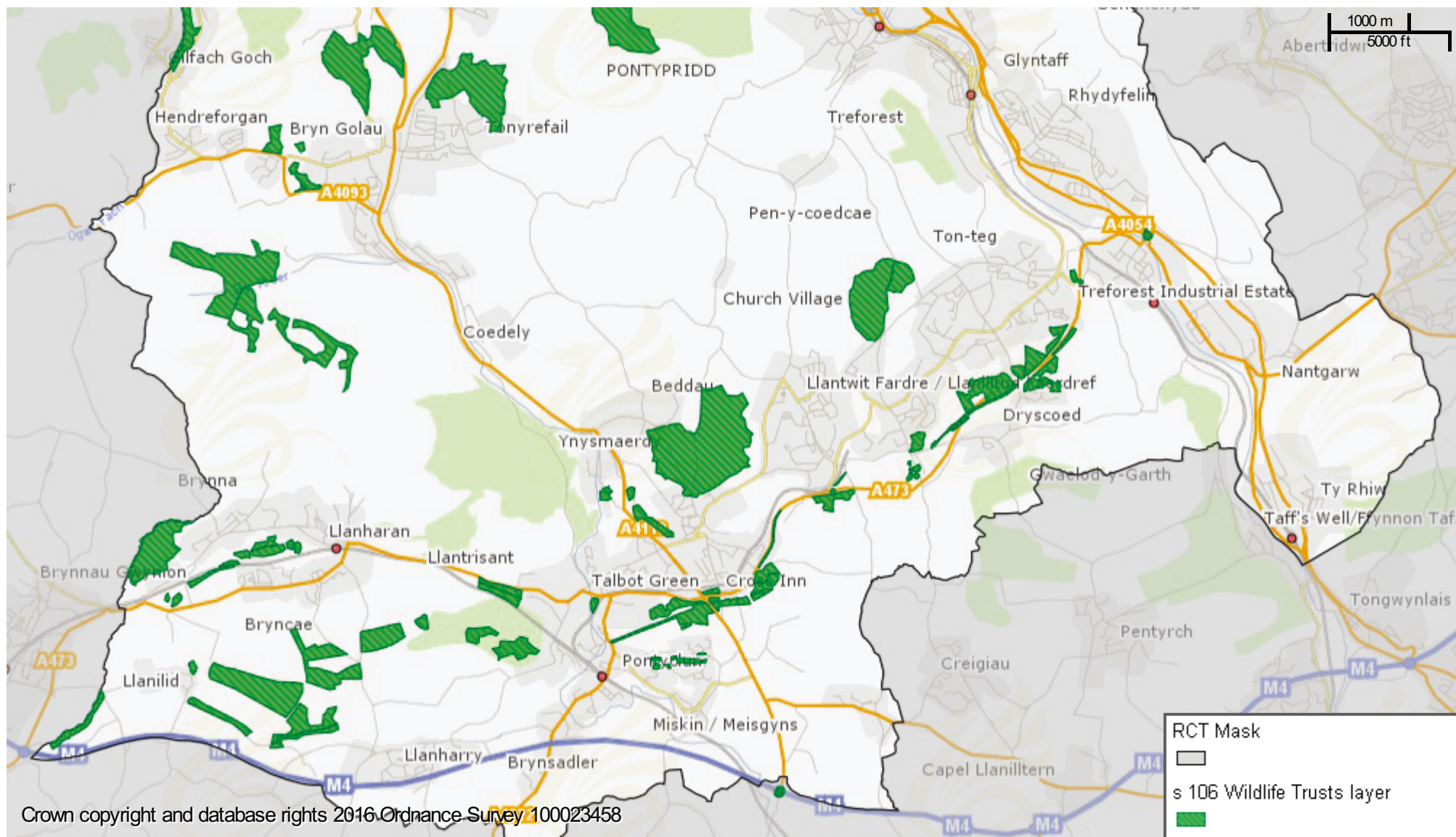
iShare printing

Scale: 1:70866

Printed on: 8/2/2017 at 12:26 PM



© Rhondda Cynon Taf



iShare printing

Scale: 1:70866

Printed on: 8/2/2017 at 12:23 PM



© Rhondda Cynon Taf



---

# INVERTEBRATE SURVEY OF CLYDACH VALE COUNTRY PARK, RHONDDA CYNON TAF

---

Mr Liam T. Olds

January 2017

This report was produced by Liam Olds (Colliery Spoil Biodiversity Initiative)  
for Rhondda Cynon Taf County Borough Council

## Colliery Spoil Biodiversity Initiative

*Raising awareness of the biological importance of colliery spoil tips in the south Wales valleys*

Liam Olds | Entomologist

[REDACTED]

W: [www.collieryspoilbiodiversity.wordpress.com](http://www.collieryspoilbiodiversity.wordpress.com)



## Contents

Executive summary.....	2
1. Introduction.....	3
1.1 Project aims.....	3
1.2 Study site.....	4
2.0 Survey Methods.....	6
2.1 Survey Dates.....	6
2.2 Sampling Methodology.....	7
2.3 Target Groups.....	8
2.4 Survey Areas.....	10
2.5 Sample Locations.....	13
3.0 Results.....	16
3.1 Species List.....	16
3.2 Target Groups.....	24
3.3 Key Species and Habitat Requirements.....	25
4.0 Discussion.....	35
4.1 Findings.....	35
4.2 Key features of colliery spoil habitats.....	41
5.0 Recommendations.....	42
4.1 Habitat management.....	42
4.2 Further study.....	44
6.0 Limitations and Conclusion.....	44
7.0 Acknowledgements.....	45
8.0 Identification Keys and References.....	46

## Executive Summary

Colliery spoil tips are an iconic feature in the landscape of the south Wales valleys, yet they are readily overlooked and underappreciated as biologically-interesting places. Despite their somewhat recognised importance for lichens, bryophytes and vascular plants, the invertebrate fauna associated with these habitats remains largely unexplored. The urgent need for scientific research to address this issue has been raised on several occasions by conservation professionals in south Wales. In response, a joint project between the Colliery Spoil Biodiversity Initiative, Amgueddfa Cymru — National Museum Wales, The Conservation Volunteers (TCV), and Rhondda Cynon Taf County Borough Council was undertaken to study the invertebrates associated with colliery spoil tips in the south Wales valleys. The principal aim of the study was to gather evidence to support or dismiss the notion that colliery spoil tips are important habitats for invertebrates. By identifying the ‘key’ invertebrate groups and most ‘important’ features of colliery spoil tips, it is anticipated that we will be better able to assess the ‘quality’ of spoil tips in south Wales. These improved assessments will ultimately ensure appropriate management and protection is achieved for the most ‘biologically interesting’ colliery spoil tips in the south Wales valleys.

Permission was granted by Rhondda Cynon Taf County Borough Council for the author and Amgueddfa Cymru (National Museum of Wales) staff to conduct invertebrate surveys on five council-owned spoil tips within the county borough. These surveys were conducted between April and September 2015, and the same period in 2016. A variety of survey techniques were deployed including sweep netting, suction-sampling (i.e. vacuum sampling), pitfall trapping, direct searching, and aerial netting. Sampling locations focussed on the most interesting habitats in order to achieve coverage of the target groups, which included families from Coleoptera, Diptera, Hemiptera and Hymenoptera. This document outlines the results of invertebrate surveys conducted at Clydach Vale Country Park over two consecutive field seasons in 2015 and 2016. In addition to providing an invertebrate species list, this document attempts to evaluate the importance of colliery spoil tips for invertebrates and makes habitat management recommendations where applicable.

A total of 230 invertebrate species were recorded at Clydach Vale Country Park across a wide variety of invertebrate groups, with the Aculeate Hymenoptera (48 species), Hemiptera (40 species), Diptera (34 species), Coleoptera (32 species) and Lepidoptera (29 species) being particularly well represented. Of the 230 invertebrate species recorded at Clydach Vale Country Park, 45 species (~20% of the total) were deemed to be of ‘conservation importance’ (i.e. being localised, scarce, rare, UK BAP, Section 7 or SINC species).

Clydach Vale Country Park supports a mosaic of habitats including unimproved dry grassland, marshy grassland, heathland, bare ground, scrub, secondary woodland, flushes, lakes, and secondary wetland. Maintaining this habitat mosaic is key to encouraging rich invertebrate assemblages. The importance of open habitats at Clydach Vale Country Park is evident by the invertebrate species recorded, many of which require warm, sunny locations with sparse vegetation and open bare ground. The encroachment of scrub, bracken and bramble are the greatest threats facing these habitats. These sites should be monitored and appropriate action (i.e. scrub removal) undertaken where needed.

## 1.0 Introduction

The pivotal role of coal mining in shaping the British way of life cannot be underestimated. For centuries, coal mining has been an essential part of British industry. Historical findings suggest coal was used by Britons even before the arrival of the Romans, with evidence suggesting the Romans learned about coal mining and its uses from Britons. At its peak, the British coal industry employed more than a million people, making it one of the country's most important industries. Many regions were dependent on it, particularly south Wales. With its provision of high quality coal, south Wales played a pivotal role in powering Britain's industrial revolution.

The South Wales Coalfield covers an expansive area, from St. Bride's Bay in the west to Pontypool in the east. At its peak, the coal industry employed some 232,000 men in 620 coal mines across south Wales. In 1913, 57 million tons of coal came up from these mines – a fifth of the entire output of the United Kingdom. The effects of World War I and the post-war depression, however, brought about a decline in the industry. By 1936, 241 collieries had closed and the workforce had halved. Following a brief revival post-Second World War, the industry continued to decline throughout the second half of the 20th century. By the end of that century, just one deep mine remained in Wales. The coal industry, the most important industrial, social and political force in modern Wales, had all but vanished.

Nearly all the signs of this once thriving industry have been lost with colliery buildings demolished and shafts capped. One thing has remained however, the numerous colliery spoil tips littering the landscape. Centuries of intensive mining activity ultimately generated excessive quantities of waste, which was subsequently tipped upon our valleys sides. Such spoil tips have become an iconic feature in the landscape of the south Wales valleys, an industrial and cultural legacy from Wales' rich coal mining history.

Following the Aberfan disaster in 1966, many spoil tips were cleared amid fears of similar tragedies lying in wait. Those deemed stable remained, left undisturbed to naturally revegetate over time. Over many decades, these spoil tips have been colonised by a wide variety of species and habitats. Once black eye-sores in the landscape, many now support habitats and wildlife of considerable local biodiversity value. Despite their somewhat recognised importance for lichens, bryophytes and vascular plants, the invertebrate fauna associated with colliery spoil tips has remained largely unexplored. To address this issue, a two year study was coordinated to investigate the importance of colliery spoil habitats for invertebrates. This study formed a joint-venture between the Colliery Spoil Biodiversity Initiative, Amgueddfa Cymru – National Museum Wales, The Conservation Volunteer's, and Rhondda Cynon Taf County Borough Council.

## 1.1 Project aims

Permission was granted by Rhondda Cynon Taf County Borough Council for the author and Amgueddfa Cymru (National Museum of Wales) staff to conduct invertebrate surveys on five local authority spoil tips within the county borough. These surveys were conducted between April and September 2015, and the same period in 2016. The principal aim of these surveys was to identify 'key' invertebrate groups, if any, associated with colliery spoil tips. During

# Clydach Vale Country Park

---

these surveys, habitat assessments were undertaken to identify important features and areas for invertebrates. Through increased knowledge of 'key' invertebrate groups and important habitat features on colliery spoil tips, it is anticipated that we will be better able to assess the 'quality' of colliery spoil tips in south Wales. These better assessments will ultimately ensure appropriate management and protection is achieved for the most 'biologically interesting' colliery spoil tips in the south Wales valleys.

## 1.2 Study site

### **Clydach Vale Country Park**

(Grid Reference: SS 968926)

Formally the location of the Cambrian Colliery and its associated railways (Figure 1), Clydach Vale Country Park was formed following a land reclamation scheme conducted between 1985 and 1987. This scheme aimed to return the area back to its pre-industrial beauty. Covering an area of approximately 113ha, Clydach Vale Country Park now supports a mosaic of habitats including unimproved dry grassland, marshy grassland, heathland, bare ground, scrub, secondary woodland, flushes, lakes, and secondary wetland.

Much of the park comprises land reclaimed from the former Cambrian Colliery, which operated between 1872 and 1966. Two lakes have been created, one at either end of the park. These lakes are known locally as the 'top' and 'bottom' lakes, with reference to their position within the valley. In addition to the two lakes (and their associated peripheral wetland vegetation), areas of open coal spoil grassland (Figure 2) and secondary deciduous woodland are the main habitat types in this area. While a proportion of this woodland has likely developed naturally through spontaneous succession, augmentation by tree planting has occurred.

A large, naturally-revegetating coal tip is also present within the boundaries of the park, situated on Mynydd Pwllyrhebog. This tip system was formed from spoil extracted from the nearby Cambrian Colliery, which was transported via tramway and tipped on top of the mountain. The tip overlooks the top lake of Clydach Vale Country Park and is surrounded by commercial forestry which is currently owned by Natural Resources Wales (NRW). Examinations of historic Ordnance Survey (OS) maps suggest this tip was completed in the late 1960s and has been left to naturally revegetate ever since. The tip comprises a mosaic of habitats in close proximity. These habitats include: dry heathland composed largely of Ling heather (*Calluna vulgaris*) and Bilberry (*Vaccinium myrtillus*); bare ground supporting rich bryophyte and *Cladonia* lichen communities; scattered trees and scrub (primarily coniferous trees encroaching from the surrounding commercial forestry); areas of unimproved, dry grassland; and wetland in the form of ditches and seasonal pools.



# Clydach Vale Country Park

---

Clydach Vale Country Park will hereinafter be referred to simply as 'Clydach'.



**Figure 1.** Cambrian Colliery, Clydach Vale, from the south-east in 1960.



**Figure 2.** Reclaimed Cambrian Colliery site (now Clydach Vale Country Park) supporting a mixture of dry and marshy grassland habitat (June 2015).

## 2.0 Survey Methods

### 2.1 Survey Dates

The site was surveyed in April, May, June, July, August and September 2015, and the same period in 2016. Surveying rarely exceeded 2 visits per month, with approximately 2-4 hours spent surveying during each visit at the height of the field season (when weather conditions were appropriate). Details of surveying weather conditions were unrecorded in 2015, however were recorded in the subsequent field season of 2016. Survey dates, weather conditions and invertebrate groups recorded during each survey can be found in Table 1 below.

An additional survey was also undertaken in January 2017 to record myriapods (centipedes and millipedes), with any encountered isopods (woodlice) also recorded.

**Table 1.** Survey dates, weather conditions and target groups during the 2015 and 2016 field seasons.

Date	Air Temp	Wind Speed	Wind Direction	Cloud Cover	Rain	Invertebrate Groups Recorded
<b>Field season 1 (2015)</b>						
19.04.2015	—	—	—	—	—	Bees & wasps
17.05.2015	—	—	—	—	—	Bees & wasps
08.06.2015	—	—	—	—	—	Multiple
23.06.2015	—	—	—	—	—	Multiple
09.07.2015	—	—	—	—	—	Multiple
29.07.2015	—	—	—	—	—	Multiple
11.08.2015	—	—	—	—	—	Leafhoppers/planthoppers & true bugs
25.09.2015	—	—	—	—	—	Ground beetles, bees & wasps
<b>Field season 2 (2016)</b>						
12.05.2016	18-21°C	11MPH	S	Clear skies	None	Bees & wasps
17.05.2016	11°C	9MPH	SW	Overcast	Heavy rain	Ants
30.05.2016	17-19°C	9-10MPH	E	Clear skies	None	Bees & wasps
27.06.2016	17°C	11-12MPH	NW	Sunny intervals	None	Bees & wasps
18.07.2016	25°C	4MPH	S-SE	Clear skies	None	Bees & wasps
03.08.2016	—	15MPH	—	Overcast	Showers	True bugs
15.08.2016	17-20°C	9MPH	SE	Clear skies	None	Bees & wasps
23.08.2016	21°C	10MPH	—	Clear skies	None	Bees & wasps
26.08.2016	16-19°C	9MPH	SW	Clear skies	None	Bees & wasps
01.09.2016	—	—	—	—	None	True bugs
<b>Additional</b>						
19.01.2017	—	—	—	Sunny intervals	None	Centipedes, millipedes & woodlice

Where information was unrecorded, this is indicated by the presence of the symbol '—' in the appropriate column.

## 2.2 Sampling Methodology

Invertebrates were sampled using several different techniques including suction-sampling (i.e. vacuum sampling), pitfall trapping, aerial netting, and various active sampling methods. Sampling locations focussed on the most interesting habitats in order to achieve coverage of the target groups.

Pitfall traps approximately 5cm in diameter were used to survey Carabidae (ground beetles). Arachnida (spiders) were also recorded incidentally using this survey method. A salt solution was placed at the bottom of each trap as a killing agent. Two line transects were devised at Clydach, both within survey area B. One transect was devised at location B1, and another at B2 (see section 2.4 for further details). Five traps were placed at 1 metre intervals along each transect. A total of 10 pitfalls were therefore set. Traps were set during the week commencing 4<sup>th</sup> May 2015 and subsequently emptied at weekly intervals. Due to time constraints, issues with trap flooding and low catches, pitfall trapping was terminated and all traps removed during the week commencing 25<sup>th</sup> May 2015. Following the seizure of pitfall trapping, ground beetles were subsequently surveyed via active sampling methods (e.g. sieving of moss, turning over stones/logs) on an ad-hoc basis.

