IMPORTANT INVERTEBRATE AREA PROFILE

South Wales Valleys

Left: Brownfield habitat at The British © Liam Olds. Right: The millipede *Hylebainosoma nontronensis* © J.P.Richards, www.bmig.org.uk.

The South Wales Valleys – commonly referred to as 'The Valleys' – are among Wales' most iconic landscapes. Here, the extensive upland plateaux are incised by deep valleys, creating the characteristic north-south angled ridges with little development or transport links across the passes with contrasting heavy urbanisation in the valley floor. The Valleys were among the most active coal mining and iron extraction regions in the UK and whilst the industry has now largely ceased, the area is dotted with former industrial sites which influence the current landscape and its biodiversity.

Former colliery sites and their associated spoil tips form a large proportion of the most important places for invertebrates within this IIA and are scattered between the Rhondda Valleys in the west and the Llwyd Valley in the east. Though often overlooked and underappreciated for their biodiversity, these sites support complex habitat mosaics of high value to invertebrates owing to their topographical complexity and varied pH, aspects, drainage, and substrate composition. Examples of such sites, which often form mosaics with other brownfield sites and adjacent natural habitats, include Old Smokey or Tylorstown Tip, Lady Windsor Colliery, Cwm Glo a Glyndyrys SSSI, Parc Penallta, Bedwellty Tip, The British, and Blorenge Common. These sites support species such as Dingy Skipper (*Erynnis tages*), Grayling (*Hipparchia semele*), the millipedes *Ceratosphys amoena confusa* and *Hylebainosoma nontronensis*, and others.

The valley plateaux and steep hillsides are dominated by open moorland with heather, blanket bog and acid grassland alongside fridd – a distinctive transitional habitat mosaic of rough grazed fields, bracken, rhôs pasture, scattered scrub and small woodland pockets – supporting species such as the Silurian moth (*Eriopygodes imbecilla*) and the pincer wasp *Aphelopus*

serratus. The low sections of the valleys are largely dominated by pastural agriculture with fields bounded by hawthorn-rich hedgerows, however some pockets of unimproved grassland are present such as Aberbargoed Grasslands National Nature Reserve, which is one of the most important rhôs pasture sites for Marsh Fritillary butterfly (*Euphydryas aurinia*) in Wales. These grasslands also support other scarce species such as the Devil's-bit Jewel Beetle (*Trachys troglodytes*) and Vulnerable Moss Carder Bee (*Bombus muscorum*).

Woodland is present in many of the valleys and often runs in a linear fashion along the valley sides. Though largely coniferous, these plantations are known to support notable invertebrates such as Cloaked Pug moth (*Eupithecia abietaria*). Ancient broadleaved woodland is limited and fragmented in many of the valleys but it provides vital habitat for a number of arboreal and dead-wood invertebrates including the Endangered White-letter Hairstreak butterfly (*Satyrium w-album*) and Scarce Oak Miner moth (*Phyllonorycter kuhlweiniella*) around the village of Abercynon, and European Stag Beetle (*Lucanus cervus*). This IIA is also unique for its collection of wet -woodland and woodland stream specialists – these include the Plain-eyed Brown Horsefly (*Tabanus miki*) at Llandegfedd Reservoir SSSI, Endangered Ten-spotted Pot Beetle (*Cryptocephalus decemmaculatus*), and English Assassin Fly (*Empis limata*).

The numerous rivers in The Valleys, including Taf Fechan, Sirhowy, Taf and Usk, are of significant importance for rare aquatic species such as the Endangered Yellow Mayfly (*Potamanthus luteus*), globally Endangered White-clawed Crayfish (*Austropotamobius pallipes*), and a number of long-legged or dolichopodid flies. The ponds and marshlands along such river corridors, especially those around the Afon Lwyd and the town of Blaina, support a variety of water beetles, among others the Critically Endangered Sussex Diving Beetle (*Laccophilus poecilus*), Lesser Silver Water Beetle (*Hydrochara caraboides*) and the water scavenger beetle *Berosus luridus*. Other river-related habitats like seepages and sand and shingle banks are important for an assemblage of ground beetles, as well as the money spider *Caviphantes saxetorum*.

