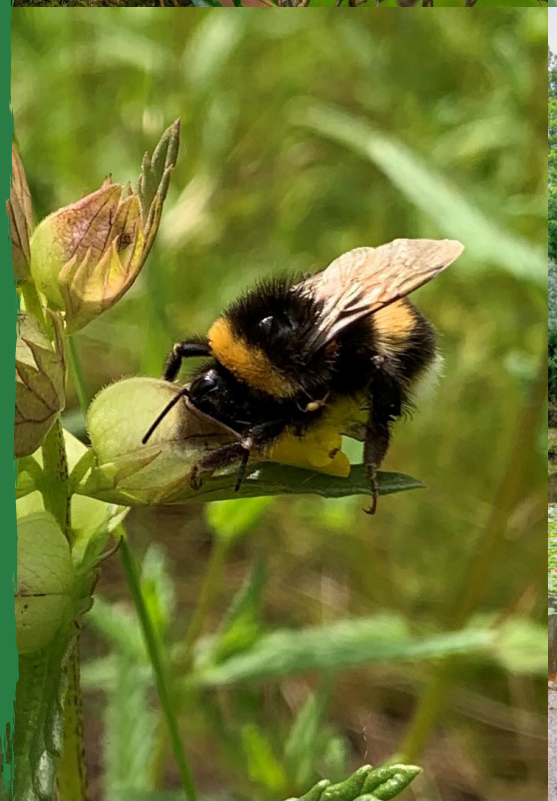
LLWYBR MAWR
MORGANNWG
THE GREAT
GLAMORGAN WAY

Managing Public Rights of Way and Greenspaces for Biodiversity

August 2023



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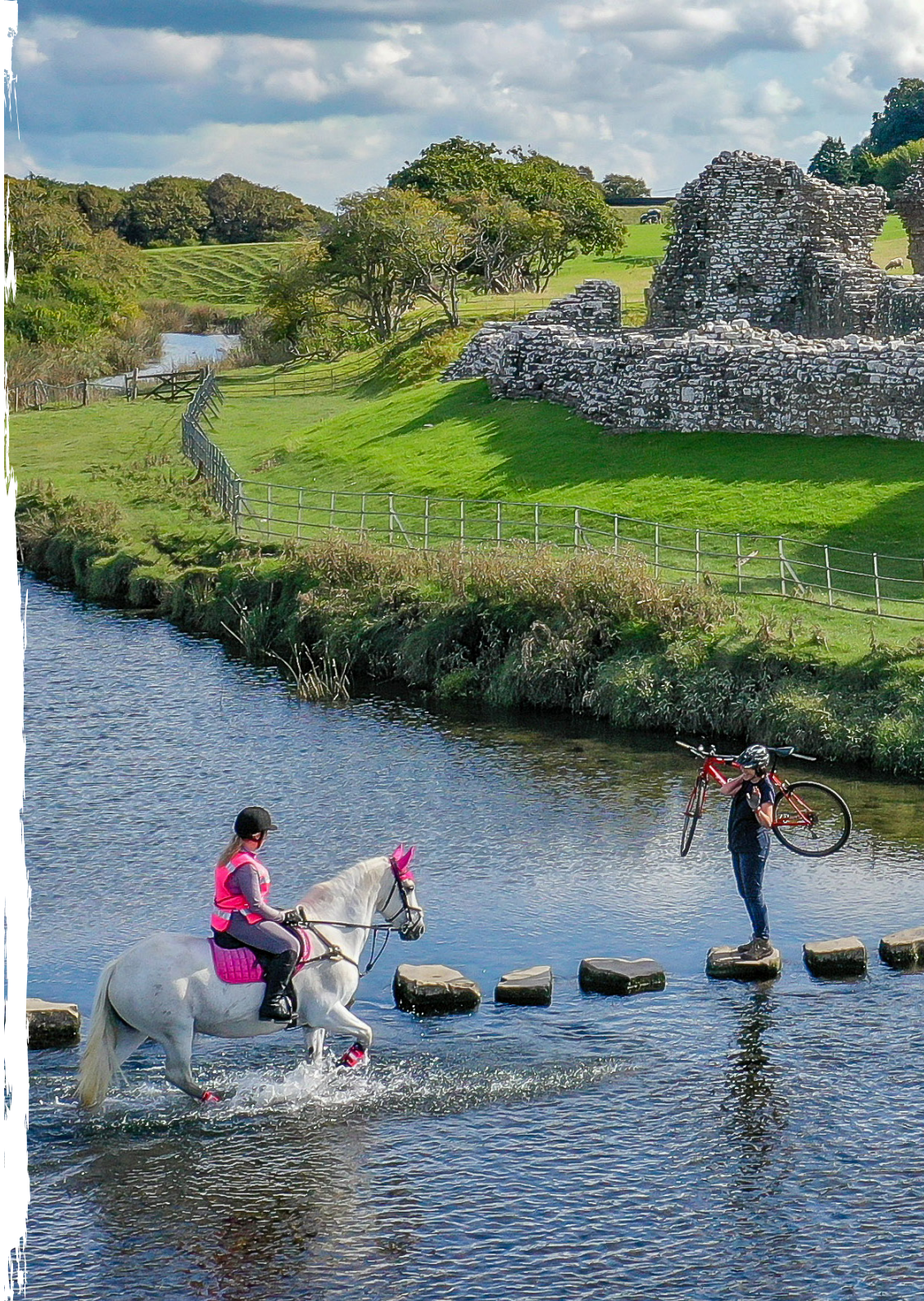
INTRODUCTION