A suction-sampler (modified leaf-blower) was used to survey for Auchenorrhyncha (leafhoppers and planthoppers) and Heteroptera (true bugs) in grassland and heathland habitats. Three sample locations were targeted at Clydach, one within survey area B (location B3) and two within area C (location C1 and C2). Please see section 2.4 for further details. These sample locations differed in terms of restoration method (technical reclamation or spontaneous succession), vegetation type and hydrology (i.e. wet or dry). At each sample location, 2m<sup>2</sup> were surveyed – the equivalent of 200 sucks of the suction-sampler. Each sample was emptied into a sealable plastic bag into which ethyl-acetate was added as a killing agent. These samples were transferred to a freezer upon arrival at Amgueddfa Cymru (National Museum of Wales, Cardiff) and subsequently sorted and identified at a later date. Sampling was conducted on 18<sup>th</sup> August 2015 only and was not repeated in 2016 as anticipated. Other invertebrate groups were also recorded incidentally using this survey method; this included Arachnida (spiders, harvestmen and pseudoscorpions) and insect families such as Chloropidae (Diptera), Opomyzidae (Diptera) and Sepsidae (Diptera).

Sweep netting was also used as a method of surveying Heteroptera in grassland and heathland habitats. This was largely done on an ad-hoc basis at various locations within survey areas A, B and C. The sweep net comprised a 15 inch diameter net mounted on a 12 inch handle. Sweep netting involved brushing over bare ground, within long vegetation, and occasionally over scrub and trees to find arboreal species. The collected material was preferentially removed using an aspirator. Other insect groups were also recorded incidentally using this survey method; this included Orthoptera (grasshoppers and crickets), Cantharidae (soldier beetles), Chrysomelidae (leaf beetles) and some Syrphidae (hoverflies).

Direct observation and aerial netting was used as a means of surveying Aculeate Hymenoptera (bees and wasps), Lepidoptera (butterflies and day-flying moths), Odonata (dragonflies and damselflies) and Syrphidae (hoverflies) in various habitats. This survey method was deployed on an ad-hoc basis at various locations within survey areas A, B and C, and elsewhere within the park.



# Clydach Vale Country Park

Active sampling methods (such as turning over stones and dead wood) were used to survey for Chilopoda (centipedes), Diplopoda (millipedes), Formicidae (ants) and Isopoda (woodlice). This survey method was deployed on an ad-hoc basis in the heathland and grassland habitats of survey areas B and C respectively. This survey method was also deployed in the deciduous woodland habitats present between survey areas A and C on the valley floor.

Molluscs were recorded following a brief search (3 – 4 person hours) by Dr Ben Rowson, Liam Olds and Sarah Foster in September 2015. Molluscs were found by direct search and by sieving a small volume (approx 4 litres) of litter, moss and lichen. A few additional records from a site visit in March 2015 by Dr Ben Rowson and Liam Olds were also added.

Details of the sampling methods deployed during the surveys, along with the survey areas and invertebrate groups recorded, can be found in Table 2 below.

**Table 2.** Sampling techniques deployed and the invertebrate groups, survey areas and habitats targeted.

Sampling Technique	Groups Recorded	Target areas/habitats
Sweep netting	Beetles (Coleoptera), ‘true bugs’ (Heteroptera), flies (Diptera) and grasshoppers (Orthoptera)	Areas A, B and C:  Dry grassland, marshy grassland, heathland, and scrub/woodland edge
Suction-sampling	Leafhoppers and planthoppers (Auchenorrhyncha), ‘true bugs’ (Heteroptera), spiders and harvestmen (Arachnida), and flies (Diptera)	Areas B and C:  Dry grassland, marshy grassland, and heathland
Direct observation and netting	Bees and wasps (Aculeate Hymenoptera), damselflies and dragonflies (Odonata) and flies (Diptera)	Areas A, B and C:  Grassland, heathland, wetland (ditches, ponds), and scrub/ woodland-edge
Pitfall trapping	Ground beetles (Carabidae), ants (Formicidae) and spiders (Arachnida)	Area B:  Heathland
Direct searching	Ants (Formicidae), centipedes (Chilopoda), millipedes (Diplopoda), slugs and snails (Mollusca), and woodlice (Isopoda)	Areas B and C:  Dry grassland, marshy grassland, and heathland

## 2.3 Target Groups

Principal target groups for the survey were:

- **COLEOPTERA** → Carabidae (ground beetles)
- **DIPTERA** → Syrphidae (hoverflies)
- **HEMIPTERA** → Auchenorrhyncha (leafhoppers and planthoppers)  
→ Heteroptera (including ground bugs, mirid bugs and lace bugs)
- **HYMENOPTERA** → Aculeata (social bees/wasps, solitary bees/wasps and ants)

## Clydach Vale Country Park

---

Incidental records of other groups were also recorded when encountered. This included:

- Arachnida (spiders, harvestmen and pseudoscorpions)
- Chilopoda (centipedes)
- Coleoptera: Apionidae (seed weevils)
- Coleoptera: Cantharidae (soldier beetles)
- Coleoptera: Cerambycidae (longhorn beetles)
- Coleoptera: Chrysomelidae (leaf beetles)
- Coleoptera: Coccinellidae (ladybirds)
- Coleoptera: Curculionidae (weevils)
- Coleoptera: Geotrupidae (dung beetles)
- Coleoptera: Leiodidae (round fungus beetles)
- Coleoptera: Silphidae (burying beetles)
- Diplopoda (millipedes)
- Diptera: Bibionidae (St Mark's flies)
- Diptera: Bombyliidae (bee flies)
- Diptera: Chloropidae (grass flies)
- Diptera: Hybotidae (dance flies)
- Diptera: Opomyzidae
- Diptera: Pediciidae (hairy-eyed crane flies)
- Diptera: Rhagionidae (snipe flies)
- Diptera: Sepsidae (black scavenger flies)
- Diptera: Stratiomyidae (soldier flies)
- Diptera: Tabanidae (horseflies)
- Diptera: Tachinidae
- Diptera: Tipulidae (crane flies)
- Hymenoptera: Symphyta (sawflies)
- Isopoda (woodlice)
- Lepidoptera (butterflies and day-flying moths)
- Mollusca (slugs and snails)
- Odonata (dragonflies and damselflies)
- Orthoptera (grasshoppers and crickets)

Where necessary, specimens were collected and later identified using a x20 binocular microscope. Most samples were stored dry and later pinned to aid identification. In contrast, Carabidae and Hemiptera (collected via pitfall trapping and suction-sampling respectively) were stored in 70% alcohol. Spiders collected as by-catch during pitfall trapping were also stored in 70% alcohol, along with any centipedes, millipedes and woodlice encountered through active sampling methods.

Identification was to species level wherever possible. Aculeate Hymenoptera were identified by the author and, where necessary, verified by Mark Pavett (Amgueddfa Cymru — National Museum Wales). All Auchenorrhyncha were identified by Dr Michael Wilson (Amgueddfa Cymru — National Museum Wales). The remaining invertebrate groups were identified by Liam Olds, with specimens compared against the reference collections at Amgueddfa Cymru

# Clydach Vale Country Park

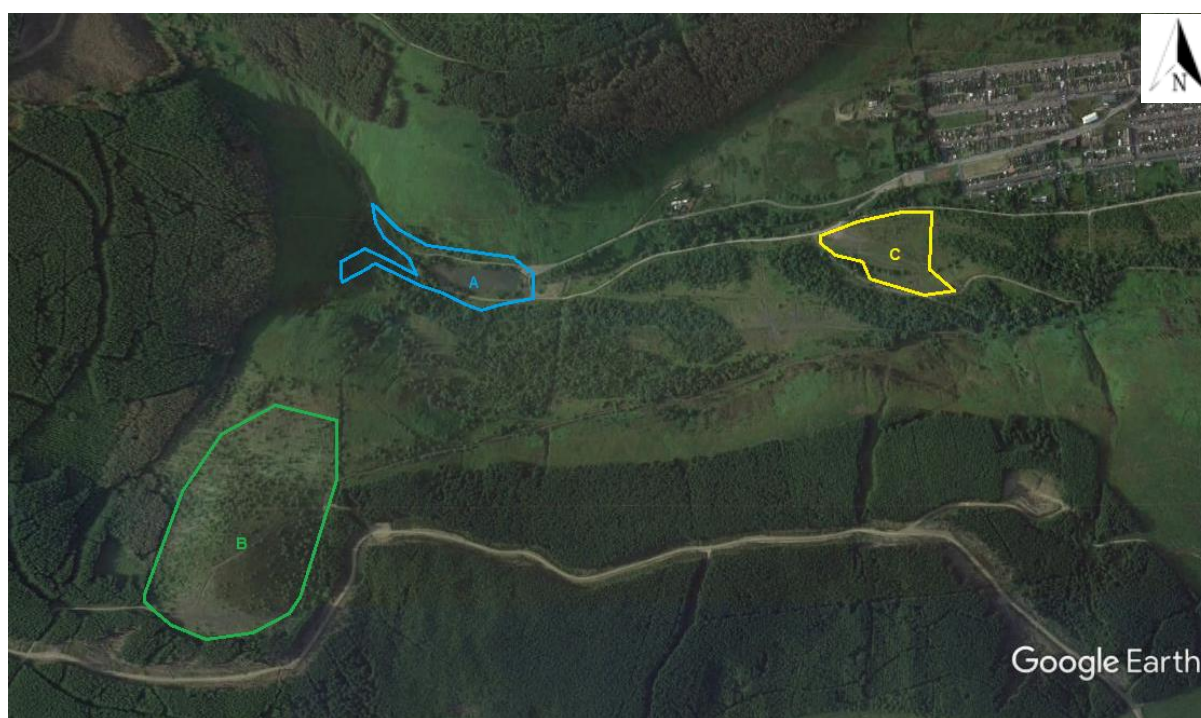
(National Museum of Wales, Cardiff) and verification sought by the appropriate experts where needed.

The status of invertebrate species (common, local, scarce, rare, UK BAP etc.) was evaluated by referring to various sources including:

- Species distribution atlases and species keys
- The National Biodiversity Network Gateway (NBN Gateway)
- County Recorders and local experts
- The UK Biodiversity Action Plan (2007)
- The 'Guidelines for the Selection of Wildlife Sites in South Wales' (SWWSP 2004)
- National Red Data Books (e.g. Falk, 1991)

## 2.4 Survey Areas

Invertebrate surveys at Clydach focussed on three major areas (areas A, B and C; Figure 3), the details of which can be found below. Collectively, these areas provided a good coverage of habitats on both reclaimed and naturally revegetating coal spoil. Details of the survey techniques deployed in each of the following target areas can be found in Table 2.



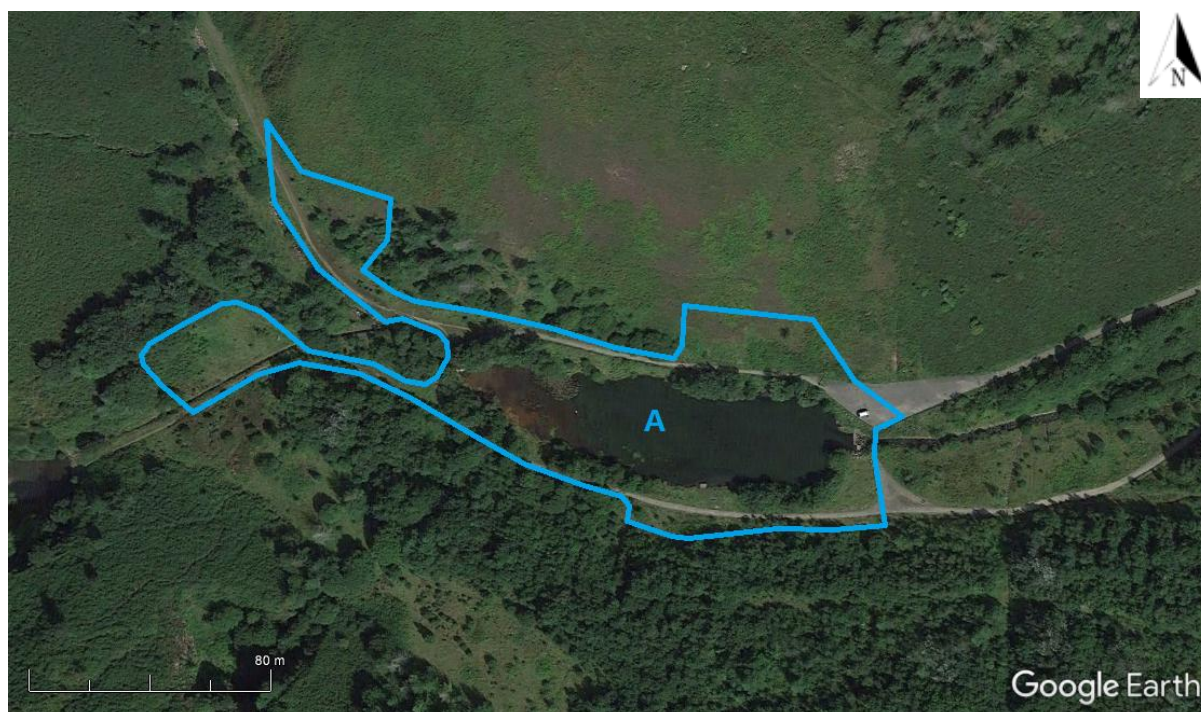
**Figure 3.** Satellite imagery of Clydach Vale Country Park showing survey areas A, B and C  
©Google 2013

**Area A** (Grid Reference centred at SS96409272) –This includes the area immediately surrounding the top lake at Clydach Vale Country Park (Figure 3; Figure 4). Located on the former site of the Cambrian Colliery, this lake was one of two created as part of the land reclamation scheme implemented between 1985 and 1987. The area immediately surrounding the lake is largely dominated by marshy grassland, with plentiful scrub and secondary woodland also present. Further away from the waters, areas of dry, unimproved



## Clydach Vale Country Park

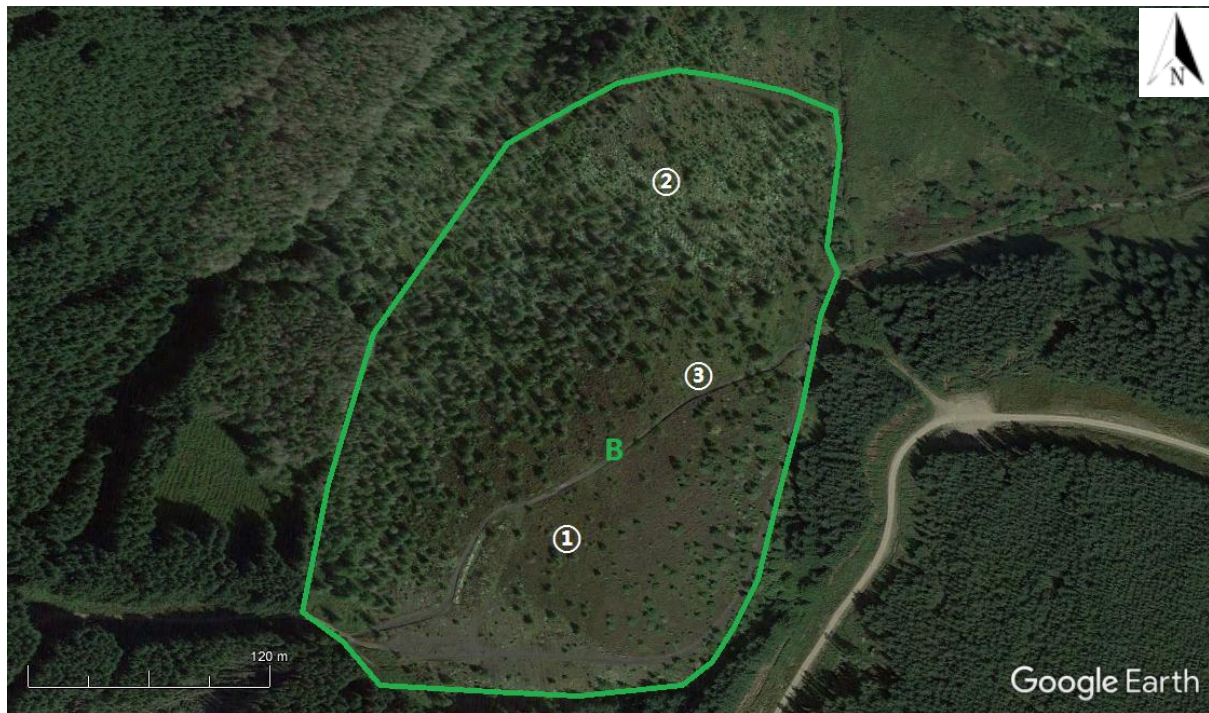
grassland are also present. Area A also includes the lower slopes of the hillside which runs along the northern edge of the lake. These south-facing slopes support nectar-rich plant assemblages dominated by Sheep's-bit (*Jasione montana*), however Ling Heather (*Calluna vulgaris*), Tormentil (*Potentilla erecta*) and bird's-foot-trefoils (*Lotus spp.*) are also present.