Reasons for selection

South Wales Valleys IIA supports at least 61 qualifying IIA species of conservation concern. The area supports the following species which are threatened on a global scale or Critically Endangered and Endangered in the UK:

- Globally Endangered White-clawed Crayfish (*Austropotamobius pallipes*)
- Critically Endangered Sussex Diving Beetle (*Laccophilus poecilus*)
- Endangered Necklace Ground Beetle (*Carabus monilis*)
- Endangered Ten-spotted Pot Beetle (*Cryptocephalus decemmaculatus*)
- Endangered Wood White (*Leptidea sinapis*)
- Endangered White-letter Hairstreak (*Satyrium w-album*)
- Endangered Stout Dart moth (*Spaelotis ravida*)
- Endangered English Assassin Fly (*Empis limata*)
- Endangered Pale Giant Horsefly (*Tabanus bovinus*)
- Endangered Yellow Mayfly (*Potamanthus luteus*)

The IIA also supports an assemblage of nationally and internationally Vulnerable invertebrates including the clown beetle *Margarinotus obscurus*, Grayling butterfly, Bure Long-legged Fly (*Dolichopus nigripes*), and European Vulnerable Moss Carder Bee. This IIA is of national significance for the Nationally Rare millipedes *Ceratosphys amoena confusa* and *Hylebainosoma nontronensis*, which are otherwise restricted to South Wales, and the long-legged fly *Sciapus basilicus* which is not known from anywhere else in Britain. Outside of this IIA, species like the

Sussex Diving Beetle (*Laccophilus poecilus*) © Roger Key

ground beetle *Bembidion inustum* is only known from one other location within Wales and the Silurian moth is restricted to the hills around the Herefordshire-Monmouthshire border. Similarly, the Bure Long-legged Fly can only be found in one other county outside of Wales.

These important invertebrates and their populations rely on the South Wales Valleys IIA's diverse habitats, especially its brownfield and fridd habitat mosaics, rivers and woodlands. Whilst parts of the IIA are under some form of legal protection (e.g. SSSI, SAC), there are considerable portions that are outside of any designated areas.

Key habitats for rare invertebrates in the IIA

Using the Pantheon analytical tool, we identified some of the key habitats and microhabitats for the selected rare invertebrates, and listed a selection of invertebrates associated with them.

- **Tall sward and scrub** (including brownfields, moorland & heathland; sward layer; litter & ground layer; and scrub) e.g. the stone centipede *Lithobius tricuspis*, Moss Carder Bee, Marsh Fritillary, Fleabane Bell (*Epiblema cnicicolana*), Scarlet Malachite Beetle (*Malachius aeneus*), and Necklace Ground Beetle.
- **Running water** (including exposed riverine sediments; seepages; unmodified fast-flowing streams; mud/shallow litter; and woodland streams) e.g. the phantom cranefly *Ptychoptera longicauda*, River Shingle Beetle (*Bembidion testaceum*), White-clawed Crayfish, the water penny beetle *Eubria palustris*, the small squaregill mayfly *Caenis pusilla.*
- **Short sward and bare ground** (including brownfields and grassland; litter & ground layer; exposed sand; sward layer; and dung & carrion) e.g. Pygmy Pill Woodlouse (*Buddelundiella cataractae*), Large Plain Stilleto fly (*Thereva cinifera*), Western Thyme Plume (*Merrifieldia tridactyla*), and the tortoise beetle *Pilemostoma fastuosa*.
- **Arboreal** (both broadleaf and conifer trees including canopy; foliage; flowers; honeydew; and carr/wet woodland) e.g. the hoverfly *Heringia brevidens*, the weevil *Isochnus foliorum*, and Cloaked Pug.
- **Acid and sedge peats** (including shallow freshwater ponds; damp/wet peat; moss lawn; mud/shallow litter; and wetland vegetation) e.g. Sussex Diving Beetle, Pale Giant Horsefly (*Tabanus bovinus*), and Bure Long-legged Fly.
- **Shaded woodland floor** (mainly broadleaf woodland including heavy & light shade; woodland litter; rocky ground; and woodland sandy soils) e.g. English Assassin Fly, and the crane flies *Tipula pabulina* and *T. alpina.*
- **Decaying wood** (both broadleaf and conifer trees with sapwood & bark decay; flowers; and heartrot) e.g. Plain Dark Bee (*Stelis phaeoptera*), the longhorn beetle *Stenurella nigra*, and European Stag Beetle.
- **Marshland** (including mud/shallow litter; and shallow freshwater pond) e.g. the water scavenger beetle *Berosus luridus*, and the long-legged fly *Sciapus basilicus.*
- **Wet woodland** (including woodland stream) e.g. the phantom cranefly *Ptychoptera longicauda.*
- **Lake** (including emerging/aquatic vegetation) e.g. the diving beetle *Graphoderus cinereus*.
- **Upland** e.g. the Silurian moth.