This toolkit will provide advice about how to manage habitats and green spaces for biodiversity on Public Rights of Way as well as within grant-funded and Council led projects. There are a wide range of habitats across South-Central Wales, from the Severn Estuary to freshwater habitats, woodlands, moorlands, high valley sides and urban areas. Therefore, this toolkit will provide guidance on how to manage, monitor and improve biodiversity for specific habitats and species. The management practices in this document will outline how to encourage grassland meadows, vegetation, trees and shrubs as well as invertebrates, amphibians, reptiles, birds and mammals, with the overall aim of improving the landscape for biodiversity and achieving biodiversity net gain.

The toolkit will also give advice and examples of how to engage the local community through outdoor activities to increase community wellbeing and ongoing project engagement. Many of the examples illustrated within the document could be adapted to benefit community led and voluntary projects.



BACKGROUND

The Vale of Glamorgan Council delivers several projects within the Public Rights of Way (PRoW) department. The Great Glamorgan Way is a grant-funded project which aims to provide around 200km of connected long-distance multi-user route through five counties (The Vale of Glamorgan, Cardiff, Bridgend, Rhondda Cynon Taf and Merthyr Tydfil), which will be referred to as South-Central Wales throughout this document. The project is funded by the EU Rural Development Program grant scheme: Enabling Natural Resources and Well-being in Wales (ENRaW), which specifies a project completion date of May 2023. Within the project, PRoW access has increased by connecting new and existing bridleways, as well as installing improved furniture such as bridle gates and handles. Alongside these works, habitat connectivity has been enhanced for conservation of Welsh biodiversity.

Species Biodiversity

The complex biological community of organisms and their interactions with each other and the natural environment is known as an ecosystem. Throughout this document biodiversity will be referred to as the variety of organisms living within an area or ecosystem. As opposed to the total population, variety is determined by species richness and evenness within an ecosystem.

Connectivity and Biodiversity Net Gain

The Great Glamorgan Way project aims to increase habitat connectivity in South-Central Wales. Habitat connectivity provides connections between fragmented habitat, allowing individuals to migrate through the landscape via a safe network i.e. green corridor. Increased connectivity can improve the function of an ecosystem, by increasing the variety of species within it, leading to biodiversity net gain. Without connectivity, individuals may become isolated in small areas such as a patch of woodland where they cannot support a viable population. This causes population decline and ecosystems can become unstable and breakdown.

There are two main types of connectivity which include linear connections such as hedgerows or ‘stepping-stones’ such as ponds and nest boxes. Whilst these types of connectivity overcome barriers to migration, removing the barriers completely also increases connectivity.

BIODIVERSITY AND WELLBEING

Medical studies have shown that the natural environment provides physical and mental health benefits through many channels including recreational activities, exercise, aesthetics and spiritual fulfilment (NHS, 2021; Mind, 2022). The Mental Health foundation (2021) stated that connecting with nature can help with emotional and psychological health, as a result people that were more connected with nature reported feeling happier.

They suggest that "high quality natural spaces are better for us and our wellbeing". Therefore, it is important to integrate 'high quality' improvements and engagement activities into any countryside or greenspace project to encourage residents to build valuable connections with their surroundings. The Great Glamorgan Way has provided direct enhancements for biodiversity as well as improved outdoor recreational spaces via a better-quality Rights of Way network. In summary, the project will likely provide health benefits by encouraging people to connect with nature and their local community through exercise, recreation and community engagement activities.

The Great Glamorgan Way will also increase tourism and provide business opportunities therefore, bringing further social and economic benefits to Welsh communities. These ideas provide support for the Wellbeing of Future Generations (Wales) Act 2015 which aims to improve social, economic, environmental and cultural wellbeing in Wales, via seven main aims. Our project supports this legislation and improves wellbeing by enhancing the landscape for biodiversity conservation and improving community cohesion.