**Figure 4.** Satellite imagery of survey area A ©Google 2016

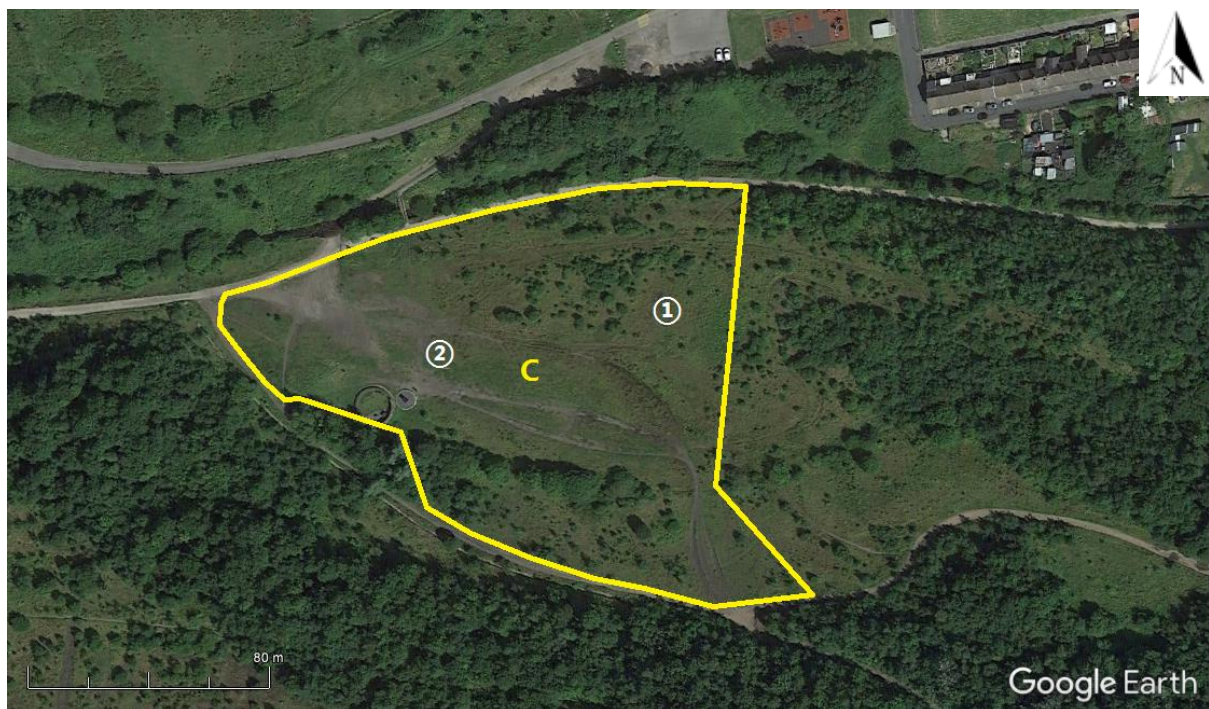
**Area B** (Grid Reference centred at SS96099234) – This survey area comprises a large, naturally-revegetating coal tip situated on Mynydd Pwllyrhebog (Figure 3; Figure 5). The tip overlooks the top lake at Clydach Vale Country Park and is surrounded by commercial forestry owned by Natural Resources Wales (NRW). Examinations of historic Ordnance Survey (OS) maps suggest this tip system was completed in the late 1960s, and has been left to naturally revegetate ever since. The tip comprises a mosaic of habitats in close proximity. These habitats include: dry heathland composed of Ling heather and Bilberry, although Bell heather (*Erica cinerea*) is also present; bare ground supporting rich bryophyte and *Cladonia* lichen communities; scattered trees and scrub (primarily conifer trees); areas of unimproved, dry grassland; and wetland in the form of ditches and seasonal pools. Main access to this tip is achieved by walking the old tramway path, which begins at grid reference SS97209261 and heads upwards in a south-westerly direction. This footpath is known locally as ‘the incline’.





**Figure 5.** Satellite imagery of survey area B ©Google 2016

**Area C** (Grid Reference centred at SS97149276) – This survey area is located on the former site of the Cambrian Colliery and its associated railways, an area which was reclaimed between 1985 and 1987. With a memorial garden to the miners who died in the 1965 disaster at the Cambrian Colliery, this area is a focal point of the park (Figure 3; Figure 6). The area comprises a mosaic of habitats including marshy grassland, dry grassland, seasonal pools, ditches, bare ground and scattered scrub (predominately willows *Salix spp.*).



**Figure 6.** Satellite imagery of survey area C ©Google 2016

## 2.5 Sample locations

While direct observation, aerial netting and sweep netting was conducted widely within survey areas A, B and C, suction-sampling and pitfall trapping was undertaken at more localised sample locations. The precise locations where these survey techniques were deployed are given below.

**B1** (Grid Reference: SS96079226) – This sample location is situated on the plateau of the naturally revegetating coal tip (survey area B) situated on Mynydd Pwllyrhebog (Figure 5). This location is dominated by dry heath composed largely of Ling heather, although Bell heather and scattered conifer trees are also present (Figure 7).

Survey method: five pitfall traps placed at 1 metre intervals along a line transect. This line transect ran in an east to west direction with no increase in elevation.

**B2** (Grid Reference: SS96139243) – Located on the northern-side of the same tip system as above (Figure 5), this location is characterised by dry, sparsely-vegetated grassland dominated by Pearly Everlasting (*Anaphalis margaritacea*); scattered conifer trees are also present (Figure 8). The area is particularly rocky with many large, exposed rocks on the surface. There is a dense ground covering of moss in some areas.

Survey method: five pitfall traps placed at 1 metre intervals along a line transect. This line transect ran in an east to west direction with no increase in elevation.

**B3** (Grid Reference: SS96129233) – Located on the eastern-side of the same tip system as above (Figure 5), this location is characterised by rank dry grassland habitat with scattered Ling heather and Bilberry (Figure 9).

Survey method: suction-sampling for Auchenorrhyncha and Heteroptera.

**C1** (Grid Reference: SS971927) – Located within survey area C (Figure 6), this sample location comprises marshy grassland habitat composed of plant species such as rush (*Juncus sp.*), umbellifers, buttercups (*Ranunculus sp.*) and Ragged-Robin (*Lychnis flos-cuculi*) (Figure 10). Scattered scrub (primarily *Salix spp.*) is also present.

Survey method: suction-sampling for Auchenorrhyncha and Heteroptera.

**C2** (Grid Reference: SS971927) – Located within survey area C (Figure 6), this sample location comprises unimproved, dry neutral grassland dominated by White Clover (*Trifolium repens*), Red Clover (*Trifolium pratense*) and Common bird's-foot-trefoil (*Lotus corniculatus*) (Figure 11).

Survey method: suction-sampling for Auchenorrhyncha and Heteroptera.





**Figure 7.** Sample location B1 (March 2016)



**Figure 8.** Sample location B2 (July 2015)





**Figure 9.** Sample location B3 (August 2015)



**Figure 10.** Sample location C1 (June 2015)





**Figure 11.** Sample location C2 (July 2016)

### 3.0 Results

#### 3.1 Species List

A full invertebrate species list is given in Table 3. An explanation of the status categories used is given below.

##### Status

- **Local** = Species displaying a localised distribution in Wales and/or UK, being found in some but not all apparently suitable habitats within its range.
- **Scarce** = Species considered scarce in Wales and/or UK. This includes scarce species which have not currently received official status designation as Nationally Scarce.
- **Nationally Scarce** = Species occurring within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970.
- **Nationally Rare** = Species occurring in 15 or fewer ten-kilometre squares of the British National Grid system since 1970.
- **UK BAP** = UK Biodiversity Action Plan priority species for conservation.
- **S7** = Section 7 list of species of principal importance for conservation of biological diversity in Wales under the Environment (Wales) Act 2016.
- **SINC A** = Contributory Species in SINC Guidelines (SWWSP, 2004).
- **SINC B** = Contributory Species in SINC Guidelines (SWWSP, 2004).
- **New to Britain** = A newly discovered species in Britain. Status has yet to be determined.

# Clydach Vale Country Park

Where Status is blank, this species is considered to be common and widespread.

**Table 3.** Invertebrate species list for Clydach Vale Country Park.

Species	Common Name/Family	Area recorded (if known)	Year recorded	Status (in Wales)	Status (in UK)
<b>Hymenoptera</b>	<b>Bees and Wasps (Aculeata)</b>				
<i>Ancistrocerus gazella</i>	Vespidae	A	2016		
<i>Andrena angustior</i>	Groove-faced Mining Bee (Andrenidae)	A	2016	<b>Local</b>	
<i>Andrena bicolor</i>	Gwynne's Mining Bee (Andrenidae)		2015		
<i>Andrena cineraria</i>	Ashy Mining Bee (Andrenidae)	A	2015, 2016		
<i>Andrena coitana</i>	Small Flecked Mining Bee (Andrenidae)	A	2015, 2016		<b>Scarce</b>
<i>Andrena fucata</i>	Painted Mining Bee (Andrenidae)	A	2016	<b>Local</b>	
<i>Andrena haemorrhoa</i>	Orange-tailed Mining Bee (Andrenidae)		2016		
<i>Andrena lapponica</i>	Bilberry Mining Bee (Andrenidae)	B	2016	<b>Local</b>	
<i>Andrena minutula</i>	Common Mini-mining Bee (Andrenidae)		2015		
<i>Andrena nigroaenea</i>	Buffish Mining Bee (Andrenidae)		2015		
<i>Andrena scotica</i>	Chocolate Mining Bee (Andrenidae)		2015		
<i>Andrena semilaevis</i>	Shiny-margined Mini-mining Bee (Andrenidae)	A	2016		
<i>Andrena tarsata</i>	Tormentil Mining Bee (Andrenidae)	A	2016	<b>S7</b>	<b>Nationally Scarce; UK BAP</b>
<i>Andrena wilkella</i>	Wilke's Mining Bee (Andrenidae)	C	2015		
<i>Anthophora furcata</i>	Fork-tailed Flower Bee (Apidae)	A	2016		
<i>Apis mellifera</i>	Western Honey Bee (Apidae)	A, B, C	2015, 2016		
<i>Bombus barbutellus</i>	Barbut's Cuckoo Bee (Apidae)	B	2015	<b>Scarce</b>	
<i>Bombus hortorum</i>	Garden bumblebee (Apidae)	A, C	2015, 2016		
<i>Bombus humilis</i>	Brown-banded bumblebee (Apidae)	A	2015	<b>S7</b>	<b>UK BAP</b>
<i>Bombus hypnorum</i>	Tree bumblebee (Apidae)	A	2015		
<i>Bombus jonellus</i>	Heath bumblebee (Apidae)	B	2015, 2016		
<i>Bombus lucorum agg.</i>	White-tailed bumblebee (Apidae)	A, B, C	2015, 2016		
<i>Bombus monticola</i>	Bilberry Bumblebee (Apidae)	A, B, C	2015, 2016		<b>Local</b>
<i>Bombus pascuorum</i>	Common carder-bee (Apidae)	A, B, C	2015, 2016		
<i>Bombus pratorum</i>	Early bumblebee (Apidae)	B	2015, 2016		
<i>Bombus sylvestris</i>	Forest cuckoo bee (Apidae)	B	2015		
<i>Bombus terrestris</i>	Buff-tailed bumblebee (Apidae)	B	2015, 2016		
<i>Dolichovespula norvegica</i>	Norwegian Wasp (Vespidae)	A	2016		
<i>Dolichovespula sylvestris</i>	Tree Wasp (Vespidae)	B	2016		

## Clydach Vale Country Park

<i>Halictus rubicundus</i>	Orange-legged Furrow Bee (Halictidae)	B	2015, 2016		
<i>Hylaeus confusus</i>	White-jawed Yellow-face Bee (Colletidae)	A	2015	<b>Scarce</b>	
<i>Lasioglossum albipes</i>	Bloomed Furrow Bee (Halictidae)	C	2015		
<i>Lasioglossum cupromicans</i>	Turquoise Furrow Bee (Halictidae)	B	2016	<b>Scarce</b>	
<i>Lasioglossum fratellum</i>	Smooth-faced Furrow Bee (Halictidae)	B	2015, 2016	<b>Local</b>	
<i>Lasioglossum leucopus</i>	White-footed Furrow Bee (Halictidae)	A	2015, 2016		
<i>Lasioglossum morio</i>	Green Furrow Bee (Halictidae)	A, B	2016		
<i>Megachile willughbiella</i>	Willughby's Leafcutter Bee (Megachilidae)	C	2015		
<i>Nomada fabriciana</i>	Fabricius' Nomad Bee (Apidae)	A	2016		
<i>Nomada leucophthalma</i>	Early Nomad Bee (Apidae)	A	2015	<b>Local</b>	
<i>Nomada panzeri</i>	Panzer's Nomad Bee (Apidae)		2015, 2016	<b>Local</b>	
<i>Nomada ruficornis</i>	Folk-jawed Nomad Bee (Apidae)	A	2015, 2016		
<i>Sphecodes ephippius</i>	Bare-saddled Blood Bee (Halictidae)	A	2015, 2016		
<i>Sphecodes hyalinatus</i>	Furry-bellied Blood Bee (Halictidae)	A, B	2016	<b>Local</b>	
<b>Hymenoptera</b>	<b>Ants (Aculeata)</b>				
<i>Formica lemni</i>	Formicidae	B	2015, 2016		
<i>Lasius flavus</i>	Yellow Meadow Ant (Formicidae)	B, C	2015, 2016		
<i>Myrmica ruginodis</i>	Formicidae	B	2015		
<i>Myrmica sabuleti</i>	Formicidae	B	2015		
<i>Myrmica scabrinodis</i>	Formicidae	C	2015, 2016		
<b>Hymenoptera</b>	<b>Sawflies (Symphyta)</b>				
<i>Arge cyanocrocea</i>	Bramble sawfly (Argidae)	A	2015		
<i>Urocerus gigas</i>	Giant Wood Wasp (Siricidae)	B	2016		
<b>Lepidoptera</b>	<b>Butterflies</b>				
<i>Aglais io</i>	Peacock (Nymphalidae)	C	2015		
<i>Aglais urticae</i>	Small tortoiseshell (Nymphalidae)	C	2015		
<i>Anthocharis cardamines</i>	Orange-tip (Pieridae)	A, C	2015, 2016		
<i>Argynnis aglaja</i>	Dark Green Fritillary (Nymphalidae)	A	2015	<b>SINC B</b>	
<i>Boloria selene</i>	Small Pearl-bordered Fritillary (Nymphalidae)	A	2015, 2016	<b>S7; SINC B</b>	<b>UK BAP</b>
<i>Coenonympha pamphilus</i>	Small Heath (Nymphalidae)	A, B, C	2015, 2016	<b>S7</b>	<b>UK BAP</b>
<i>Erynnis tages</i>	Dingy skipper (Hesperiidae)	C	2015	<b>S7; SINC B</b>	<b>UK BAP</b>
<i>Gonepteryx rhamni</i>	Brimstone (Pieridae)	A	2015		
<i>Hipparchia semele</i>	Grayling (Nymphalidae)	B	2015, 2016	<b>S7; SINC B</b>	<b>UK BAP</b>
<i>Lycaena phlaeas</i>	Small Copper (Lycaenidae)	A, B	2016		
<i>Maniola jurtina</i>	Meadow Brown (Nymphalidae)	A, C	2015, 2016		
<i>Ochlodes sylvanus</i>	Large skipper (Hesperiidae)	C			

# Clydach Vale Country Park

<i>Polyommatus icarus icarus</i>	Common blue (Lycaenidae)	A, C	2015, 2016		
<i>Pyronia tithonus</i>	Gatekeeper (Nymphalidae)	C	2015, 2016		
<i>Thymelicus sylvestris</i>	Small skipper (Hesperiidae)	C	2015		
<i>Vanessa atalanta</i>	Red Admiral (Nymphalidae)	A, C	2015, 2016		
<b>Lepidoptera</b>	<b>Moths</b>				
<i>Camptogramma bilineata</i>	Yellow shell (Geometridae)	A	2015		
<i>Chiasmia clathrata</i>	Latticed Heath (Geometridae)	A	2015	<b>S7</b>	<b>UK BAP</b>
<i>Ematurga atomaria</i>	Common heath (Geometridae)	B	2015		
<i>Epirrhoe alternata</i>	Common Carpet (Geometridae)	B	2015		
<i>Epirrhoe tristata</i>	Small Argent and Sable (Geometridae)	B	2015		
<i>Euclidia glyphica</i>	Burnet Companion (Noctuidae)	C	2015		
<i>Hecatera bicolorata</i>	Broad-barred white (Noctuidae)	B	2015		
<i>Lycophotia porphyrea</i>	True Lover's Knot (Noctuidae)	B	2015		
<i>Petrophora chlorosata</i>	Brown Silver-line (Geometridae)	A	2015		
<i>Phytometra viridaria</i>	Small Purple-barred (Erebidae)	B	2016	<b>Local</b>	
<i>Pyrausta purpuralis</i>	Common Purple & Gold (Crambidae)	C	2015		
<i>Tyria jacobaeae</i>	Cinnabar (Arctiidae)	C	2015	<b>S7</b>	<b>UK BAP</b>
<i>Zygaena trifolii</i>	Five-spot burnet (Zygaeninae)	C	2015	<b>Local</b>	
<b>Odonata</b>	<b>Dragonflies &amp; Damselflies</b>				
<i>Coenagrion puella</i>	Azure damselfly (Coenagrionidae)	A	2015, 2016		
<i>Cordulegaster boltonii</i>	Golden-ringed dragonfly (Cordulegastridae)	B	2015, 2016	<b>SINC B</b>	
<i>Enallagma cyathigerum</i>	Common blue damselfly (Coenagrionidae)	A	2015, 2016		
<i>Ischnura elegans</i>	Blue-tailed damselfly (Coenagrionidae)	A	2015, 2016		
<i>Lestes sponsa</i>	Emerald Damselfly (Lestidae)	A	2015, 2016		
<i>Libellula depressa</i>	Broad-bodied chaser (Libellulidae)	A	2015		
<i>Orthetrum coerulescens</i>	Keeled Skimmer (Libellulidae)	C	2016	<b>SINC A</b>	
<i>Pyrrosoma nymphula</i>	Large red damselfly (Coenagrionidae)	A	2015, 2016		
<b>Orthoptera</b>	<b>Grasshoppers &amp; Crickets</b>				
<i>Chorthippus parallelus</i>	Meadow grasshopper (Acrididae)	A, C	2015, 2016		
<i>Myrmeleotettix maculatus</i>	Mottled grasshopper (Acrididae)	B, C	2015, 2016	<b>SINC B</b>	
<i>Omocestus viridulus</i>	Common green grasshopper (Acrididae)	A, C	2015, 2016		
<b>Coleoptera</b>	<b>Beetles</b>				
<i>Amara aenea</i>	Carabidae	B1	2015		
<i>Anoplotrupes</i>	Woodland dor beetle	B	2015		