The stone centipede *Lithobius tricuspis* © Christian Owen, www.bmig.org.uk.

Habitat Threats and Opportunities

Wildlife-rich brownfields

Threats

- The loss of brownfields, through development or inappropriate reclamation, remediation and management, is causing brownfield habitats to become increasingly fragmented. Over time, this

can lead to local extinction events, particularly with scarce species that are poor dispersers.
- The 'greening' of brownfields, involving tree planting or the addition of nutrient-rich topsoil and seeding with grass species, removes fine-scale habitat mosaics and inevitably leads to the loss of rare and scarce species.
- Clearing and 'tidying up' brownfields for public access, such as the removal of substrates, can remove valuable habitats for invertebrates.
- The introduction of broad-scale and intensive management, such as cutting large swathes of a site, can disrupt habitat mosaics that are key to brownfield biodiversity. Conversely, an absence of management on long abandoned brownfields can lead to scrub encroachment and the eventual loss of open habitats.
- Invasive non-native species (e.g. Buddleia and Cotoneaster) can negatively affect the vegetation and structural composition of brownfield habitats.

Opportunities

- Identify and protect wildlife-rich brownfields when reviewing Local Development Plans.
- Avoid development, reclamation or remediation proposals that threaten brownfield habitats and their associated invertebrate fauna.
- Introduce a positive management regime that is rotational and done in a piecemeal manner in response to site monitoring. This may involve rotationally creating new scrapes or other periodic disturbance.
- The addition of substrates such as industrial spoil, sand or calcareous aggregates will enhance the floral resource by creating different soil conditions and bare substrates for characteristic plant communities to develop.
- Identify opportunities to diversify topographical features through the creation of scrapes, hollows or depressions — these can create localised warm microclimates where there is bare ground, or form shallow ephemeral pools, inundation grassland or permanently wet areas.
- Control or remove invasive species.

Running water

Threats

- Water pollution and nutrient enrichment from agricultural run-off (artificial fertilisers, livestock faeces, worm treatments), sewage discharges or chemical water treatment can alter the composition and disrupt the lives of aquatic and semi-aquatic invertebrates.
- Engineering activities such as flood alleviation schemes, straightening of watercourses, dredging, water storage and abstraction have modified flows in some rivers and streams, lowered water tables and removed available habitat.
- Barriers such as weirs and dams disrupt natural flow processes and prevent some species from moving freely. Walls and piling prevent the watercourse from spreading onto its floodplain, replenishing wetlands and creating damp habitats.
- Removal of riparian vegetation, particularly trees can result in increased water temperatures which affect cold-loving species. Conversely, encroachment of scrub on the channel through the lack of grazing and woodland management can lead to overshading and impact on the dispersal abilities

Left to right: Large Plain Stilleto (*Thereva cinifera*) © Steven Falk; Moss Carder Bee (*Bombus muscorum*) © Steven Falk; Pygmy Pill Woodlouse (*Buddelundiella cataractae*) © Filip Trnka



of flying invertebrates to adjacent sites.