Successful Community Engagement

Volunteer activities within grant-funded projects can aid project engagement and act as hands-on educational opportunities. Engaging the local community to improve their local area is a valuable tool that can improve community cohesion and care for a project. A successful engagement activity will have seen a task through from start to finish, giving volunteers a sense of pride in what they have achieved therefore, increasing the chance that they will care for and maintain any instalments. They will also be an enjoyable experience for all those involved with the aim of encouraging individuals to get involved in future activities.

To obtain volunteers consider reaching out to the appropriate target audience via local nature partnerships, the local Wildlife Trust and other local wildlife charities. Social media campaigns also have a large reach with volunteers when posted on appropriate platforms within target groups.

Ensure that volunteers are given information for the day including time of meeting, location and appropriate clothing for weather conditions. Prior to this, a thorough risk assessment should have been carried out including use of tools, site conditions and extreme weather. Disclose any risks to be aware of for example, you may have noticed a poisonous species growing nearby. When on site, specific training is essential for all volunteers when carrying out manual labour activities to reduce the chance of injury, especially when working with tools or uneven terrain. Treat the activity as an educational tool to provide knowledge about the task at hand as well as biodiversity and nature conservation. The volunteers can then use the knowledge they have learned in their own gardens and communities.

WORKING IN PARTNERSHIP

The GGW team would like to give a special thanks to our project partners. When installing the Great Glamorgan Way, the team maintained good relationships with the Vale of Glamorgan Council, Cardiff Council, Rhondda Cynon Taf County Borough Council, Merthyr Tydfil County Borough council and Bridgend County Borough Council. Other project partners included the Wildlife Trust, Sustrans, The British Horse Society, Cycling UK, and Natural Resources Wales. We were able to work in partnerships with these organisations who shared a common interest with the project, to deliver a shared goal.

When delivering a project, it is essential to maintain good relationships with local groups and charities. Useful contacts to have when installing enhancements for biodiversity include Local Nature Partnerships, the local Wildlife Trust, other local wildlife charities and local nature groups. These groups will be able to provide local knowledge of habitats, needed improvements, volunteer groups and reliable contractors. Conservation groups may also aid with ongoing monitoring and maintenance of any biodiversity improvements. The successful relationships the Great Glamorgan Way maintained allowed the team to deliver the project to a high quality, in a time effective manner.

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
European Agricultural Fund for Rural Development: Europe Investing in Rural Areas
Llywodraeth Cymru Welsh Government

USING PUBLIC RIGHTS OF WAY WITH BIODIVERSITY IN MIND

Visit: https://www.gov.uk/government/publications/the-countryside-code

RESPECT EACH OTHER

- Give way to other users. All saddles are welcome on the Great Glamorgan Way
- Respect local people, their homes and where they work
- Leave gates how you found them
- Do not block access and gateways
- Keep to the marked paths and designated public areas
- Keep dogs on a lead around livestock and within sight at all times

RESPECT THE ENVIRONMENT

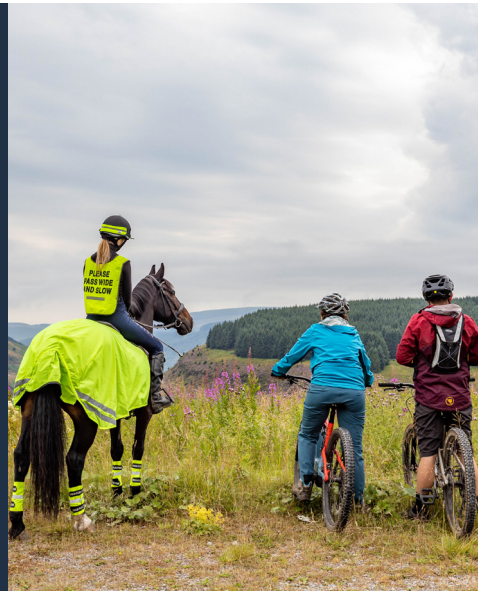
- Take home at least as much litter as you brought with you
- Bag dog poo and bin it
- Do not light fires and BBQs outside of designated areas

RESPECT LOCAL WILDLIFE

- Protect habitats by keeping to the marked path and designated public areas
- Do not to feed animals as this can harm them or cause them to become stressed
- Give wildlife, livestock and horses space, especially if they are with their young. If animals become spooked or defensive, they may cause harm to you or themselves.