# Clydach Vale Country Park

<i>stercorosus</i>	(Geotrupidae)				
<i>Bradycellus harpalinus</i>	Carabidae	C	2015		
<i>Cantharis pallida</i>	Cantharidae		2015		
<i>Cantharis rustica</i>	Cantharidae	A	2015		
<i>Catops sp.</i>	Leiodidae	B	2016		
<i>Cicindela campestris</i>	Green Tiger Beetle (Carabidae)	B	2016		
<i>Coccinella septempunctata</i>	7-spot ladybird (Coccinellidae)		2016		
<i>Coelositona cambricus</i>	Curculionidae	C	2015		
<i>Galerucella lineola</i>	Brown Willow Beetle (Chrysomelidae)		2016		
<i>Gastrophysa viridula</i>	Green dock beetle (Chrysomelidae)		2015		
<i>Gonioctena olivacea</i>	Broom Leaf Beetle (Chrysomelidae)		2015		<b>Local</b>
<i>Harpalus affinis</i>	Carabidae		2015		
<i>Ischnopterapion loti/modestum</i>	Apionidae	C	2015		
<i>Leptura quadrifasciata</i>	Four-banded Longhorn Beetle (Cerambycidae)	A	2016		<b>Nationally Scarce</b>
<i>Luperus longicornis</i>	Chrysomelidae		2015		
<i>Micrelus ericae</i>	Curculionidae	B3	2015		
<i>Nebria brevicollis</i>	Carabidae		2015		
<i>Nebria salina</i>	Carabidae	B1	2015		<b>Local</b>
<i>Notiophilus aquaticus</i>	Carabidae		2015		
<i>Otiorhynchus singularis</i>	Clay-coloured Weevil (Curculionidae)		2015		
<i>Perapion curtirostre</i>	Apionidae	C	2015		
<i>Phaedon cochleariae/armoraciae</i>	Chrysomelidae	B	2016		
<i>Protapion apricans</i>	Apionidae	C	2015		
<i>Protapion assimile</i>	Apionidae	C	2015		
<i>Protapion trifolii</i>	Apionidae	C	2015		
<i>Plateumaris discolor</i>	Chrysomelidae	A	2016		
<i>Psylliodes cucullata</i>	Chrysomelidae	B	2015		
<i>Rhagonycha fulva</i>	Common red soldier beetle (Cantharidae)	A, C	2016		
<i>Rhyzobius litura</i>	Coccinellidae	C2	2015		
<i>Silpha atrata</i>	Silphidae		2016		
<i>Timarcha tenebricosa</i>	Bloody-nosed beetle (Chrysomelidae)	A	2015		
<b>Diptera</b>	<b>Flies</b>				
<i>Baccha elongata</i>	Syrphidae		2015		
<i>Bibio pomonae</i>	Bibionidae		2016		
<i>Bombylius major</i>	Bombyliidae		2015, 2016		
<i>Cheilosia fraterna</i>	Syrphidae	A	2016		
<i>Cetema elongatum/simile</i>	Chloropidae	B, C	2015		
<i>Cetema neglectum</i>	Chloropidae	C	2015		
<i>Dicranota claripennis</i>	Pediciidae		2016		
<i>Dilophus febrilis</i>	Bibionidae		2016		
<i>Episyrphus</i>	Syrphidae		2015		

## Clydach Vale Country Park

<i>balteatus</i>					
<i>Geomyza balachowski</i>	Opomyzidae		2015		
<i>Haematopota pluvialis</i>	Tabanidae		2015		
<i>Hybos culiciformis</i>	Hybotidae	B3	2015		
<i>Leucozona lucorum</i>	Syrphidae		2015		
<i>Melanostoma scalare</i>	Syrphidae		2015		
<i>Melanostoma mellinum</i>	Syrphidae		2015		
<i>Neoascia meticulosa</i>	Syrphidae	A	2015, 2016		
<i>Neoascia podagrica</i>	Syrphidae	A	2016		
<i>Opomyza germinationis</i>	Opomyzidae	B3	2015		
<i>Opomyza petrei</i>	Opomyzidae	C	2015		
<i>Oxycera pardalina</i>	Stratiomyidae		2016		<b>Nationally Scarce</b>
<i>Platycheirus albimanus</i>	Syrphidae		2015		
<i>Rhagio scolopaceus</i>	Rhagionidae	B	2016		
<i>Sepsis cynipsea</i>	Sepsidae	B3	2015		
<i>Sepsis orthocnemis</i>	Sepsidae	B3, C	2015		
<i>Sericomyia silentis</i>	Syrphidae	A	2015, 2016		
<i>Sphaerophoria philanthus</i>	Syrphidae	B	2016		
<i>Syrphus ribesii</i>	Syrphidae		2015		
<i>Syrphus torvus</i>	Syrphidae		2015, 2016		
<i>Tachina grossa</i>	Tachinidae		2015	<b>Local</b>	
<i>Tachina ursina</i>	Tachinidae	A	2015		
<i>Tipula fulvipennis</i>	Tipulidae		2016		
<i>Volucella bombylans</i>	Syrphidae		2015		
<i>Volucella pellucens</i>	Syrphidae		2015		
<i>Xylota jakutorum</i>	Syrphidae	A	2015		<b>Nationally Scarce</b>
<b>Auchenorrhyncha</b>	<b>Leafhoppers/planthoppers</b>				
<i>Anoscopus albifrons</i>	Cicadellidae	B3	2015		
<i>Anoscopus flavostriatus</i>	Cicadellidae	C1	2015		
<i>Anoscopus serratulae</i>	Cicadellidae	C1	2015		
<i>Aphrodes makarovi</i>	Cicadellidae	C2	2015		
<i>Arocephalus punctum</i>	Cicadellidae	C2	2015		
<i>Cercopis vulnerata</i>	Red-and-black Froghopper (Cercopidae)	A	2016		
<i>Cicadella viridis</i>	Cicadellidae	C1	2015		
<i>Conomelus anceps</i>	Delphacidae	C1, C2	2015		
<i>Conosanus obsoletus</i>	Cicadellidae	C1	2015		
<i>Dicranotropis divergens</i>	Delphacidae	B3	2015		<b>Nationally Scarce</b>
<i>Elymana sulphurella</i>	Cicadellidae	C1, C2	2015		
<i>Euscelis incisus</i>	Cicadellidae	C1, C2	2015		
<i>Macropsis sp.</i>	Cicadellidae		2016		
<i>Megophthalmus scanicus</i>	Cicadellidae	B3, C2	2015		

## Clydach Vale Country Park

<i>Neophilaenus exclamationis</i>	Aphrophoridae	B3	2015		
<i>Neophilaenus lineatus</i>	Aphrophoridae	B3, C1, C2	2015		
<i>Philaenus spumarius</i>	Aphrophoridae	B3, C1, C2	2015		
<i>Populicerus confusus</i>	Cicadellidae		2016		
<i>Psammotettix</i> sp.	Cicadellidae	C1, C2	2015		
<b>Heteroptera</b>	<b>True Bugs</b>				
<i>Adelphocoris quadripunctatus</i>	Miridae	C	2016		<b>New to Britain</b>
<i>Apolygus spinolae</i>	Miridae	A	2016		
<i>Chartoscirta cocksii</i>	Saldidae	C1, C2	2015, 2016		<b>Scarce</b>
<i>Closterotomus norwegicus</i>	Miridae	A	2016		
<i>Cymus glandicolor</i>	Lygaeidae	B, C2	2015		
<i>Dolycoris baccarum</i>	Hairy shieldbug (Pentatomidae)	C2	2015		
<i>Grypocoris stysi</i>	Miridae	A	2015		
<i>Himacerus boops</i>	Nabidae	C2	2015		<b>Local</b>
<i>Leptopterna dolabrata</i>	Miridae	A	2016		
<i>Myrmus miriformis</i>	Rhopalidae	C1, C2	2015		
<i>Nabis flavomarginatus</i>	Broad Damsel Bug (Nabidae)	B3, C1, C2	2015, 2016		
<i>Nabis limbatus</i>	Marsh Damsel Bug (Nabidae)	B3, C1, C2	2015, 2016		
<i>Notostira elongata</i>	Miridae	B3	2016		
<i>Pachytomella parallela</i>	Miridae	B3	2015		
<i>Peritrechus geniculatus</i>	Lygaeidae	C2	2015		
<i>Piezodorus lituratus</i>	Gorse shieldbug (Pentatomidae)	B3, C2	2015		
<i>Plagiognathus chrysanthemi</i>	Miridae	A	2016		
<i>Scolopostethus decoratus</i>	Lygaeidae	B3	2015, 2016		
<i>Stenotus binotatus</i>	Miridae	A	2016		
<i>Stygnocoris rusticus</i>	Lygaeidae	C2	2015		<b>Local</b>
<i>Stygnocoris sabulosus</i>	Lygaeidae	B3, C2	2015, 2016		
<b>Arachnida</b>	<b>Spiders, Harvestmen &amp; Pseudoscorpions</b>				
<i>Alopecosa</i> sp.	Lycosidae	B3	2015		
<i>Araneus</i> sp.	Araneidae	C2	2015		
<i>Clubiona terrestris</i>	Clubionidae	B3	2015		
<i>Clubiona trivialis</i>	Clubionidae	B3	2015		<b>Local</b>
<i>Drassyllus pusillus</i>	Gnaphosidae	B1	2015		<b>Local</b>
<i>Eros</i> sp.	Mimetidae	B3	2015		
<i>Haplodrassus signifer</i>	Gnaphosidae	B1	2015		<b>Local</b>
<i>Heliophanus</i> sp.	Salticidae	C1, C2	2015		
<i>Neobisium carcinoides</i>	Neobisiidae	B3	2015		

# Clydach Vale Country Park

<i>Nemastoma bimaculatum</i>	Nemastomatidae	B3, C	2015		
<i>Opilio saxatilis</i>	Phalangiidae	B3	2015		
<i>Pachygnatha degeeri</i>	Tetragnathidae	B2, C2	2015		
<i>Pardosa monticola</i>	Lycosidae	B1	2015		<b>Local</b>
<i>Pardosa pullata</i>	Lycosidae	B2, B3	2015		
<i>Phalangium opilio</i>	Phalangiidae	C	2015		
<i>Trochosa terricola</i>	Lycosidae	B2	2015		
<i>Xysticus cristatus</i>	Thomisidae	B1	2015		
<i>Xysticus erraticus</i>	Thomisidae	B3	2015		<b>Local</b>
<b>Chilopoda</b>	<b>Centipedes</b>				
<i>Geophilus truncorum</i>	Geophilidae		2017		
<i>Lithobius pilicornis</i>	Lithobiidae		2017		<b>Nationally Scarce</b>
<b>Diplopoda</b>	<b>Millipedes</b>				
<i>Ceratosphys amoena (form confusa)</i>	Opisthocheiridae		2017		<b>Nationally Rare</b>
<i>Chordeuma proximum</i>	Chordeumatidae		2017		
<i>Hylebainosoma nontronensis</i>	Haaseidae		2017		<b>Nationally Rare</b>
<i>Nanogona polydesmoides</i>	Craspedosomatidae	C	2017		
<i>Polydesmus sp.</i>	Polydesmidae	C	2017		
<b>Isopoda</b>	<b>Woodlice</b>				
<i>Oniscus asellus</i>	Common shiny woodlouse (Oniscidae)		2017		
<i>Trichoniscus pusillus agg.</i>	Common pygmy woodlouse (Trichoniscidae)		2017		
<i>Trichoniscus pygmaeus</i>	Least Pygmy Woodlouse (Trichoniscidae)	C	2017		
<b>Mollusca</b>	<b>Slugs and Snails</b>				
<i>Arion ater/rufus</i>	Arionidae		2015		
<i>Arion intermedius</i>	Hedgehog Slug (Arionidae)		2015		
<i>Arion subfuscus</i>	Dusky Slug (Arionidae)		2015		
<i>Deroceras reticulatum</i>	Grey Field Slug (Agriolimacidae)		2017		
<i>Nesovitrea hammonis</i>	Rayed Glass Snail (Oxychilidae)		2015		
<i>Vitrina pellucida</i>	Pellucid Glass Snail (Vitrinidae)		2015		
<b>Other</b>					
<i>Lissotriton helveticus</i>	Palmate Newt	C	2016		
<i>Rana temporaria</i>	Common Frog		2016		
<i>Vipera berus</i>	Adder	A	2015, 2016	<b>UK BAP</b>	
<i>Zootoca vivipara</i>	Common Lizard	A	2015, 2016	<b>UK BAP</b>	



## 3.2 Target Groups

Species representation from the target groups outlined in Section 2.3 was as follows:

### Coleoptera

- Carabidae (Ground beetles): 7 species

### Diptera

- Syrphidae (hoverflies): 16 species

### Hemiptera

- Auchenorrhyncha (leafhoppers and planthoppers): 19 species
- Heteroptera ('true bugs'): 21 species

### Hymenoptera

- Aculeata (bumblebees, social bees/wasps, solitary bees/wasps and ants): 48 species

In addition to the Target Groups outlined above, the following groups were also recorded:

### Incidental Recordings

- Arachnida (spiders and pseudoscorpions): 18 species
- Chilopoda (centipedes): 2 species
- Coleoptera: Apionidae (seed weevils): 5 species
- Coleoptera: Cantharidae (soldier beetles): 3 species
- Coleoptera: Cerambycidae (longhorn beetles): 1 species
- Coleoptera: Chrysomelidae (leaf beetles): 8 species
- Coleoptera: Coccinellidae (ladybirds): 2 species
- Coleoptera: Curculionidae (weevils): 3 species
- Coleoptera: Geotrupidae (dung beetles): 1 species
- Coleoptera: Leiodidae (round fungus beetles): 1 species
- Coleoptera: Silphidae (burying beetles): 1 species
- Diplopoda (millipedes): 5 species
- Diptera: Bibionidae (St Mark's flies): 2 species
- Diptera: Bombyliidae (bee flies): 1 species
- Diptera: Chloropidae (grass flies): 2/3 species
- Diptera: Hybotidae (dance flies): 1 species
- Diptera: Opomyzidae: 3 species
- Diptera: Pediciidae (hairy-eyed craneflies): 1 species
- Diptera: Rhagionidae (snipe flies): 1 species
- Diptera: Sepsidae (black scavenger flies): 2 species
- Diptera: Stratiomyidae (soldierflies): 1 species
- Diptera: Tabanidae (horseflies): 1 species
- Diptera: Tachinidae: 2 species
- Diptera: Tipulidae (craneflies): 1 species
- Hymenoptera: Symphyta (sawflies): 2 species
- Isopoda (woodlice): 3 species
- Lepidoptera (butterflies and day-flying moths): 29 species

- Mollusca (slugs and snails): 6 species
- Odonata (dragonflies and damselflies): 8 species
- Orthoptera (grasshoppers and crickets): 3 species

## 3.3 Key Species and Habitat Requirements

Key species include any local, scarce, rare, UK BAP, Section 7, or any other species of conservation significance that was recorded on-site.

### HYMENOPTERA

The following information was largely obtained by reference to Falk (2015) and the Bees, Wasps and Ants Recording Society (BWARS) website (available at <http://www.bwars.com/>).

#### **Groove-faced Mining Bee** (*Andrena angustior*)

**Local**

This species is widespread in England and Wales, but is localised with a curiously patchy distribution. Habitats are typically base-poor, especially open heathy woodland but also heathland and moorland edge, soft rock cliffs, coastal grassland/heathland and occasionally brownfield sites. A variety of flowers are visited including spring-blossoming scrubs such as Hawthorn (*Crataegus monogyna*) and roses (*Rosa sp.*), and herbaceous plants such as Wood Spurge (*Euphorbia amygdaloides*), Herb-Robert (*Geranium robertianum*), Bilberry, speedwells, Bramble (*Rubus fruticosus agg.*), dandelions, Daisy (*Bellis perennis*), and various umbellifers and crucifers. Nesting typically occurs in loose aggregations along sandy paths and in south-facing slopes and faces. This species (adult female) was observed foraging on peripheral wetland vegetation surrounding the top lake (survey area A) in June 2016.

#### **Small Flecked Mining Bee** (*Andrena coitana*)

**Scarce**

This species is widespread but scarce across Britain, predominating in heathland and moorland districts. Habitats include heathland, heathy woodland, moorland edge, fenland and coastal grassland, predominantly on base-poor soils. This species has been recorded foraging on Cat's-ear (*Hypochaeris radicata*), Tormenitl, thistles (*Cirsium spp.*), Common Knapweed (*Centaurea nigra*), Hogweed (*Heracleum sphondylium*), Harebell (*Campanula rotundifolia*), Lesser Spearwort (*Ranunculus flammula*), Lesser Stitchwort (*Stellaria graminea*) and Ragwort (*Senecio jacobaea*). Nesting has rarely been observed but appears to be solitary in light soils. This species (adult males and females) was observed foraging on Tormenitl alongside *Andrena tarsata* in survey area A.

#### **Painted Mining Bee** (*Andrena fucata*)

**Local**

This species has a widespread but rather localised distribution in Britain, and is rarely common. Habitats include woodland rides and clearings, coastal scrub, heathland and moorland edge (especially where woodland or scrub is present nearby). Flowers visited include hawthorns, roses, Bramble, Raspberry, currants (*Ribes speciosum*), Bilberry, Wood Spurge, umbellifers and crucifers. Nesting can occur singly or in small aggregations but is not often observed. This species (adult males and females) was observed foraging on Sheep's-bit (*Jasione montana*) in survey area A.