- Activities such as ploughing can increase sediment run-off in to streams and rivers. Excessive sediment loading can contribute to invertebrate declines in various ways e.g. clogging of gills, changes in habitat and prey availability, oxygen and light levels.
- Non-native species such as Himalayan Balsam and Japanese Knotweed can be a particular problem to rivers and their associated woodlands, crowding out other supportive native plant species and habitats for invertebrates.
- Sedimentation and drying, caused by reduced water flow, can result in the deterioration of shingle bank habitats.
- Light pollution disrupts the lives of nocturnal insects and can contribute to insect decline.
- Solar panels adjacent to running water can attract aquatic invertebrates with reflected polarised light appearing as suitable egg laying sites.

Opportunities

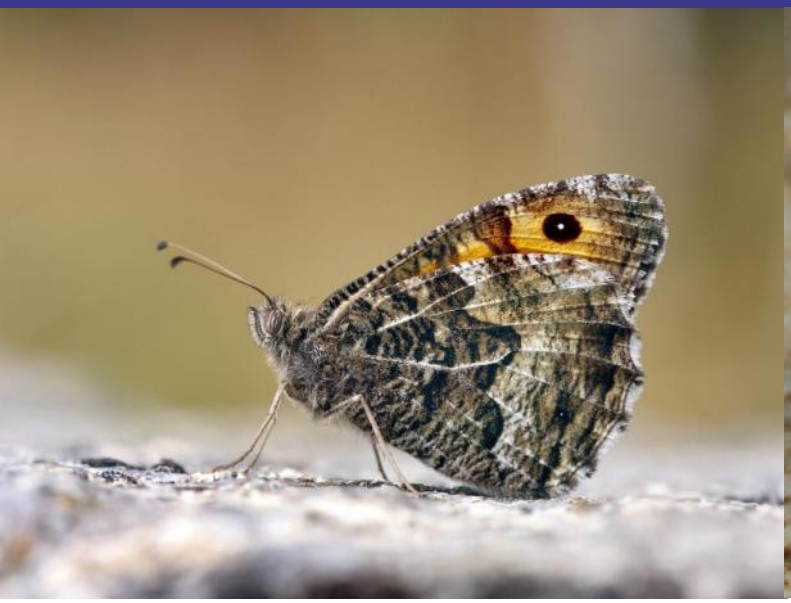
- Monitor water quality and protect running waters from land-borne pollution through negotiations with local farmers and businesses.
- Restore a more natural flow regime by removing barriers such as weirs and culverts and re-profiling watercourses from fast-flowing, straight, deep and steep channels to meandering shallow channels with varying speed in water flows. Where practicable, allow rivers to use their floodplain in times of higher flows.
- Establish vegetation buffers and woodland around running waters to improve water quality and habitat for invertebrates – this helps with trapping non-point source pollutants in run-off events, stabilises riverbanks, and creates shaded areas.
- Allow some grazing on riverbanks as this creates marginal habitat with tussocky vegetation for roosting and mating, and varied microhabitats along the water edge such as poached areas.
- Keep livestock from entering the watercourse or moving across gravel bars and beaches as this compacts the gravels and their faeces will increase nutrient concentrations.
- Reduce excessive bank erosion through the use of stock fencing along watercourses.
- Influence and review lighting strategies around running waters, seeking to reduce or eliminate the use of artificial lighting wherever possible.
- Control or remove invasive species such as Himalayan Balsam and Japanese Knotweed.
- Patterned, roughened or painted glass, or a horizontal light-blocking grid can be used on solar panels to reduce their attractiveness to aquatic invertebrates.