MAKE GOOD MEMORIES

- Plan your route
- Tell someone else where you are going and when you expect to return
- Read up to date Great Glamorgan Way guidance on route conditions
- Take photos and share



SITE DESIGNATIONS

When creating connectivity for biodiversity it is important to consider the presence of rare habitats and species, which are a priority for enhancement. Formally designated, legally protected sites should not be altered however, providing connectivity around or between existing important sites will likely prove to be successful in growing populations and achieving biodiversity net gain.

Designation	Abbreviation	Level of protection	Designator	Description
Special Areas of Conservation	SAC	European (Conservation of Habitats and Species Regulations 2017)	Welsh Government	Legally protected habitats which are threatened at an international level.
Special Protection Area	SPA	European (Conservation of Habitats and Species Regulations 2017)	Welsh Government	Legally protected rare bird habitats which are threatened at an international level.
Ramsar sites		International (The Ramsar Convention)	Welsh Government	International protection for rare wetland habitat including marsh, fen, peatland or water. There are just 10 Ramsar sites in Wales.
Site of Special Scientific Interest	SSSI	National	Natural Resources Wales (NRW)	Formally designated as important landscapes to science, this may be due to the presence of rare species, important habitat characteristics or geological features. SSSIs are protected against development and must be managed to protect the feature that has been considered important for science.
Site of Importance for Nature Conservation	SINC	Local	Local authority	Non-statutory designation aimed to safeguard local habitats from planning and development. SINCs can indicate local priority habitats that will benefit from maintenance, habitat enhancements or connectivity provisions.

Detailed information on all Welsh SACs and SSSIs is publicly provided by Natural Resources Wales (NRW) via an online 'protected areas, designated site search': https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en

ANNUAL TIMETABLES FOR HABITAT MANAGEMENT

The annual timetables are intended to accompany the more detailed management practices in the following chapters, to be used as a guide to plan seasonal habitat management works.

- Ideal time to carry activity for the best outcome for biodiversity
- Okay to carry out activity at this time, but it may not be as successful
- Do not carry out activity during this time due to legal requirements or damage caused to biodiversity

Installation	January	February	March	April	May	June	July	August	September	October	November	December
Installling Improvements for Invertebrates												
Meadow Flower Planting												
Bee Hotel												
Large Bug Hotel												
Dead Wood												
Installling Improvements for Amphibians and Reptiles												
Wildlife Pond												
Hibernaculum												
Log Piles												
Installling Improvements for Birds												
Bird Boxes												
Owl Boxes												
Installling Improvements for Mammals												
Hedgerow Planting												
Bat Boxes												
Installling Improvements for Vegetation and Trees												
Tree Planting												

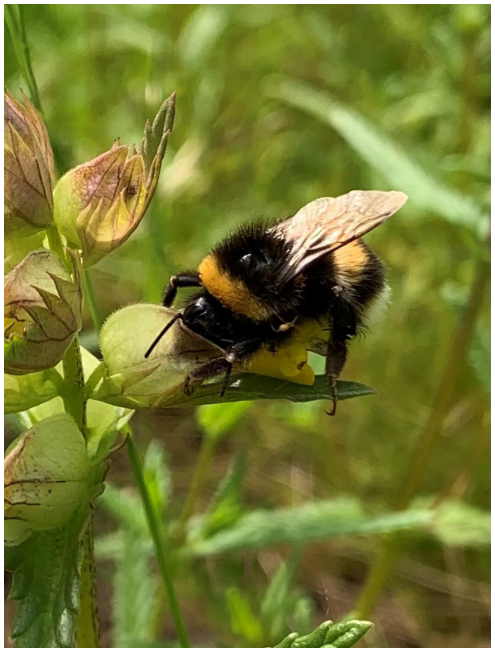
Installation	January	February	March	April	May	June	July	August	September	October	November	December
Maintaining Improvements for Invertebrates												
Mowing												
Clean Bee Hotel												
Add to Large Bug Hotel												
Dead Wood												
Maintaining Improvements for Amphibians and Reptiles												
Wildlife Pond												
Log Piles												
Maintaining Improvements for Birds												
Clean Bird Boxes												
Clean Owl Boxes												
Maintaining Improvements for Mammals												
Formative hedgerow pruning (year 1-2)												
Hedgerow pruning (year 3+)												
Bat Boxes												
Maintaining Improvements for Vegetation and Trees												
Balsam Bashes												
Maintaining Ancient Trees												