## Clydach Vale Country Park

---

### **Bilberry Mining Bee** (*Andrena lapponica*)

**Local**

This species has a widespread but very patchy and localised distribution in England, Wales and Ireland. It favours open-structured heathy woodland where Bilberry is plentiful, though it will also visit upland heathland and moorland. Pollen is gathered primarily from *Vaccinium* species, typically Bilberry. Nesting can occur singly or in loose aggregations, often along the edges of paths and tracks that receive plentiful sunshine. This species (adult females) was observed foraging on Bilberry in survey area B in May 2016.

### **Tormentil Mining Bee** (*Andrena tarsata*)

**UKBAP; S7; Nationally Scarce**

This species is widely recorded in heathland and moorland districts of Britain, but is scarce and much declined in many areas. Habitats typically include heathland, moorland, heathy woodland rides and clearings, plus quarries and brownfield sites with base-poor rocks or soils. Pollen is typically obtained from Tormentil, though it can use related species. Nectar is obtained from brambles, Harebell, heathers, Wild Angelica (*Angelica sylvestris*) and Yarrow (*Achillea millefolium*). Nesting occurs in light, sparsely vegetated soils, with a preference for south-facing slopes. It can nest singly or in compact aggregations. This species (adult males and females) was observed foraging on Tormentil and Sheep's-bit in survey area A in June 2016.

### **Barbut's Cuckoo Bee** (*Bombus barbutellus*)

**Scarce**

This species is widespread and locally frequent in parts of southern and central England, though is much scarcer in Wales. *Bombus barbutellus* is the social parasite of *B. hortorum* and *B. ruderatus*, and is found in a wide variety of habitats used by its host species. Spring females visit Ground-ivy (*Glechoma hederacea*), dead-nettles (*Lamium spp.*), Hawthorn, and umbellifers. Summer females visit thistles, clovers, vetches and scrub such as Buddleia (*Buddleja davidii*). This species (adult male) was observed foraging on thistles in survey area B in July 2015.

### **Brown-banded bumblebee** (*Bombus humilis*)

**UK BAP; S7**

This species has undergone a significant decline in its distribution, with most remaining populations confined to extensive areas of coastal grasslands along the southern and western coasts of England and Wales. *Bombus humilis* is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales.

In common with other bumblebees, relatively large areas of suitable habitat, in the order of ten square kilometres, are required to maintain viable populations. A wide variety of habitats are exploited, though it is strongly associated with areas of tall, open grasslands supporting a good proportion of perennial plants. Flowers visited include legumes (especially bird's-foot-trefoils, clovers, Kidney Vetch (*Anthyllis vulneraria*), everlasting-peas and *Vicia* vetches), labiates, Honeysuckle (*Lonicera spp.*), roses, thistles and Teasel (*Dipsacus fullonum*). This species (single worker) was observed foraging in the grassland habitats surrounding the top lake (survey area A) in June 2015.

## Clydach Vale Country Park

---

### **Bilberry Bumblebee** (*Bombus monticola*)

**Local**

This species is widespread in upland areas of northern and western Britain but has experienced a marked decline in its distribution throughout its former range. Spring queens visit willows (*Salix spp.*), Bilberry (and other *Vaccinium* species) and Gorse, while summer queens visit heathers, clovers and Devil's-bit Scabious (*Succisa pratensis*). Workers forage heavily on Bilberry before moving on to clovers, bird's-foot-trefoils, thistles, brambles, heathers and other plants. Nesting usually occurs in old rodent burrows.

Queens, males and workers were observed foraging in the heathland habitats of survey area B in 2015. Workers were also frequently observed foraging in the legume-rich grassland habitats of survey area C in 2015. Despite its abundance in 2015, this species showed a marked decline in 2016, with only a few workers observed in survey areas B and C.

### **White-jawed Yellow-face Bee** (*Hylaeus confusus*)

**Scarce**

This species is widespread and locally common in southern England, but is scarcer in Wales and northern England. It is found in a wide variety of habitats both coastal and inland, and one of the more frequent *Hylaeus* in wooded settings. Females visit a variety of flowers but are most frequently found on umbellifers and brambles. Nesting typically occurs in dead twigs, pithy stems and holes in dead wood. It has also been seen burrowing into the ground. This species (adult female) was observed in July 2015.

### **Turquoise Furrow Bee** (*Lasioglossum cupromicans*)

**Scarce**

This species is widely distributed in Britain, but is generally very scarce away from the English Midlands, northern England and North Wales. Various habitats are exploited, with quarries and brownfield sites being important habitats in the Midlands. In the west and north, it generally favours higher ground and can occur on moorland. Various flowers are visited including hawkish composites, thistles, Rosebay Willowherb (*Chamerion angustifolium*), Ling Heather, Sheep's-bit, Turnip, cinquefoils and stonecrops. Nesting has been observed in the mortar of stone walls and rock faces. This species (adult females) was observed foraging on dandelions in survey area B and on Tormetil at another location (SS96289241) in May 2016.

### **Smooth-faced Furrow Bee** (*Lasioglossum fratellum*)

**Local**

This species is widely distributed in Britain and locally common in some districts, especially the north and west. This species is typically characteristic of heathland, moorland, acid woodland and other base-poor habitats. Various plants are visited including willows, heathers, Tormetil, dandelions, Cat's-ear, thistles, brambles, ragworts, Bilberry, Sheep's-bit, Devil's-bit Scabious, bellflowers (*Campanula sp.*) and Rosebay Willowherb. Nesting occurs in small aggregations in south-facing slopes and banks. This species (adult females) was observed foraging on Tormetil in survey area A in April 2015 and May 2016.

## Clydach Vale Country Park

---

### Early Nomad Bee (*Nomada leucophthalma*)

Local

This species is widespread but rather localised throughout Britain in various habitats including open woodland, brownfield sites, heathland, and moorland edge. Known hosts are *Andrena clarkella* and *A. apicata*, both of which require habitats with plentiful Sallows (*Salix spp.*). Although neither *A. clarkella* nor *A. apicata* were recorded at Clydach, the presence of *N. leucophthalma* indicates the presence of one or both of these species. *N. leucophthalma* is known to visit various flowers including dandelions, Colt's-foot, forget-me-nots (*Myosotis sp.*), Bilberry, Barren Strawberry (*Potentilla sterilis*), Sallows and other willows. This species (adult female) was observed in survey area A in April 2015.

### Pazer's Nomad Bee (*Nomada panzeri*)

Local

This species is found throughout Britain in a wide variety of habitats, particularly thriving in coppice woodland (using *Andrena helvola* as a host) and woods, but also heathland or moorland edge with Bilberry (using *A. lapponica*). It is locally common in the north and west, but scarce in some districts. Various flowers are visited including spring-blossoming shrubs, Greater Stitchwort (*Stellaria holostea*), dandelions, Wood Spurge and Cow Parsley (*Anthriscus sylvestris*). Known hosts include various spring-flying bees including *Andrena fucata*, *A. fulva*, *A. helvola*, *A. lapponica*, *A. synadelpha* and *A. varians*. This species (adult females) was observed displaying nest searching behaviour at SS96289241 in April 2016. These females were of the dark form, which is typically associated with *Andrena lapponica*.

### Furry-bellied Blood Bee (*Sphecodes hyalinatus*)

Local

Widespread and locally common throughout much of the British Isles, this species is found in a wide variety of open habitats. Various flowers are visited but especially composites and umbellifers. Known hosts for the species include *Lasioglossum morio*, *L. leucopus*, *L. nitidiusculum*, *L. pauxillum* and *L. parvulum*. This species (adult females) was observed foraging on dandelions in survey area A, and displaying nest searching behaviour in survey area B in May 2016.

## LEPIDOPTERA

The following information was largely obtained by reference to Butterfly Conservation's website (available at <http://butterfly-conservation.org/>).

### Dark Green Fritillary (*Argynnis aglaja*)

SINC B

This species is listed in 'List B' of the SINC Guidelines (SWWSP, 2004), which states that their presence should contribute to wildlife site selection. This species has experienced a 30% decline in distribution across Britain since the 1970s, although it remains locally abundant in parts of Wales.

This species occurs in a range of flower-rich habitats including coastal grassland, dunes and scrub, chalk and limestone grassland, moorland and wet flushes, and acid grassland with bracken. The main larval foodplant in many habitats is Common Dog-violet (*Viola*



## Clydach Vale Country Park

---

*riviniana*), though Hairy Violet (*V. hirta*) is also used on calcareous grasslands, and Marsh Violet (*V. palustris*) on moorland and in wetter habitats.

### **Small Pearl-bordered Fritillary** (*Boloria selene*)

**UK BAP; S7; SINC B**

This species has experienced a 34% decline in distribution since the 1970s and is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales. It is also included in List 'B' of the SINC Guidelines (SWWSP, 2004) Butterflies of Conservation Significance.

In northern and western Britain, this species is most commonly found in damp grassland flushes and moorland habitats. The main larval foodplants are Common Dog-violet and Marsh Violet.

### **Small Heath** (*Coenonympha pamphilus*)

**UK BAP; S7**

This species has experienced dramatic declines over the last 20 years and is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales.

This species can be found in a variety of habitats, though it is typically found in open areas, such as grassland and heathland. Adults prefer a short grass sward. The main larval foodplants are Bent grasses (*Agrostis* sp.), Fescues (*Festuca* sp.) and Meadow-grasses (*Poa* sp.). Adults feed on a variety of flowers including Bramble, buttercups, Devil's-bit Scabious, Common Fleabane (*Pulicaria dysenterica*), Greater stitchwort, Kidney vetch, Ragwort, Tormential, and Yarrow.

### **Dingy skipper** (*Erynnis tages*)

**UK BAP; S7; SINC B**

This localised species has experienced declines in recent decades and is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales. It is also included in List 'B' of the SINC Guidelines (SWWSP, 2004) Butterflies of Conservation Significance.

This species can be found in a variety of habitats including dunes, sea cliffs, heathland and woodland glades, however the largest colonies occur on sunny, south-facing downland slopes. The main larval foodplant is Common Bird's-foot-trefoil, but Greater Bird's-foot-trefoil (*Lotus pedunculatus*) and Horseshoe Vetch (*Hippocrepis comosa*) is also used.

### **Grayling** (*Hipparchia semele*)

**UK BAP; S7; SINC B**

This species has suffered population declines in recent years and is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales. It is also included in List 'B' of the SINC Guidelines (SWWSP, 2004) Butterflies of Conservation Significance.

The main habitat requirement for this butterfly is sheltered, sunny and dry sites with sparse vegetation and bare ground. The main larval foodplants are Bristle bent (*Agrostis curtisii*),

## Clydach Vale Country Park

---

Early hair-grass (*Aira praecox*), Red fescue (*Festuca rubra*) and Sheep's-fescue (*Festuca ovina*). Adults feed on Common Bird's-foot Trefoil, Bramble, Carline thistle (*Carlina vulgaris*), Heather (*Calluna vulgaris*/*Erica* sp.), Marjoram (*Origanum vulgare*), Red clover, Teasel and thistles.

### **Latticed Heath** (*Chiasmia clathrata*)

**UK BAP; S7**

This species is listed as a Priority Species on the UK BAP (research only) and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales.

It is widely distributed throughout most of Britain where it occurs in a range of open habitats including moorland, grassland and brownfield sites. The larvae feed on Lucerne (*Medicago sativa*) and clover (*Trifolium spp.*). This species is regarded as common and widespread in Glamorgan (Gilmore et. al. 2014).

### **Small Purple-barred** (*Phytometra viridaria*)

**Local**

This widely distributed species is common in the south of England, however occurs locally elsewhere in Britain. It frequents acid heathland, chalky downland and open woodland where the larvae feed on the flowers and leaves of Common Milkwort (*Polygata vulgaris*) and Heath Milkwort (*P. serpyllifolia*). This species is regarded as uncommon in Glamorgan (Gilmore et. al. 2014). This species was observed on the heathland habitats of survey area B.

### **Cinnabar Moth** (*Tyria jacobaeae*)

**UK BAP; S7**

Despite remaining a common and widespread species in Wales, this species is listed as a Priority Species on the UK BAP and is listed under Section 7 of the Environment (Wales) Act 2016 of Species of Principle Importance in Wales.

Cinnabar moths occur in many open habitats that contain their larval foodplant - Common Ragwort.

### **Five-spot burnet** (*Zygaena trifolii*)

**Local**

Locally distributed in south-west England and Wales, this species occupies damp meadows, marshes and sea cliffs. The larvae feed on bird's-foot trefoils (*Lotus spp.*). This species is regarded as uncommon in Glamorgan (Gilmore et. al. 2014).

## **ODONATA**

The following information was largely obtained by reference to the British Dragonfly Society website (available at <http://www.british-dragonflies.org.uk/>).

### **Golden-ringed dragonfly** (*Cordulegaster boltonii*)

**SINC B**

This species is listed in 'List B' of the SINC Guidelines (SWWSP, 2004), which states that their presence should contribute to wildlife site selection, though it is relatively common in the south Wales valleys.

## Clydach Vale Country Park

---

Larval habitats include small, and often acidic, moorland and heathland streams or runnels in bogs. Typically, breeding streams are unshaded by trees, less than 2m wide, and are often deeply cut and overhung with fern, grasses and other emergent vegetation.

### **Keeled skimmer** (*Orthetrum coerulescens*)

**SINC A**

This localised species is listed in List 'A' of the SINC Guidelines (SWWSP, 2004). It is locally common in acid, boggy regions in south and south-west Britain. This species occurs at small rivers and streams, ditches and swampy pools in acid-peat regions.

## ORTHOPTERA

The following information was obtained by reference to the Grasshoppers and Related Insects Recording Scheme of Britain and Ireland website (available at <http://www.orthoptera.org.uk/>).

### **Mottled grasshopper** (*Myrmeleotettix maculatus*)

**SINC B**

Widely distributed but uncommon, this species favours dry situations exposed to the sun with short turf, bare ground and free-draining soils. Typical habitats include disused quarries, road and rail cuttings, heaths and coastal dunes.

## COLEOPTERA

### **Broom Leaf Beetle** (*Gonioctena olivacea*)

**Local**

This species is typically found on broom *Cytisus* where it feeds on the leaves and stems, although is sometimes found on Dyer's Greenweed (*Genista tinctoria*), Laburnum (*Laburnum anagyroides*), Gorse (*Ulex europaeus*) and lupin (*Lupinus sp.*). It is locally distributed in England and Wales (Duff, 2016).

### **Four-banded Longhorn Beetle** (*Leptura quadrifasciata*)

**Nationally Scarce**

This species is widely distributed throughout Britain but is rather localised. Larvae develop in dead and decaying stumps of deciduous trees (*Alnus*, *Fagus*, *Salix*, *Populus*, *Quercus*, *Betula*, *Corylus*), although birch is considered to be the preferred host tree. Adults visit a wide range of flowers, particularly umbellifers.

### **Nebria salina**

**Local**

This species is typically found on sandy/unproductive spoils and lowland heaths. It is considered local in Britain (Luff, 2007). This species was collected via pitfall trapping in survey area B in May 2015.

## DIPTERA

## Clydach Vale Country Park

---

### **Hill Soldier** (*Oxycera pardalina*)

**Nationally Scarce**

Considered a seepage obligate ('a species that is an exclusive inhabitant of seepages and their margins') in Natural England (2002), *Oxycera pardalina* is strongly associated with calcareous seepages. It will use such seepages in a variety of broad habitat types including woodland, soft-rock cliffs, and open seepages in grazed limestone hill country. It is especially keen on mossy rock faces, including well-established drainage features in old limestone quarries. The amphibious larvae are usually found in wet mosses but will crawl over wet rocks. This species (adult female) was observed on willow scrub (*Salix* sp.) near survey area A in August 2016. The presence of this species indicates the close proximity of a calcareous seepage.

### **Tachina grossa**

**Local**

This species is localised to heathland and downland where the host species are found, though it can be fairly frequent where it occurs. Its larvae burrow into the caterpillars of large moths, often of the Oak Eggar (*Lasiocampa quercus*), where they parasitise the host – feeding and developing within. Adults are most often seen in bright weather feeding at umbellifers, Creeping Thistle (*Cirsium arvense*) and other wildflowers, or basking on bramble foliage. This species was recorded widely across the site.

### **Xylota jakutorum**

**Nationally Scarce**

Once considered a Caledonian pinewood species, this species has undergone a large range expansion southwards and is now found throughout much of northern England, Wales and south-west England. This range expansion has been achieved by the apparent ability of *X. jakutorum* to utilize areas of modern coniferous forestry. This species is closely associated with decaying conifer plantations where it breeds in the rotting stumps. Adults are known to visit a wide range of flowers including buttercups, bramble and umbellifers.

This species is listed as Notable (Falk, 1991), however its large range expansion in recent years suggests its status should be revised.

This species was observed foraging on peripheral wetland vegetation surrounding the top lake (survey area A) in June 2015.

## AUCHENORRHYNCHA

The following information was largely obtained by reference to the British Bugs website (available at <http://www.britishbugs.org.uk/>).

### **Dicranotropis divergens**

**Nationally Scarce**

This scarce, montane species is an uncommon specialist found in wet upland grassland. This species has been recorded from upland areas such as the Cairngorms National Park, Snowdonia National Park and Brecon Beacons National Park. This species was collected via suction-sampling in an area of rank grassland near the summit of the naturally-revegetating tip (survey area B, location B3). Here, the altitude exceeds 450 metres.



## HETEROPTERA

The following information was largely obtained by reference to the British Bugs website (available at <http://www.britishbugs.org.uk/>).