Ten-spotted Pot Beetle (*Cryptocephalus decemmaculatusl)* © Roger Key

Woodland and trees

Threats

- Historical damage of woodland through industrial use and large-scale conifer timber planting resulted in direct habitat loss of native woodland, causing a slow recolonisation rate of invertebrates into some of these areas.
- Loss of woodland grazing or management such as maintenance of rides or coppicing, can lead to woodlands becoming shaded and lacking structural variation, which significantly impacts invertebrate species.
- Overgrazing and disturbance where deer populations are high prevents young trees from being recruited and may reduce ground layer vegetation that provides valuable nectar and pollen sources for invertebrates.
- Important veteran trees and decaying wood sources are often at risk from overzealous management, including the tidying-up of standing and fallen trees and collection of fallen material for firewood. Lack of spatial and temporal continuity of veteran trees can affect the dispersal ability of the associated specialist species.




Left: Grayling (*Hipparchia semele*) © Patrick Clement. Right: Silurian (*Eriopygodes imbecilla*) © Ilia Ustyanstev. Both images from https://butterfly-conservation.org/

- Fragmentation of woodlands can lead to inability of invertebrates to move between fragments.
- Invasive non-native species (e.g. Rhododendron) can negatively affect the vegetation and structural composition of woodlands.
- Ash Die-back and other tree diseases and pests, which are exacerbated by the climate change, can result in changes in tree species and age composition.

Opportunities

- Overall, aim for a mix of dead wood, healthy live trees, young saplings, scrub areas and open spaces such as glades, rides or scallops. In addition to the increased light levels in the forest, rides create varied woodland edge microhabitats and allow grasses and wildflowers to regrow.
- Consider long-term age structure, aiming to increase the recruitment of young trees and ensuring a continuity of mature trees. This can be achieved through practices such as coppicing and thinning. Additionally, mark out 'future veteran' trees to ensure the existing veterans will be replaced in the future.
- Retain all dead wood, both standing and fallen, in situ and discourage the collection of firewood. Additionally, retain trees showing decay features and do nothing to damage those features.
- Maintain/re-establish light grazing regimes in ancient woodlands to manage understorey vegetation.
- Aim to restock and regenerate native tree species - this creates the important thicket stage habitat and encourages a diversity of foodplant-specific invertebrates such as White-letter Hairstreak (on elm), the longhorn beetle *Stenurella nigra* (on mature chestnut), Scarce Oak Midget moth (on oak) or Ten-spotted Pot Beetle (on willow).
- Promote growth of suitable tree species on land between existing woodland sites to extend and reconnect fragmented patches of woodland.
- Control or remove invasive and competitive species such as Rhododendron, Japanese Knotweed and bramble.

Wetlands

Threats

- Water pollution through chemicals, nutrients and sediment from agriculture, sewage discharges and road run-off can directly kill or alter populations of invertebrate and plant species, resulting in a loss of biodiversity.
- Changes in land-cover can result in the release of sediment and nutrients into the water body, causing increased eutrophication, siltation, and anoxic conditions. This is further exacerbated by the removal of waterside vegetation and reedswamp that act as barriers to particulate matter and absorb nutrients.
- The direct loss or damage of wetland features to urbanisation or infilling depletes wetland resources for invertebrates in the countryside. It also increases isolation of the remaining wetlands,

making colonisation by less mobile species more difficult.

- Local water abstraction and drainage schemes can change hydrological regimes and lower water tables, causing shallow wetland features like ponds and lakes that are crucial to the lifecycle of many threatened species to dry out.
- Invasive and competitive plant species (e.g. duckweed *Lemna spp*.) can prevent establishment of native plants that are used as shelter and food for invertebrates. Similarly, invasive animals such as the Signal Crayfish (*Pacifastacus leniusculus*) can have drastic consequences for the native White-clawed Crayfish (*Austropotamobius pallipes*).
- Lack of management of vegetation around wetland features can lead to scrub encroachment and succession to woodland, removing valuable wet habitat features for invertebrates. Conversely, overgrazing can produce a close-cropped and uniform sward that lacks many key plants, offers little shelter, and provides few flowers for pollinators.