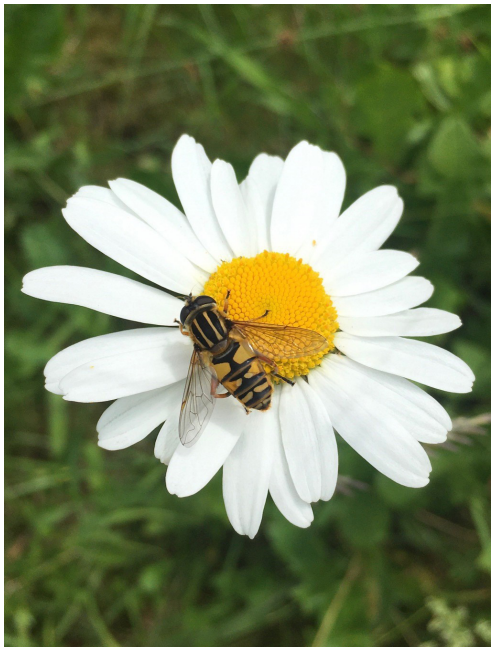
HABITAT MANAGEMENT FOR INVERTEBRATES

Mowing regimes

Reduced mowing increases biodiversity by encouraging meadow flower species and invertebrates, such as butterflies and bees. Wildflower meadows can be created in gardens however, they may take a few years to establish on tightly kept lawns. Different mowing regimes can create temporary meadows, spring meadows or summer meadows. For more information on rewilding your garden visit https://www.rewildingbritain.org.uk/start-rewilding/how-to-make-your-garden-wilder

Biodiversity benefits	Habitat for invertebrates, which are essential pollinators. Invertebrates are a food source for birds.
Temporary meadows	Do not mow in May.
Spring meadows	Do not mow before July and then mow as normal. Spring meadows can benefit from meadow flower planting.
Summer meadows	Mow once in March and then again in August Summer meadows are the most beneficial for biodiversity as they offer sheltered habitat for invertebrates until autumn.
Location	Gardens, parks, lawns and verges.
Maintenance	If you would like the area to look neater consider mowing borders or pathways through the meadow Further information: https://www.rspb.org.uk/get-involved/activities/nature-on-your-doorstep/garden-activities/stop-mowing-your-lawn-for-nature/
Community Engagement	Create meadows in parks and public areas Opportunity to educate community about wildflower meadows, pollinators and important habitats.
Cost	Low.





Nest Boxes and Posts for Solitary Bees

Solitary bees such as mason bees and leaf cutter bees are suffering the effects of habitat loss, especially in urban areas. Female solitary bees lay six to twelve eggs in smooth, hollow tubes during the spring or early summer. They leave pollen and nectar in the cell, which are consumed by larvae when the eggs hatch in the summer. The larvae overwinter as a cocoon and emerge from the cell as an adult bee the following spring. When building or installing a bee box ensure that the tubes or holes are smooth inside so that the bees are not harmed at any stage.

Biodiversity benefits	Nesting sites for solitary bees. Protection for solitary bee nests from mowing and predators.
Timescale	Any time.
Method	Cut hollow bamboo or stems to short lengths and put them in a plant pot. Alternatively, source a bee hotel, made from untreated FSC approved timber or Woodstone.
Location	Sunny spot facing south. Small houses should be 1-3 metres from the ground. To avoid aggression and spread of disease multiple small bee houses spread around an area are better than one large hotel.
Maintenance	Nests should be cleaned out with warm water in the Spring after the adult bees have emerged to reduce the spread of fungi, diseases and parasites.
Community Engagement	Build small bee boxes in plant pots activity. Cleaning out and maintenance. Opportunity to educate community about pollinators, endangered species and important habitats.
Cost	Variable (dependant on materials and supplier)

Community Engagement Case Study

The Great Glamorgan Way team sourced sustainable bee posts made of waste materials from the Cornish China Clay industry. The posts were installed across the Great Glamorgan Way route in primary schools and community areas. Activity sheets were provided to the schools to teach the pupils about solitary bees and how to care for the bee post. This was successful in engaging teachers and pupils with the project and current ecological issues.

Large Bug Hotels

Larger bug hotels can attract a range of invertebrates, reptiles and amphibians, and larger gaps may be made at the base for hedgehogs. Invertebrates play an important role in decomposition, pest control and pollination. Hollow stems and canes can encourage solitary bees whereas other materials will attract other species such as beetles, woodlice and ladybirds. This is an activity that can be easily carried out in schools, parks and gardens at a low cost, to teach children about insects and habitats.