### ***Adelphocoris quadripunctatus***

**New to Britain**

The species was first reported as new to Britain from a specimen photographed by Mr Christopher Lawrence near Beddau (Rhondda Cynon Taf) in July 2016. The first known specimen of *Adelphocoris quadripunctatus* in Wales comes from Coedely Colliery, collected by Liam Olds in August 2015. Originally thought to be a recent colonist, the discovery of historic specimens collected from southern England in the late 19<sup>th</sup> Century suggests this species has been previously overlooked in Britain.

*A. quadripunctatus* can be found in meadows, roadsides and woodland/field edges where it reportedly feeds on nettles (*Urtica sp.*). While current literature suggests Common Nettle (*Urtica dioica*) as its preferred food plant, *A. quadripunctatus* has consistently been found amongst Fabaceae (*Lotus corniculatus* and *L. pedunculatus*) in south Wales, which is noted as a less frequently used host by European authors.

This species was observed on *Lotus corniculatus* in the dry grassland habitat of survey area C in August 2016.

### ***Chartoscirta cocksi***

**Scarce**

Although widely distributed in Britain, this species is considered relatively scarce among sphagnum and tussocks in bogs. This species was collected via suction-sampling in the marshy grassland habitats of survey area C in August 2015 and 2016.

### ***Himacerus boops***

**Local**

This species is locally distributed in southern Britain in dry habitats such as heathland and acid grassland. This species was collected via suction-sampling in the dry grassland habitats of survey area C (sample location C2) in August 2015.

### ***Stygnocoris rusticus***

**Local**

This species is widespread but local throughout the Britain, particularly on dry sandy or chalky soils. This species was collected via suction-sampling in the dry grassland habitats of survey area C (sample location C2) in August 2015.

## ARACHNIDA

The following information was obtained by reference to the Spider and Harvestman Recording Scheme website (available at <http://srs.britishspiders.org.uk/portal.php/p/Welcome>).

### ***Clubiona trivialis***

**Local**

This species has a widespread distribution in Britain north of a line between Glamorgan and the Humber, but to the south it is very scattered. *C. trivialis* is generally found amongst low vegetation such as heather and gorse, and sometimes under stones, but it has also been found on pines. It often occurs on high ground but has also been found at sea level. In the south the species mainly occurs on heathland.

This species is very local in the south, but more frequent in the north. This species was collected via suction-sampling in survey area B (sample location B3) in August 2015.

### ***Drassyllus pusillus***

**Local**

This species has a widespread but patchy and scattered distribution in Britain, mostly in lowland regions in the southern half of Britain and central eastern Scotland. It appears to have a preference for open, dry areas such as sandy heaths and chalk downland and is often found under stones, discarded rubbish and in grassy tussocks. This species was collected via pitfall trapping in survey area B (sample location B1) in May 2015.

### ***Haplodrassus signifer***

**Local**

This species is widespread throughout most of Britain and, indeed, throughout the entire Holarctic region. It is commonest on heathlands and grasslands where it is often found under scattered stones, discarded rubbish and in grassy tussocks. This species was collected via pitfall trapping in survey area B (sample location B1) in May 2015.

### ***Pardosa monticola***

**Local**

This species is widespread but locally distributed as far north as central Scotland. It usually occurs in open short vegetation in grasslands, meadows, open heaths and dunes, especially where the habitat is old and unimproved. It may be abundant on chalk grassland and stabilised dunes. This species was collected via pitfall trapping in survey area B (sample location B1) in May 2015.

### ***Xysticus erraticus***

**Local**

This species has a widespread but patchy and scattered distribution in Britain. It is principally a grassland and heathland spider with a penchant for shorter swards such as those found on grazed calcareous grassland, upland base-rich flushes or disturbed sites such as quarries. This species was collected via suction-sampling in survey area B (sample location B3) in August 2015.

## **CHILOPODA**

The following information was obtained by reference to the British Myriapod and Isopod Group website (available at <http://www.bmig.org.uk/>).

## ***Lithobius pilicornis***

**Nationally Scarce**

This species is locally frequent in south-west England, but there are also scattered records across England and south Wales. This species is generally always associated with human activity e.g. towns, cities etc.

## **DIPLOPODA**

The following information was obtained by reference to the British Myriapod and Isopod Group website (available at <http://www.bmig.org.uk/>).

## ***Ceratosphys amoena form confusa***

**Nationally Rare**

This species was discovered new to Britain in September 2014 from Bargoed, south Wales. Relatively little information is available on this species in Britain, however Christian Owen has found *C. amoena* to be fairly common in the Welsh valleys occurring in a range of habitats including: rough grassland, brownfield sites, an old overgrown landfill site, an unkempt cemetery, Rhôs pasture, Heather (*Calluna vulgaris*) and Bilberry (*Vaccinium myrtillus*) heathland, Bracken (*Pteridium aquilinum*) heathland, hedgerows and woodland (including wet woodland) (Telfer et al. 2015). It has been found by searching leaf-litter, turning over logs and stones, and by torchlight searching of rocks for active individuals. It has also been found in association with decaying wood under bark of a standing dead tree, in a rot-hole 8ft up an apple tree, and in rotten wooden fence-posts.

## ***Hylebainosoma nontronensis***

**Nationally Rare**

This species was discovered new to Britain in September 2014 from Bargoed, south Wales. Relatively little information is available on this species in Britain, however Christian Owen has found *H. nontronensis* to be fairly common in the Welsh valleys though slightly less frequent than *C. amoena*. It occurs in a range of habitats including an unkempt cemetery, Heather and Bilberry heathland (from thick moss at the base of Heather), Bracken heathland, hedgerows and woodland (including wet woodland) (Telfer et al. 2015). It has been found by searching leaf-litter, turning over logs and by torchlight searching for active individuals.

## **4.0 Discussion**

### **4.1 Findings**

At least 230 invertebrate species were positively identified through surveys at Clydach Vale Country Park. Further species, particularly within the spider family Linyphiidae, are awaiting identification and are not currently reported within this document. Of the 230 species that have so far been identified, at least 45 of these (~20% of the total) are deemed to be of 'conservation importance' (i.e. they are localised, scarce, rare, UKBAP, Section 7 or SINC species). A breakdown of these species into the status categories outlined in section 3.1, and into the corresponding invertebrate groups, can be found in Table 4 and Table 5 respectively.

## Clydach Vale Country Park

**Table 4.** Breakdown of species of ‘conservation importance’ at Clydach Vale Country Park into the applicable status categories.

Status category	Definition of status category*	Number of species
<b>Localised</b> (Wales and/or UK)	Species displaying a localised distribution in Wales and/or UK, being found in some but not all apparently suitable habitats within its range.	21
<b>Scarce</b> (Wales and/or UK)	Species considered scarce in Wales and/or UK but have not received the official status of ‘Nationally Scarce’.	4
<b>Nationally Scarce</b> (UK)	Species occurring within the range of 16 to 100 ten-kilometre squares of the British National Grid system since 1970.	6
<b>Nationally Rare</b> (UK)	Species occurring in 15 or fewer ten-kilometre squares of the British National Grid system since 1970.	2
<b>UK BAP</b>	UK Biodiversity Action Plan priority species for conservation.	8
<b>Section 7</b>	Species of principal importance for conservation of biological diversity in Wales under the Environment (Wales) Act 2016.	8
<b>SINC A</b>	Contributory Species in SINC Guidelines (SWWSP, 2004).	1
<b>SINC B</b>	Contributory Species in SINC Guidelines (SWWSP, 2004).	6
<b>New to Britain</b>	Newly discovered species in Britain. Status yet to be determined.	1

\*Please note, species were not solely confined to a single category (for instance, all UK BAP species were also Section 7 listed).

**Table 5.** The number of species of ‘conservation importance’ recorded in each of the studied invertebrate groups.

Invertebrate group (ordered alphabetically)	Number of species of ‘conservation importance’
Aculeate Hymenoptera (bees, wasps and ants)	14
Arachnida (spiders, harvestmen and pseudoscorpions)	5
Auchenorrhyncha (leafhoppers and planthoppers)	1
Chilopoda (centipedes)	1
Coleoptera (beetles)	3
Diplopoda	2
Diptera (flies)	3
Heteroptera (‘true bugs’)	4
Lepidoptera (butterflies and day-flying moths)	9
Odonata (dragonflies and damselflies)	2
Orthoptera (grasshoppers and crickets)	1
<b>Total number of species of ‘conservation importance’</b>	<b>45</b>

The findings of the surveys, in relation to each the studied invertebrate groups, is discussed below.



# Clydach Vale Country Park

---

## Hymenoptera

Clydach Vale Country Park appears to be a particularly important site for Aculeate Hymenoptera (bees, wasps and ants), with 48 different species identified. Among these, 40 bee species, 5 ant species and 3 wasp species were recorded. In addition, two sawfly species were also recorded.

Of the 40 bee species recorded, 14 species were considered to be of ‘conservation importance’ – a higher proportion than amongst any other invertebrate group recorded at Clydach (Table 5). The discovery of the nationally scarce Tormentil Mining Bee (*Andrena tarsata*) was a particularly noteworthy find. This species has experienced significant declines in recent times and has been lost from an estimated 50% of its known sites since 1970 (JNCCC, 2010). The presence of the Small Flecked Mining Bee (*Andrena coitana*) was also encouraging, given its apparent scarcity across the British Isles (Falk, 2015).

The bee fauna at Clydach represents a good mixture of habitat generalists (common species able to exploit a wide variety of habitats), alongside more specialist species. Of the more specialist species, most were found to be strongly associated with open-structured heathy woodland and/or heathland and moorland edge (e.g. *Andrena angustior*, *Andrena coitana*, *Andrena fucata*, *Andrena lapponica*, *Andrena tarsata*, and *Lasioglossum fratellum*), while others showed a preference for legume-rich grasslands (e.g. *Andrena wilkella* and *Bombus humilis*). Many of the species recorded at Clydach typically nest in light, sparsely vegetated soils, showing a preference for south-facing slopes. It is likely, therefore, that the dry, free-draining and sparsely-vegetated coal spoil is proving important nesting opportunities for ground-dwelling bee genera such as *Andrena* (mining bees) and *Lasioglossum* (furrow bees). The site was also found to be a local stronghold for the Bilberry Bumblebee (*Bombus monticola*), particularly in 2015. Unfortunately, like many other aculeates, this species suffered a poor year in 2016 and was substantially less common in many areas.

Five species of ant (Formicidae) were identified at Clydach, with the Yellow meadow ant (*Lasius flavus*) appearing to be the most common species. Ant abundance was found to be substantially greater in survey area B than elsewhere in the park. The greater abundance of bare ground habitat in this area, typical of naturally-revegetating spoil tips, is likely to be a significant factor given the preference of many ant species for dry, open habitats.

## Lepidoptera

Twenty-nine species of Lepidoptera (butterflies and day-flying moths) were recorded at Clydach Vale Country Park. Of these, 9 species were deemed to be of ‘conservation importance’.

Amongst the butterfly species, five species of ‘conservation importance’ were recorded. These include: Grayling (*Hipparchia semele*), Dingy skipper (*Erynnis tages*), Small Heath (*Coenonympha pamphilus*), Small pearl-bordered fritillary (*Boloria selene*) and Dark green fritillary (*Argynnis aglaja*). Grayling were found to be fairly numerous on the naturally revegetating slopes of survey area B, however were largely unrecorded from elsewhere in the park (i.e. from the technically reclaimed areas such as survey area C). With the species requiring open habitats with sparse vegetation and plentiful bare ground, it is possible that

## Clydach Vale Country Park

---

the technically reclaimed areas of the park are too well vegetated to support good populations of Grayling butterflies.

Dingy skipper (*Erynnis tages*) was recorded in the legume-rich grassland habitat of survey area C, where its larval foodplant - common bird's-foot-trefoil – is abundant. The superficially-similar Burnet Companion moth (*Euclidia glyphica*) was also noted in the same area. Small pearl-bordered fritillary (*Boloria selene*) was generally found to be in low abundance within a rather localised area of survey area A (SS96279281). Here it was noted foraging on Coltsfoot (*Tussilago farfara*) and dandelions in spring 2015 and 2016. Dark green fritillary (*Argynnis aglaja*) was found to be particularly numerous during the summer months in grassland near the quarry in survey area A (SS96259276). Elsewhere, the species was found to be particularly abundant on the hillside adjacent to survey area B (SS962924). Small Heath (*Coenonympha pamphilus*) was recorded widely across the site in a variety of habitats on both naturally-revegetating and reclaimed coal spoil.

Amongst the moth species, several species typical of heathland and moorland habitats were recorded including: True Lover's Knot (*Lycophotia porphyria*), Common Heath (*Ematurga atomaria*), Small Purple-barred (*Phytometra viridaria*), and Small Argent and Sable (*Epirrhoe tristata*). The most interesting of these is perhaps the Small Purple-barred, which frequents acid heathland where the larvae feed on the flowers and leaves of Common Milkwort and Heath Milkwort. This species is regarded as uncommon in Glamorgan (Gilmore et. al. 2014) and was recorded in survey area B. Other species recorded at Clydach include the uncommon Five-spot Burnet (*Zygaena trifolii*), which was found to be rather numerous in the grassland habitats of survey area C, along with the Cinnabar moth (*Tyria jacobaeae*). Latticed Heath (*Chiasmia clathrata*) was recorded in several areas, however was most prevalent within survey area A (SS96279281).

### Odonata

All dragonfly records (including damselflies) were generated by casual observations when surveying other invertebrate groups, and were never the subject of targeted surveys. A total of 8 species were positively identified at Clydach, most of which were recorded in the wetland habitats surrounding the top lake (survey area A). Broad-bodied chaser (*Libellula depressa*) was found to be particularly numerous in the quarry (SS96189270), which is flooded and contains a relatively large water body. Golden-ringed dragonfly (*Cordulegaster boltonii*) were the most widely recorded species, being found around the top lake (survey area A), but also patrolling drainage ditches around survey area B (SS96099250). Keeled Skimmer's (*Orthetrum coerulescens*) were also noted patrolling flooded tyre tracks in the marshy grassland habitats of survey area C (SS97169276).

### Orthoptera

Amongst the Orthoptera, just three species were recorded – all of which were grasshoppers in the family Acrididae. Mottled grasshopper (*Myrmeleotettix maculatus*) was the only species of conservation importance, given its SINC B status under the South Wales Wildlife Sites Partnership (2004). This widespread but uncommon species favours dry situations exposed to the sun with short turf, bare ground and free-draining soils. This species was recorded widely across the site but was most numerous on the heathland habitats of survey

## Clydach Vale Country Park

---

area B. The greater abundance of bare ground habitat in survey area B likely explains the greater numbers of Mottled Grasshopper in this area.

### Coleoptera

At least 32 beetle species were positively identified at Clydach Vale Country Park. Individuals included representatives from the families Chrysomelidae (8 species), Carabidae (7 species), Apionidae (6 species), Cantharidae (3 species), Curculionidae (3 species), Coccinellidae (2 species), Cerambycidae (1 species), Geotrupidae (1 species), Leiodidae (1 species) and Silphidae (1 species).

Despite Carabidae being one of the target groups of the study, only 7 species were recorded. This low figure was predominately the result of issues with the flooding of pitfall traps during heavy rainfall, and project time constraints. These factors contributed to the seizure of pitfall trapping after only 2 weeks. Carabidae (and Coleoptera as a whole) were greatly under-recorded at Clydach and require further survey effort in the future.

Of those beetle species recorded, at least 3 were deemed to be of 'conservation importance'. This included the nationally scarce Four-banded Longhorn Beetle (*Leptura quadrfasciata*), the larvae of which develop in dead and decaying wood, especially in the lower parts of standing trees, stumps, felled trunks and branches down to 15cm in diameter (Alexander, 2002). It is known to exploit a wide range of hosts including alder, aspen, beech, birch, hazel, oak, poplar, willow, elder and various conifers. This species could have originated from nearby conifer plantations, although the possibility that it has developed on-site within decaying deciduous trees (such as willow which is typical of colliery spoil habitats) cannot be ruled out. The localised ground beetle *Nebria salina* and localised leaf beetle *Gonioctena olivacea* were also recorded during the surveys.

### Diptera

At least 34 fly species were positively identified at Clydach Vale Country Park. Individuals included representatives from the families Syrphidae (16 species), Bibionidae (2 species), Chloropidae (2/3 species), Opomyzidae (2 species), Sepsidae (2 species), Tachinidae (2 species), Tipulidae (2 species), Bombyliidae (1 species), Hybotidae (1 species), Pediciidae (1 species), Rhagionidae (1 species), Stratiomyidae (1 species) and Tabanidae (1 species). Of these, 3 species were deemed to be of 'conservation importance'.

The discovery of the very scarce soldierfly *Oxycera pardalina* (Hill Soldier) was highly significant, and likely represents the most significant invertebrate discovery during the surveys. This species is strongly associated with calcareous seepages, and is regarded as a calcareous seepage obligate in Boyce (2002) - meaning it is an exclusive inhabitant of calcareous seepages and their margins. The presence of this species signifies the presence of a calcareous seepage, and thus the possibility of further scarce and rare invertebrates being present at Clydach Vale Country Park. Efforts should be made to locate this seepage(s), and targeted surveys undertaken to record soldierflies (Stratiomyidae) and crane flies (Tipulidae) associated with these uncommon micro-habitats.

# Clydach Vale Country Park

---

## Auchenorrhyncha and Heteroptera

At least 40 species of Hemiptera were identified at Clydach Vale Country Park, with 19 species of Auchenorrhyncha (leafhoppers and planthoppers) and 21 Heteroptera ('true bug') species recorded. Many of these species were typical of dry habitats, particularly dry grassland and dry heath. Such species include: *Himacerus boops*, *Peritrechus geniculatus*, *Stenotus binotatus*, *Stygnocoris rusticus*, *Stygnocoris sabulosus*, *Arocephalus punctum*, and *Elymana sulphurella*. This finding suggests, as expected, that the free-draining nature of the spoil substrate is producing dry ground conditions, thus creating suitable conditions for a range of specialist species. As is evident from the plant flora at Clydach, such as the presence of Round-Leaved Wintergreen (*Pyrola rotundifolia* spp. *maritima*), these free-draining coal tips are somewhat replicating dune slack habitats.