Opportunities

- Discharges of effluent from the sewer network and other point sources of pollution should be strictly controlled to ensure water stays clean. For wetland features in improved grassland or arable fields, establish a buffer strip (e.g. unfertilised tussocky grass or reed) to protect them from run-off, pesticide spray drift or fertiliser inputs.
- Aim for structural diversity in and around water bodies, including large beds of submerged vegetation and a mixture of dense and shorter emergent vegetation, and a succession of marginal vegetation from bare substrate to tall herbage, scrub and trees. This will provide a wide range of places available for invertebrates to shelter, feed and breed in.
- Continue grazing on wetland sites where this is appropriate to avoid them scrubbing over, but reduce the grazing pressure if excessive poaching, erosion and loss of diverse vegetation structure becomes evident. Allow livestock some access to pond margins to create areas of poached ground and bare mud that are important for invertebrates such as craneflies.
- Maintain stable water levels in permanent water bodies as extreme fluctuations can be deleterious to some species, however retain temporary pools if these are natural.
- Try and create a diverse bank profile including gently sloping as well as steeper margins. Provide some shaded areas around wetland features, these provide shelter and food for many species as well as help mitigate the impact of increasing summer temperatures and climate change.
- Control or remove invasive species.
- Restore active processes in degraded wetlands through the purchase of additional land, blocking of ditches and removal of scrub/tree cover. Target restoration work near to existing high quality wetland sites to improve connectivity and to provide opportunities for invertebrates to develop resilient populations that are able to colonise new sites.

Rhôs pasture

Threats

- Grassland 'improvement' through drainage, ploughing, re-seeding, fertiliser and slurry application, and conversion to arable reduce invertebrate biodiversity through direct habitat loss and reduction in foodplants, flower and pollen resources.
- Lack of grazing management or abandonment leads to an excessive spread of Purple Moor Grass, scrub and thatch, eventually turning sites into wet scrubland and woodland. This causes the loss of structural mosaic in the sward and reduction in flowering-plant diversity and associated invertebrates.
- Over-stocking or bringing heavy machinery onto sites, especially in the wetter months can cause soil

Pale Giant Horsefly (*Tabanus bovinus*) © Nick Goodrum (CC BY 2.0)

Plain Dark Bee (*Stelis phaeoptera*) © Line Sabroe (CC BY 2.0)

compaction, leading to excessive spread of competitive species such as rush and docks, at the cost of other wildflowers.

- Extensive grazing, especially with sheep and over the spring and summer months, can cause a short uniform sward and inability of wildflowers to bloom and set seed.
- Changes in the water levels as a result of land drainage, flood alleviation engineering, or gravel and surface and ground water abstraction can lead to drying out of the sites and removal of valuable seasonal and permanent wet habitat features for invertebrates.
- Endectocides used in the treatment of livestock parasites can negatively affect dung beetles and other dung invertebrates.

<u>Opportunities</u>

- Avoid grassland-damaging practices such as drainage, ploughing, re-seeding, fertiliser treatment and slurry application.
- Establish conservation-led grazing regime which avoids excessive poaching or scrub establishment and aims to create a mix of taller tussocks of Purple Moor Grass as well as open and shorter areas favouring other flowering plants. This structural diversity will support the widest diversity of invertebrates, including rare species such as Marsh Fritillary, which is dependent on the presence of both grass tussocks and Devil's-Bit Scabious.
- If possible, avoid grazing by sheep and use ponies or cattle instead, ideally hardy breeds that are lighter in weight and can cope with wetter ground and feeding on rush and Purple Moor Grass.
- Avoid compaction by lowering stocking densities during the wet months and perform any mechanical works required in the dry months of the year.
- Restore natural hydrological processes to re-wet drained grasslands through blocking of ditches and removal of tree cover. Local water companies and landowners should be made aware of the sensitivity of wet grasslands to changes in water abstraction patterns or groundwater quality.

Author: Lucia Chmurova

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https://www.buglife.org.uk/our-work/important-invertebrate-areas/