Biodiversity benefits	Nesting sites for invertebrates. Protection for invertebrates from predators and mowing. Increased pollinator population.
Timescale	Any time.
Method	Place a pallet on some bricks to create a sturdy base Collect hollow bamboo canes or drill holes into logs. Stuff these into the pallet with other biodegradable materials e.g. cardboard tubes, bricks, straw and leaves. When the pallet is full, place another pallet on top and repeat. Source some waterproof material for the roof, we secured old roofing tiles to the top using wire. Visit the Great Glamorgan Way website for further instructions: https://greatglamorganway.co.uk/en_gb/projects/build-a-minibeast-hotel-in-your-garden/
Location	Sunny spot facing South, with some shade Choose an area where the bug hotel will not need to be moved e.g. the bottom of your garden.
Maintenance	Add to the bug hotel and create new layers as often as you like. Ensure it remains sturdy for safety reasons.
Community Engagement	Building a bug hotel. Opportunity to educate community about pollinators, endangered species and important habitats.
Cost	Free.

Community Engagement Case Study

The Great Glamorgan Way Project created a large bug hotel with local children at the Vale of Glamorgan agricultural show. The team collected up biodegradable materials such as logs, cardboard tubes, hollow bamboo canes and leaves. The materials were stuffed into pallets to create a bug hotel. We used this opportunity to engage with children and teach them about pollinators and endangered species. With the help of Natural Resources Wales, the team were able to install the minibeast hotel locally, within Hensol Forest SSSI, with the aim of encouraging children to get outdoors.

Tree Stumps and Dead Wood Habitat

Dead wood can support a diversity of beetles and woodlice, amongst other invertebrates. The herbivorous stag beetle is a protected species which feeds on tree sap and breeds in rotting dead wood. Habitat for stag beetles is declining in South Wales due to tree stumps and dead wood being removed from local parks and green spaces. Provisions of dead wood, rotting tree stumps and logs piles for beetle habitat is particularly important in urban areas, where greenspaces are more heavily managed.

Biodiversity benefits	Nesting sites for protected stag beetle Habitat for a range of invertebrates, lichens and fungi.
Timescale	Any time.
Method	Leave deadwood on the ground in woodland areas Leave tree stumps in green spaces Logs can be piled to form suitable habitat.
Location	Sunny areas with some shading Woodland Anywhere would be beneficial.
Maintenance	No maintenance needed.
Community Engagement	Creating log piles in local woodland Opportunity to educate community about invertebrates, endangered species and important habitats.
Cost	Free

HABITAT MANAGEMENT FOR AMPHIBIANS AND REPTILES

Wildlife Ponds

The most successful ponds in attracting native UK biodiversity will be dug and then left to establish, allowing native plants and wildlife to take advantage of the new habitat. Ponds establish quickly, attracting a number or invertebrates such as pond skaters and diving beetles within a few weeks. If the pond is installed correctly in a suitable location, you could expect to observe amphibians such as frogs and newts within the first year.

Biodiversity benefits	Habitat for a range of freshwater macroinvertebrates Habitat for reptiles and amphibians Habitat for invertebrates such as dragonflies and mayflies Larger ponds will provide feeding sites and habitat for birds such as herons, kingfishers and mallards.
Timescale	Autumn - Spring.
Method	To attract a variety of flora and fauna create a pond which is 20-60cm deep in the centre Banks should be gradually sloped Butyl liners are good for smaller ponds but for larger ponds consider natural clay, which is found deep in the soil Use the removed soil to form a sunny bank, hibernaculum or rockery for reptiles and amphibians Further instructions: https://www.wildlifetrusts.org/actions/how-build-pond
Location	Select a low point where a pond would naturally form Choose a sunny spot which is partly shaded as there will be less chance of excessive algal growth and eutrophication A group of smaller ponds is likely to provide greater benefits for biodiversity than one large pond.
Maintenance	Remove excessive aquatic plant growth to reduce the chance of anoxic conditions and eutrophication.
Community Engagement	Building, restoring and maintaining ponds with the local community Opportunity to educate about freshwater habitats and endangered species.
Cost	High.

Hibernaculum

Hibernacula are underground areas where reptiles and amphibians such as snakes, lizards, toads, newts and frogs can overwinter. The underground chambers are made by digging a hole and then filling it with logs, sticks and stones with lots of gaps. The top is then covered over with a mound of soil to provide warmth. Other mammals such as rodents or bats may also seek refuge in a hibernaculum.

Biodiversity benefits	Nesting sites for reptiles and amphibians. Overwintering sites for reptiles and amphibians. Shelter and nesting opportunity for small mammals. Protection from predators and mowing.
Timescale	Any time.
Method	Dig a 50cm deep hole using a spade. Fill the hole with logs, sticks and stones, leaving lots of gaps between them. Cover over with a mound of soil, leaving open gaps in the side or short plastic drainpipes as entrance points. Plant grass or meadow flower seed on the soil mound.
Location	Partly shaded location Near shrubs and vegetation Consider locating in vicinity to a pond to attract amphibians.
Maintenance	When maintaining grass and vegetation around the mound create a gradual increase from short grass to long grasses and vegetation, to shrubs.
Community Engagement	Build a hibernaculum in a public area or park with local residents Opportunity to educate community about reptiles, amphibians, important habitats and protected species.
Cost	Free.