In areas of impeded drainage, which appear to be far more prevalent on the reclaimed sections of the park, wetland habitats have formed. Several species typical of wet grassland habitats were noted. Such species include: *Cymus glandicolor*, *Dicranotropis divergens*, *Nabis flavomarginatus*, *Nabis limbatus*, *Anoscopus flavostriatus*, *Cicadella viridis*, *Conomelus anceps*, and *Conosanus obsoletus*. It appears that areas of impeded drainage on colliery spoil tips even have the ability to replicate bog habitats, supporting species such as the scarce shorebug *Chartoscirta cocksii* which is typically found among sphagnum and tussocks in bogs.

## Arachnida

At least 14 species of spider, 3 species of harvestmen (Opiliones) and 1 pseudoscorpion species were positively identified at Clydach Vale Country Park. Specimens were collected as by-catch from pitfall trapping at sample location B1 and B2, and via suction-sampling at locations B3, C1 and C2. Of the 18 species recorded, 5 are deemed to be of 'conservation importance'. These are as follows: *Clubiona trivialis*, *Drassyllus pusillus*, *Haplodrassus signifer*, *Pardosa monticola* and *Xysticus erraticus*. These species appear to show a preference for open habitats, such as open heath and grassland habitats typical of survey area B and C respectively. Evidence suggests spiders are likely to be an important invertebrate group on colliery spoil tips, with 69 species identified on the coal tips around the Big Pit National Coal Museum (Blaenafon) in 2009 (Carter, 2009). Of the 69 species identified by Carter, 21 were local or uncommon, with 3 listed as Vulnerable in draft of a conservation review by Dawson et al (2008). Thus, further survey effort should be directed towards Arachnids at Clydach Vale Country Park in the future.

## Chilopoda and Diplopoda

A total of two centipede species (Chilopoda) and five millipede species (Diplopoda) were identified at Clydach Vale Country Park. These species were recorded from a single visit in January 2017 and were predominately recorded in the woodland habitats on the reclaimed sections of the park. A few additional species were also discovered under rocks in the grassland habitat of survey area C. Surprisingly, no myriapods could be found on the naturally-revegetating coal tip of survey area B.



# Clydach Vale Country Park

---

Of the seven myriapod species recorded at Clydach Vale Country Park, three are deemed to be of 'conservation importance'. This includes *Lithobius pilicornis* (Nationally Scarce), *Ceratosphys amoena form confusa* (Nationally Rare) and *Hylebainosoma nontronensis* (Nationally Rare). These represent significant finds given the scarcity of records for these species in the UK. Further survey effort will likely reveal additional species.

## Isopoda

Three woodlice species were recorded at Clydach Vale Country Park during a single visit in January 2017. These represented common and widespread species: *Oniscus asellus*, *Trichoniscus pusillus agg.* and *Trichoniscus pygmaeus*. Further survey effort may reveal additional species, however the dry and acidic soils are likely to be unfavourable to most woodlice species.

## Mollusca

Mollusc abundance, biomass and species diversity was found to be low at Clydach Vale Country Park. A brief survey in March 2015 and September 2015 revealed just 5 mollusc species (with one additional species added in January 2017). This low number is probably due to the areas' acidic and free-draining nature, and lack of vegetation, leaf litter, wood and soil in some areas (particularly survey area B).

## 4.2. Key features of colliery spoil habitats

Based on the results of these invertebrate surveys, several key features of colliery spoil tips can be noted, some of which are not mutually exclusive. The first of these is the free-draining nature of the spoil substrate, which acts to create dry grassland and heathland habitats. While this free-draining nature is likely to be detrimental to invertebrate groups typically requiring wet or moist habitats (e.g. molluscs and woodlice), it is clear this feature is beneficial to a number of specialist species. This is evident by the presence of a large number of specialist species adapted to dry grassland and heathland habitats. This is further emphasised by the impressive solitary bee diversity recorded at Clydach Vale Country Park. The majority of the 28 solitary bee species recorded at Clydach nest in 'light' or 'sandy' soils. It therefore appears that the fine and free-draining coal spoil substrate somewhat replicates sandy soils. Together with an abundance of bare ground habitat, this dry spoil appears to provide suitable nesting opportunities for ground-nesting species.

The second key feature of colliery spoil tips is their thin, nutrient poor soils. These create stressed conditions that prevent dominant plant species from taking over, slowing vegetation succession and leading to the formation of largely open and sunny habitats. The slow rates of vegetation succession also result in substantial bare ground coverage. Areas of open, bare ground create warm microclimates in which thermophilic (warmth-loving) invertebrates can bask. This bare ground also provides invertebrates with burrowing and ground nesting opportunities (as in the case of solitary bees), and provides foraging areas for visual predators such as spiders (e.g. wolf spiders) and ground beetles (e.g. Green Tiger Beetle *Cicindela campestris*). There is also evidence to indicate that these warm microclimates aid the incubation of eggs (Key, 2000). Several species, particularly amongst the aculeates and

arachnids, were noted to show preference for open-structured habitats at Clydach Vale Country Park.

The third key feature of colliery spoil tips is their variability. Colliery spoil tips are highly complex habitats of varied topography, aspect, substrate composition, hydrology, pH, and levels of disturbance. This variation is evident both within single tip systems, and across sites. These diverse factors result in the formation of complex habitat mosaics in close proximity, providing ideal habitats for invertebrates, many of which require two or more habitats to complete their lifecycle. A mosaic of habitats is clearly evident at Clydach Vale Country Park, where dry neutral and acid grasslands, ffridd, scrub, dry heath, marshy grassland, secondary woodland, ditches, calcareous seepages, seasonal pools, and lakes all co-exist within a relatively small area. The diverse range of invertebrates recorded is a product of the diversity of habitats present within the boundaries of the park.

## 5.0 Recommendations

### 5.1 Habitat Management

The edaphic conditions typical of most colliery spoil tips (acidic, nutrient-poor, free-draining, sometimes toxic spoil) are extremely limiting to plant growth. This subsequently slows vegetation succession, meaning that sites that have received no interference (such as the addition of nutrients typical of land reclamation schemes) can often persist (remaining relatively stable) for decades without active management. Inevitably, over time, conditions improve for plant growth (i.e. a soil layer establishes and nutrient content builds) and the communities present move from pioneer communities towards climax communities. There is still some uncertainty as to when, if at all, we should impose management on colliery spoil tips - should we leave colliery spoil tips to naturally succeed to woodland, or perhaps intervene earlier in the natural succession process?

Although an absence of management on colliery spoil tips is often a key factor in promoting high biodiversity, management will eventually be necessary to retain that wildlife value. Without management, these sites will eventually revert to dense scrub and secondary woodland with the loss of open habitats and the unique species they support.

Clydach Vale Country Park supports a mosaic of habitats, as is evident by the diverse habitat requirements of some of the species recorded. The habitat requirements of these invertebrates include:

- Heathland and moorland edge (e.g. *Andrena angustior*, *Andrena coitana*, *Andrena lapponica*, *Andrena tarsata*, *Bombus monticola*, *Lasioglossum fratellum*, *Drassyllus pusillus*, *Micrelus ericae*, *Phytometra viridaria*)
- Dry grassland (e.g. *Himacerus boops*, *Stygnocoris rusticus*)
- Wet/marshy grassland (e.g. *Boloria selene*, *Chartoscirta cocksii*, *Coelositona cambricus*, *Dicranotropis divergens*)
- Open, bare ground (e.g. *Hipparchia semele*, *Myrmeleotettix maculatus*)
- Dead or decaying wood (e.g. *Leptura quadrifasciata* and *Xylota jakutorum*)
- Calcareous seepages (*Oxycera pardalina*)

## Clydach Vale Country Park

---

- Legume-rich grasslands (e.g. *Andrena wilkella*, *Argynnis aglaja*, *Bombus humilis*, *Erynnis tages*, *Protapion apricans*, *Protapion assimile*, *Protapion trifolii*, *Zygaena trifolii*)
- Small streams, ditches and swampy pools (e.g. *Cordulegaster boltonii*, *Orthetrum coerulescens*)

It is clear from the species recorded that Clydach Vale Country Park supports habitat generalists alongside more specialist species. Many of those specialist species are not solely dependent on a single habitat type, and require several habitats in close proximity to complete their lifecycles. For example, many aculeates will nest in areas of open bare ground, while also foraging in heathland, grassland and woodland-edge habitats. Maintaining this open mosaic of habitats is thus important if we are to conserve these species and the diverse invertebrate fauna at Clydach Vale Country Park.

The importance of open habitats at Clydach is highlighted by the species recorded, many of which require warm, sunny locations with sparse vegetation and plentiful bare ground. The encroachment of scrub, bracken and bramble are the greatest threats facing these habitats. Encroachment, largely by willow (*Salix spp.*), is already evident in the legume-rich grasslands of survey area C, and in other open grassland habitats (e.g. at grid reference SS969926). Though not currently problematic, such areas should be monitored for scrub encroachment and appropriate action (i.e. scrub removal) undertaken where applicable. Cycles of disturbance and abandonment are important in maintaining bare ground habitat. Where bare ground habitat has been lost, bare ground scrapes can be created using machinery.

The encroachment of coniferous trees into the open heathland habitats of survey area B is already visible and is likely to become problematic in future years. If such encroachment continues, the important heathland habitats of this area will be lost – to the detriment of specialist invertebrate species reliant on this habitat. Targeted conifer felling in survey area B should be considered in the near future, potentially with some tree stumps being left *in situ* for the benefit of saproxylic (wood-feeding) invertebrates.

Encroachment of flower-rich habitats by bracken and bramble is becoming an issue around the top lake (survey area A). Here, the loss of wildflower species such as Tormentil could be potentially catastrophic given the heavy reliance of some species on this plant – particularly the scarce bees *Andrena coitana* and *Andrena tarsata*. Efforts should be made to conserve existing areas of Tormentil around the top lake (and at other known locations within the park), while also aiming to promote further growth. While management of Bramble is necessary, eradication should be avoided given the reliance of *Andrena tarsata* and other insects on Bramble as a nectar source.

The presence of the Four-banded Longhorn Beetle (*Leptura quadrfasciata*) highlights the importance of leaving dead and decaying wood *in situ*. Any dead or dying trees that are unlikely to cause safety issues should be retained *in situ*, providing habitats for saproxylic invertebrates.

While the scrub and woodland habitats at Clydach Vale Country Park have received insufficient investigation to make conclusive comments, it is likely that these habitats are

important to a number of invertebrate taxa more closely associated with damper habitats. A number of myriapod species were only recorded in these habitats, most notably *Ceratosphys amoena* subsp. *confusa*, *Hylebainosoma nontronensis* and *Lithobius pilicornis*. Likewise, the majority of molluscs and all woodlice were recorded in these areas. It can be assumed that these sallow-rich woodlands are also an important forage resource for pollinating insects in early spring. The presence of *Nomada leucophthalma* somewhat supports this belief, the hosts of which are heavily reliant on sallow-rich habitats.

### 5.2 Further Study

This survey represents the results from just one of five colliery spoil tips studied over successive years of 2015 and 2016. As is evident from this survey report alone, colliery spoil tips clearly support numerous invertebrate species of ‘conservation interest’ across a wide variety of taxonomic groups. This study has only just scratched the surface on the amazing invertebrate fauna that can be found in these often overlooked habitats, and more survey work is highly recommended to explore this further. Through a greater understanding of the invertebrates found in these habitats, we will be better able to access the ‘quality’ of colliery spoil tips in the future and ensure ‘appropriate’ management and protection is achieved for the most ‘biologically-interesting’ spoil tips in the south Wales valleys.

## 6.0 Limitations and Conclusion

### Limitations

This document presents the results of survey work conducted by the author as part of The Conservation Volunteer’s (TCV) Natural Talent Traineeship Scheme. This scheme (funded by The Esmée Fairbairn Foundation) responds to identified skills shortages in the conservation sector by providing trainees with the opportunity to develop expertise in less well known species, habitats, or a mixture of both. The lack of field experience by the author, particularly during the first year of the study, has likely influenced the results. This inexperience has potentially resulted in some species being overlooked, even amongst the better recorded invertebrate groups (i.e. solitary bees). As such, it should be noted that this survey does not provide a comprehensive species list of target taxa present at Clydach Vale Country Park.

The interests of the author have also influenced the results, with recording bias towards particularly taxa to the detriment of others. For instance, given the authors interest in bees, there was a bias towards bee recording to the detriment of other aculeates (wasps and ants). As such, these groups were under-recorded. Further survey effort will almost certainly yield further species in these under-recorded groups.

Finally, this document presents the results of surveys conducted over what can only be described as two ‘sub-optimal’ field seasons in 2015 and 2016. Despite a decent spring in 2015 (with a notably dry, sunny and warm April), summer 2015 was cooler and wetter than average. Spring 2016 was characterised by a rather cool April and a rather warm May, followed by a wetter than average summer. The cooler and wetter than average conditions (particularly in summer 2015 and 2016) are likely to have been unfavourable to thermophilic (warmth-loving) invertebrates and thus influenced the results.



## Conclusion

Colliery spoil tips are an iconic feature in the landscape of the south Wales valleys, yet they are greatly overlooked and underappreciated as biologically-interesting places. Despite their somewhat recognised importance for lichens, bryophytes and vascular plants, the invertebrate fauna associated with these habitats has – until now - remained largely unexplored. The findings of this report highlight the diversity of invertebrate life that can be found on colliery spoil tips, including many species considered to be of ‘conservation importance’.

The presence of many habitat specialists at Clydach Vale Country Park (such as those typically found in heathland and moorland edge habitats) indicate that colliery spoil habitats are mimicking more natural habitats– habitats which are declining and becoming increasingly fragmented in Britain. It is therefore likely that this site is of significance in helping to sustain local species populations that are declining in our wider countryside.

The presence of 45 species of ‘conservation importance’ is highly encouraging and suggests that the colliery spoil habitats at Clydach Vale Country Park, together with surrounding habitats, are of importance to invertebrates in the local area. The presence of 8 UK BAP and Section 7 listed species, as well as 10 scarce or Nationally Scarce species and 2 Nationally Rare species, is somewhat impressive and supports the notion that colliery spoil tips are acting as a refuge for rare and scarce invertebrates rapidly declining in our modern impoverished landscapes.

Habitat management at Clydach Vale Country Park should focus on maintaining the habitat mosaics that have proved to be of important to the recorded invertebrate fauna. Particular attention should be directed towards maintaining open habitats, such as the grasslands in survey area C and the heathland in survey area B. These sites should be monitored to ensure scrub and bramble do not invade, and appropriate action undertaken where needed. The maintenance of bare ground habitat is also key in these areas. Ensuring continued disturbance (e.g. by human trampling or perhaps more controversially, by off-road motorcyclists) will be important in maintaining open bare ground, as will the clearing of encroaching scrub.

## 7.0 Acknowledgements

The author wishes to thank the following people and organisations: Richard Wistow (Rhondda Cynon Taf County Ecologist) for his enthusiasm for the project and his continued support throughout; Dr Michael Wilson (Amgueddfa Cymru — National Museum Wales) for identifying Auchenorrhyncha specimens; and Mark Pavett, Dr John Deeming and Brian Levey (all Amgueddfa Cymru — National Museum Wales) for their assistance in the identification and verification of Aculeate Hymenoptera, Diptera and Coleoptera specimens respectively. Many thanks are also sent to; John McFarlane and The Conservation Volunteers (TCV) for giving me the opportunity to conduct this research through the Natural Talent Traineeship Programme in 2015; The Esmée Fairbairn Foundation for funding my Natural Talent Traineeship in 2015; Amgueddfa Cymru (National Museum of Wales) for

giving me access to museum facilities and the important entomological reference collections; and to Rhondda Cynon Taf Council for funding this research project in 2016.

### 8.0 Identification Keys and References

**Bantock, T. & Botting, J. (2013).** *British Bugs: An online identification guide to UK Hemiptera* [Online]. Available at: <http://www.britishbugs.org.uk/>.

**Barber, A. D. (2008).** *Key to the identification of British centipedes*. Shrewsbury: Field Studies Council.

**Biedermann, R. & Niedringhaus, R. (2009).** *The Plant- and Leafhoppers of Germany – Identification key to all species*. Wissenschaftlich Akademischer Buchvertrieb-Fründ, Scheeßel.

**Boyce, D. C. (2002).** *A review of seepage invertebrates in England*. English Nature Research Reports No. 452. Peterborough: English Nature.

**Brown, V. K. (1983).** *Naturalists' Handbooks 2: Grasshoppers*. Cambridge: Cambridge University Press.

**Carter, J. (2009).** *Arachnida (spiders and harvestmen) Survey of Big Pit, Blaenafon*. National Museum of Wales.

**Dawson, I., Harvey, P., and Russell-Smith, T. (2008).** *A National Status Review – the draft results*. Newsletter of the British Arachnology Society, 112:18-24.

**Duff, A. G. (2012).** *Beetles of Britain and Ireland, Volume 1: Sphaeriusidae to Silphidae*. A. G. Publishing.

**Duff, A. G. (2016).** *Beetles of Britain and Ireland, Volume 4: Cerambycidae to Curculionidae*. A. G. Publishing.

**Evans, R. L. and Potts, S. G. (2013).** *Iconic Bees: Yorkshire and the Humber - Tormontil Mining Bee*. Reading: University of Reading. Available online at: [https://www.foe.co.uk/sites/default/files/downloads/bees\\_yorkshire\\_humber.pdf](https://www.foe.co.uk/sites/default/files/downloads/bees_yorkshire_humber.pdf)

**Falk, S. J. (1991).** *A review of the scarce and threatened flies of Great Britain (Part 1) – Research and Survey in Nature Conservation*, 39:166.