Log Piles

Similar to hibernacula, log piles can create a safe place for reptiles and amphibians to overwinter, commonly providing habitat for common toads. They can also provide an area for invertebrates and for small mammals to hibernate.

Biodiversity benefits	Overwintering sites for reptiles and amphibians. Habitat for invertebrates including stag beetles and small mammals such as hedgehogs. Invertebrates provide a food source for birds.
Timescale	Any time.
Method	Form a pile of logs and fallen deadwood.
Location	Shady areas will create a damp environment, encouraging mosses and fungi. The wood will break down faster encouraging wood-boring species such as stag. Sunny spots will dry out the wood and may attract bees.
Maintenance	As wood begins to rot down add new logs to the pile.
Community Engagement	Build log piles with local community groups and volunteers Opportunity to educate about hibernation and endangered species.
Cost	Free.

HABITAT MANAGEMENT FOR BIRDS

Nest boxes for birds

The UK was once covered with broadleaved woodlands which have mostly been removed due to human activity and land-use change. It is important to provide suitable habitat for woodland birds. Nest boxes are a good way of increasing roosting and nesting sites in areas where there are limited woodlands and broadleaved hedgerows for example, urban areas, parks, and gardens. They will also provide benefits where trees are young and lacking cavities for nesting such as in young or coppiced woodland areas.

Biodiversity benefits	Nesting sites and winter roosts for woodland birds Protection from predators Woodcrete nest boxes will be more durable and long lasting than wooden boxes.
Timescale	Any time (ideally before winter so the box can be used as a winter roost).
Method	Woodstone boxes are the most durable, lasting up to 25 years. Alternatively build or source an untreated, FSC approved wooden box. For more information on building your own wooden nest box visit https://greatglamorganway.co.uk/projects/build-a-nest-box-at-home Install the box facing Northeast to avoid strong sunlight and prevailing winds, using the height recommendations on the right. Birds can be territorial so do not locate nest boxes within 20 metres of another box, to avoid aggression.
Location	Urban areas, parks and gardens.
Maintenance	Do not open the box when birds are nesting (all wild birds and their nests are legally protected in the UK under the Wildlife and Countryside Act 1981) If you would like to watch the nesting process, install a nest box camera before the breeding season Remove the nest during the autumn when the young have fully fledged. Unhatched eggs can legally be removed from September to January Clean the box with boiling water to reduce the chance of spreading parasites between birds. Do not use detergent as this could harm them.
Community Engagement	Monitoring nest boxes with local nature groups Opportunity to educate community about nesting birds and protection.
Cost	Medium cost.

Choosing the right nest box

If you are installing a nest box to attract a specific species, it's important to choose the right next box and install it in the optimum location.

Front opening	Height of nest box (metres)	Potential species attracted
Open Fronted	1 - 2	Robin, blackbird, Eurasian wren
28mm	2 - 4	Blue tit, marsh tit, tree sparrow, coal tit
32mm	2 - 4	Nuthatch, great tit, pied flycatcher
45mm	3+ (attach under eaves of a building)	Starling

Community Engagement Case Study

The Great Glamorgan Way team ran a successful nest box building activity for children at the Vale of Glamorgan Show. The nest boxes were made from untreated, FSC approved wooden kits sourced from the Nestbox Company. The nest boxes included a variety of front openings for different species of birds. For easy identification and monitoring each box was engraved with a number. The nest boxes were then installed in Hensol Forest, where the public can locate them using the GPS co-ordinates and map provided by the project.

The children were taught about different bird boxes so that they could choose which birds they wanted to attract. They were then taught how to use small hand tools and supervised on a one-to-one basis. Due to the popularity of this activity some people unfortunately had to be turned away to maintain a safe working environment. It is recommended that when running this activity individuals are booked into time slots to avoid overcrowding.

By running the activity and creating a map of the bird boxes in situ, we improved community wellbeing by encouraging families to get outdoors. This also proved to be a successful promotional activity for the Great Glamorgan Way, both at the local county show and through the logo on our nest boxes which are installed in a public place on the route.