**Falk, S. J. (2015).** *Field Guide to the Bees of Great Britain and Ireland*. British Wildlife Field Guide. London: British Wildlife Publishing.

**Gilmore, D., Slade, D. and Stewart, B. (2014).** *The Moths of Glamorgan*. Cornwall: Atropos Publishing.

**Hopkin, S. (1991).** *A key to the woodlice of Britain & Ireland*. Richmond Publishing, Slough.

**Hubble, D.S. (2014).** *A review of the scarce and threatened beetles of Great Britain*. The leaf beetles and their allies. Chrysomelidae, Megalopodidae and Orsodacnidae. Species Status No.19. Natural England Commissioned Report NECR161.

**Joy N. H. (1932).** *A Practical Handbook of British Beetles*. London: H. F. & G. Witherby.

**JNCC (2010).** *Andrena tarsata*. UK Priority species Pages V2.

**Key, R. (2000).** Bare ground and the conservation of invertebrates. *British Wildlife*, 11, 183-191.

**Luff, M. L (2007).** *The Carabidae (ground beetles) of Britain and Ireland*. Royal Entomological Society Handbooks for the Identification of British Insects Vol 4, Part 2 (2nd Ed.). Royal Entomological Society, St Albans and Field Studies Council, Shrewsbury.

**Pont, A. C. (1979).** *Sepsidae*. Diptera (Handbooks for the Identification of British Insects 10/5c). London: Royal Entomological Society of London.

**Prys-Jones, O. E. & Corbet, S. A. (2011).** *Bumblebees*. Pelagic Publishing.

**Skinner, G. J. & Allen, G. W. (1996).** *Naturalists Handbooks 24: Ants*. Richmond Publishing Co. Ltd.

**South Wales Wildlife Sites Partnership (2004).** *Guidelines for the Selection of Wildlife Sites in South Wales*. Gwent Wildlife Trust.

**Southwood, T. R. E. & Leston, D. (1959).** *Land and Water Bugs of the British Isles*. Frederick Warne & Co. Ltd.

**Stubbs, A. E. & Drake, M. (2001).** *British soldierflies and their allies: an illustrated guide to their identification and ecology*. British Entomological and Natural History Society.

**Stubbs, A. E. & Falk, S. (2002).** *British hoverflies, an illustrated identification guide*. Second edition. Reading: British Entomological and Natural History Society.

**Telfer, M. G., Gregory, S. J., Kime, R. D., Owen, C. & Spelda, J. (2015).** *Ceratosphys amoena* Ribaut, 1920 and *Hylebainosoma nontronensis* Mauriès & Kime, 1999 new to Britain (Diplopoda: Chordeumatida). Bulletin of the British Myriapod & Isopod Group 28: 15-30.

**Wales Biodiversity Partnership (2007).** *List of Species & Habitats of Principle Importance for Conservation of Biological Diversity in Wales*. Wales Biodiversity Partnership/Welsh Assembly Government.

**Wilson, M. R., Stewart, A. J. A., Biedermann, R., Nickel, H. & Niedringhaus, R. (2015).** *The Planthoppers and Leafhoppers of Britain and Ireland – Identification keys to all families and genera and all British and Irish species not recorded from Germany.* Wissenschaftlich Akademischer Buchvertrieb-Fründ, Scheeßel.

**Yeo, P. F. & Corbet, S. A. (1995).** *Naturalists' Handbooks 3: Solitary Wasps.* Richmond Publishing Co. Ltd.



## A Better Deal for Future Generations - setting the challenge for the Cardiff Capital Region City Deal

### Future Generations Commissioner- Sophie Howe

#### Introduction

City Deals are a vital opportunity for our public service leaders to demonstrate how they are planning for the future - tackling the problems of today but with the longer-term impact at the forefront of their planning.

Gone are the days when we can look at a single issue in isolation. People's lives are not lived in silos. The ability to work is not just dependent on skills but other factors such as having a transport system that is affordable and easily accessible. It depends on good health and wellbeing, for which we need access to green spaces and clean air.

As decisions about the Cardiff Capital Region City Deal are being made since the Well-being of Future Generations Act came into force they are an important milestone in the life of the Act. They offer an opportunity for us to see how local authorities, Welsh Government, and other partners are working to fulfil their obligations. That is, how they intend to maximise their contribution to the well-being goals using the five ways of working set out in the Act.

As a 20-year programme, the City Deal also offers an unusual and valuable opportunity for the authorities involved to work on a longer time frame. Short-term funding cycles are often blamed by public bodies for an inability to make long-term plans with positive long-term impacts, so we expect that they will welcome the opportunity that the City Deal programme offers to do just this.

It is also an opportunity to show how applying the Act to a major public investment programme could deliver not just some anticipated short-to-medium term economic gains in the traditional way but also transformational change in terms of our economic, social, cultural and environmental well-being. It is a chance to rise to persistent challenges such as climate change, poverty, inequality, social cohesion, jobs and skills in a truly long-term and preventative way.

#### 1. What kind of economic development?

The overarching priorities and approaches for the City Deal programme, set by the UK Government, demand that the projects emerging from this Deal should be able to contribute to a five percent uplift in regional Gross Value Added (GVA) in south east Wales. However, chasing GVA uplift 'alone' is not compatible with pursuing the well-being of future generations and Welsh public bodies' commitments under the Act. The statutory definition of 'a prosperous Wales' sets out significant non-negotiable qualifiers about the nature and direction of economic development, specifically tying this to the creation of a low-carbon society, respecting environmental limits by using resources efficiently and proportionately, and acting on climate change.

The 10 Local Authorities and the Welsh Government are subject to the duty under the Well-being of Future Generations Act. They must demonstrate that the City Deal will enable them

to pursue an appropriate type of economic development, maximising their contribution to the seven well-being goals.

To develop a programme in 2016 that does not have low carbon as its central pillar is not just environmentally irresponsible - it is also economically irresponsible. Not only is there a need to meet the obligations under the Environment Act and the recently ratified Paris agreement, but the long-term costs to the economy of failing to tackle climate change and failing to secure reliable, affordable energy are going to be significant. Thinking in the long-term way the Act requires, means that the City Deal cannot discount these future costs if this risks leaving future generations with the consequences such as financial and environmental debt to pay. For example, a recent study<sup>1</sup> showed that a 21-year-old graduate will lose around £100,000 in income during their lifetime (with children of millennials thought to lose almost three times that) as a result of the economic burdens relating to climate change.

The global costs of tackling climate change to stabilise CO<sub>2</sub>e levels at 500-550ppm were estimated to be around 1% of Gross Domestic Product (GDP) by 2050, in a review undertaken by Nicholas Stern<sup>2</sup>. More recently, Stern has stated that the modelling under-estimated the hidden risks of climate change impacts and the costs could be higher and are likely to keep increasing until action is taken at all levels<sup>3</sup>. On the other hand, the benefits outweigh the costs: Stern valued these benefits at around \$2.5 trillion over the medium and long-term.

Some of the challenges and questions which the city deal must address include:

- Ensuring the business opportunities that will be pursued through the City Deal are appropriate for a low-carbon economy. For instance, what types of natural resource and energy do they depend on? Will they still be viable under projected climate change conditions and shrinking fossil fuel reserves?
- Ensuring investment in transport infrastructure as proposed realistically reduces the environmental costs of travel in the Cardiff Capital Region. It must take into account a range of scenarios about future travel needs, such as changing patterns of work, modes of transport and implications of ageing population – as well as a robust lifecycle analysis of the physical infrastructure required.

## 2. What kind of work, prosperity, and well-being and for whom?

The purpose of developing the economy is not purely to grow GDP. This alone will not achieve the Wales we want. In fact, there is growing evidence that shows increases in GDP have done little to reduce inequalities.

Research in Wales (e.g. the Deep Place studies) has shown that economic development routinely leaves behind substantial parts of the population. The Well-being of Future Generations Act requires this to change - the pursuit of prosperity is not a goal in isolation

---

<sup>1</sup> <http://www.demos.org/publication/price-tag-being-young-climate-change-and-millennials-economic-future>

<sup>2</sup> [http://www.wwf.se/source.php/1169157/Stern%20Report\\_Exec%20Summary.pdf](http://www.wwf.se/source.php/1169157/Stern%20Report_Exec%20Summary.pdf)

<sup>3</sup> <https://www.desmogblog.com/2014/06/19/lord-stern-we-ve-underestimated-economic-costs-globalwarming>

but a means towards well-being in its widest sense. This includes addressing long-term challenges such as persistent poverty, poor health and improving the life chances for everyone, particularly the most disadvantaged.

There are stark differences across the Cardiff Capital Region in terms of levels of deprivation. The least deprived areas within the Region are found in southern parts of Bridgend and Rhondda Cynon Taff (Taff Ely), the Vale of Glamorgan, north Cardiff, suburban areas of Newport and large parts of Monmouthshire.

The most deprived areas are found in the south Wales Valleys, Barry, south Cardiff and inner Newport. Differences in employment and income accounts for about half of this difference: average unemployment is about 8%, slightly higher than the Wales and UK averages – but this varies from 5% in Monmouthshire to 13% in Blaenau Gwent. The region also includes some hotspots of youth unemployment (under 25s) – 26% in Blaenau Gwent; 22% in Rhondda Cynon Taff, and 20% in Torfaen<sup>4</sup>.

There is a huge variation in child poverty across the region: 34% of children in Blaenau Gwent are living in poverty compared with 15% in neighbouring Monmouthshire.

In eight of the ten Local Authority areas in the region, child poverty is above the Welsh average. The evidence shows that children living in poverty do less well at school and earn less as adults, thus perpetuating a cycle of poverty.

The Joseph Rowntree Foundation estimates that poverty costs the Cardiff Capital Region at least £2.2 billion a year.

Our population is ageing and becoming more diverse. Life expectancy is increasing for all, but not equally, and healthy life expectancy varies dramatically across the region. In some parts of the region, there is a 20-year difference in healthy life expectancy between the least and most deprived parts of the same areas, e.g. in Llynfi valley (Maesteg and Bridgend)<sup>5</sup>, or in Cardiff and Vale of Glamorgan<sup>6</sup>. In males, the gap in life expectancy between Blaenau Gwent and neighbouring Monmouthshire is 4.5 years.

Not only do people live shorter lives in Blaenau Gwent, the proportion of those years spent in good health is lower too. The percentage of males and females assessing their general health as good or very good varies markedly across the region with over 80% of those in rural parts of the Vale of Glamorgan, north Cardiff and much of Monmouthshire reporting good health, whilst in places like Barry, south Cardiff and large parts of the south Wales valleys the figure is less than 70%.

- The City Deal must play its role in reversing these inequalities, for example through stimulating different patterns of work and employment, and breaking inter-generational cycles of poverty where it is most persistent.

---

<sup>4</sup> Public Health Wales Observatory

<sup>5</sup> <http://www.comfirstbridgend.com/news-and-information-home/article/00000118>

<sup>6</sup> <http://www.wales.nhs.uk/sitesplus/922/page/87233>

At the same time, global trends suggest that much low-skilled and manufacturing work will gradually disappear as digital and automated alternatives replace the need for human labour. These are trends that the City Deal will need to engage with over its lifetime, by considering, for instance:

- How the programme will make the best use of the skills already available in south east Wales, and build on them?
- How it will support the next generations to acquire a broad and adaptable skills base that will make them fit for future work, given that they may be earning their livelihoods doing work that we cannot yet imagine?
- How it will create opportunities for more women, older people and other underrepresented groups to participate in the workforce, engaging in productive and rewarding work?

As the Future of Work<sup>7</sup> report highlighted “work in the future will be more interconnected and network-oriented, where the high-skilled minority (characterised by their creativity, analytical and problem-solving capabilities and communications skills) will have strong bargaining power in the labour market, whilst the low-skilled will bear the brunt of the drive for flexibility and cost reduction, resulting in growing inequality.”

Technological changes and the pace of changes reported by World Economic Forum, indicate that globally a total loss of 7.1 million jobs are expected by 2020, two thirds of which are concentrated in office and administrative roles<sup>8</sup>.

These technological changes will influence the availability of jobs for a younger population, giving them an advantage growing up in a digital age. Workers in older age groups will need to embrace technology fully to compete in the labour market.

The projected trends pose a significant risk to wider economic strategies and the future of the economy in the region and the rest of Wales if we do not act now to plan for these changes.

Current trends show that in six of the ten Local Authorities, the proportion of school leavers with adequate basic skills and qualifications is below the Wales average, which will have a significant bearing on their prospects and life chances. It is vital that economic programmes are purposefully designed to tackle these issues, for instance by focusing opportunities, resources and investment in areas of higher deprivation, even if these are unlikely to offer the greatest absolute increases in GVA.

### 3. How does this help communities?

It is clear that many people in Wales feel disconnected from the decisions that impact on them, which are usually taken by others on their behalf and are often felt to be completely ineffective in improving their lives.

---

<sup>7</sup> <http://mbsportal.bl.uk/taster/subjareas/hrmemptyrelat/ukces/1785622014-evidence-report-84-future-ofwork.pdf>

<sup>8</sup> <http://reports.weforum.org/future-of-jobs-2016/employment-trends/>



Brexit is a wake-up call for all those developing policy and delivering public services. Most parts of the region voted strongly to leave the EU, despite the huge investment of EU money here. It is hugely important to take every opportunity to use the City Deal programme to re-engage communities in determining their own future well-being.

The City Deal is likely to focus very heavily on investment in physical infrastructure, particularly transport infrastructure. Infrastructure can be an important enabler of well-being but only where the right contextual factors are in place and specific relevant efforts are made.

The 2007 Valleys Regional Park Visioning Report found that 48% of people living in the Valleys had no relationship with their natural green space. The Tredegar<sup>9</sup> and Pontypool<sup>10</sup> Deep Place studies in south east Wales have argued for a much stronger focus on whole place systems thinking with more focus on locally specific priorities to ensure equitable and sustainable outcomes for current and future generations. The City Deal must take account of the specific and rather diverse context of south east Wales and ensure that any investment in infrastructure is both locally appropriate and leverages wider well-being gains.

For instance, how does it address increasing demand for social and health care provision in the short-to-medium term future whilst reducing and preventing future need for such provision? Across Wales the NHS deficit is predicted to be £700m by 2020, and the Health Boards in the city region had reported deficits of £47m this year alone. The links between employment and health are well-evidenced and therefore the City Deal should be striving to deliver against our aspirations for a healthier nation, which means targeting attention on areas of high economic inactivity.

We also know that the environment is key to health, so programmes delivered as part of the deal need to seize opportunities to bring nature into the city environment, enhance public green space, and encourage cycling and walking through transport plans. Wales' Chief Medical Officer has identified physical inactivity as a principal health risk, which is costing Wales over £650m a year. Across Wales only 30% of adults do the recommended levels of exercise (30 minutes 5 or more times a week), and in this region eight out of ten areas are not even matching this average.

What works in one community may not work in another so it is important that whatever approach is adopted is both flexible and responsive to local preferences. We know that growth is likely to be seen in the larger cities of Cardiff and Newport, whereas Heads of Valleys will experience a decrease; and Monmouthshire is expected to see an increase in those aged 65 years and above.

A region with a thriving culture must have a strong sense of identity to help build pride in its place, and yet where people live is not the same as where they work. Across the region 210,000 people move from one Local Authority to another to work and more than 100,000 people move in and out of Cardiff each day. With a focus to drive the number of people speaking Welsh language to one million and the culture that this brings, the Region should look to take this opportunity to drive better integration.

---

<sup>9</sup> [http://www.regenwales.org/project\\_9\\_The--Deep-Place--Study](http://www.regenwales.org/project_9_The--Deep-Place--Study)

<sup>10</sup> <http://www.cardiff.ac.uk/sustainable-places/research/projects/the-deep-place-study>

- The City Region has the potential to provide a transformational opportunity for the area. Through an innovative, integrated approach to management and investment the City Region can take a lead in creating and sustaining an attractive, thriving, and productive environment that delivers sustainable economic, social, and environmental benefits and a high quality of life for all its citizens. The City Deal must ensure the distinctiveness and diversity of the region is reflected and enhanced in terms of culture, language and sense of place.

Moving forward in a place-based way will depend on involving local citizens and institutions in determining the relevant strategies. This goes far beyond carrying out time-specific consultation exercises as the Growth and Competitiveness Commission has apparently already done. It involves creating mechanisms for people to engage with and direct key decisions about what is done in their neighbourhood, throughout the lifetime of the City Deal programme, and working collaboratively with the full range of local institutions to deliver well-being writ large.

- What kinds of mechanisms will be put in place to ensure that community voice is a key driver of specific developments that will come about through this programme?

#### 4. Getting the best deal for Future Generations

Globally and in the UK, there are many examples of cities which have approached their economic development in innovative ways that put sustainability and citizens at the centre.

For instance, Stuttgart has brought landscape planning into the core of its city development approach, effectively creating a 'regional landscape park' which brings multiple social, environmental and recreational benefits and increases the region's competitiveness as a business location, supporting its economic development whilst helping the region to address climate change.

In the United States, Portland Oregon is delivering its sustainability goals by comprehensively changing its patterns of energy use – combining energy efficiency measures such as replacing their streetlights to LEDs with switching to clean renewable energy sources, generating solar power and disinvesting from fossil fuels.

Swansea is developing proposals for a city deal programme around the themes of connectivity, renewable energy and health and well-being.

These examples show that it is possible to get a virtuous spiral of impacts across economic, environmental, social and cultural domains if the approach is driven by a bigger and better vision than simply increasing economic activity or GVA. We would maintain that the Cardiff Capital Region deserves nothing less than a similar visionary approach fit for our future generations.