HABITAT MANAGEMENT FOR MAMMALS

Native Hedgerow Planting for Hazel Dormice (and Woodland Birds)

Biodiversity benefits	Green corridors for endangered hazel dormice Foraging and nesting sites for woodland birds Habitat for invertebrates and pollinators Foraging sites for bats and provision of linear features for echolocation.
Timescale	Plant during November – February.
Method	Remove any existing vegetation and grass to reduce competition Bareroot whips are young, light and easy to plant with minimal tools Create a deep slit in the ground with the head of a spade Insert the whip Compress the earth around the tree Provide about 1 litre of water soon after planting Provide a biodegradable 60cm rabbit guard around each whip to protect from small grazing mammals To provide the greatest benefits for biodiversity plant two parallel rows to create the hedgerow. Three rows are even better but require more space and cost more. The rows should be at least 50cm apart but a larger distance of up to 1 metre will provide the greatest benefits for biodiversity.
Location	Provide a green corridor by connecting existing habitat Connect woodland patches Connect existing mature hedgerows Fill large hedgerow gaps e.g. disused gateways.
Maintenance	Keep the base of the hedge free from weeds for the first 2-3 years, to reduce competition for resources You may wish to add peat free compost or woodchip to the base of your trees to help with weed prevention.
Community Engagement	Volunteer hedgerow planting activity Opportunity to teach about habitats and endangered species.
Cost	High.

Choosing the right hedgerow species

Although most hedging species will provide shelter, specific species bring benefits for different wildlife. When sourcing your trees consider what species are already growing in your local area, as these will likely be the most successful.

Community Engagement Case Study

The Great Glamorgan Way project successfully planted 7000 hedgerow whips across South-Central Wales. That's over 1 mile of native hedgerow! Each hedgerow species was selected for its durability, success as a hedgerow species and benefits for biodiversity. The planting was carried out using a combination of contractors and volunteer days. Volunteer days were a great opportunity to engage local residents with the project as well as helping to improve wellbeing, by completing outdoor physical activity.

Hedgerow planting is a popular volunteer activity and was successful in advertising the project however, it does require purchase of a number of tools such as spades. It is recommended that there is a limit on capacity to retain the safety of volunteers and event organisers.

Nest boxes for bats

Bat boxes provide artificial roosts in areas where natural roosting sites are limited. Bats roost in colonies so it is recommended to install multiple boxes facing different directions in one location, which will allow the bats to select the roost dependant on their optimum temperature conditions. Larger boxes placed in sunnier spots will act as maternity roosts.

It is illegal to deliberately disturb, injure or kill wild bats under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). These regulations also make it illegal to deliberately disturb or restrict access to their roosting, nesting or breeding sites, even if the bats are not present, so do not open a nest box without a licenced bat worker. Selecting an open based nest box will mean that you will not have to open the box to clean it, as waste will drop out of the bottom of the box.

Biodiversity benefits	Roosting sites and maternity roosts for endangered species.
Timescale	Any time.
Method	Source durable Woodstone boxes which can last up to 25 years or FSC approved wooden nest boxes, which will be cheaper but less durable. Attach to a building or tree, at least 4 metres from the ground.
Location	Over 4 metres high In a sunny location facing between Southwest and Southeast Sheltered from strong wind Away from artificial light sources e.g. windows and outdoor lights.
Maintenance	Do not move or open the nest box without a licenced bat worker If the box needs to be moved due for safety reasons such as a falling tree, contact Natural Resources Wales (NRW) or your local bat group for support.
Community Engagement	Building wooden bat boxes with community groups. Opportunity to teach about protected species.
Cost	Medium.

HABITAT MANAGEMENT FOR VEGETATION

Invasive Non-Native Species: Himalayan Balsam Pulls

Himalayan balsam is an invasive non-native species (INNS) in the UK under Schedule 9 of the Wildlife and Countryside Act 1981. Therefore, "it is an offence to plant or otherwise cause to grow these species in the wild." Himalayan balsam spreads quickly as one plant can produce up to 2000 seeds, which are dispersed by up to 7 metres when the seedpods explode. It often grows near rivers which transport the seeds over large distances.

Himalayan balsam can grow up to 2.5 metres during one summer, creating a dense canopy which shades out other native plants, causing them to die. The pink, tubular flowers produce large amounts of nectar and are very attractive to bees, which leads to bees pollinating the balsam whilst neglecting native plant species.

Biodiversity benefits	Decrease competition for native vegetation Reduce shading of native vegetation Remove favoured nectar sources which and encourage bees to pollinate native flora species.
Timescale	April – June. Do not pull from July onwards when the seeds are viable.
Method	Pull the plant up from the roots and crush the roots Visit the Great Glamorgan Way website for further instructions: https://greatglamorganway.co.uk/en_gb/invasive_species/himalayan-balsam/
Location	Himalayan balsam thrives in wet conditions, it is often found growing on riverbanks and wasteland.
Maintenance	Repeat the following year until the patch is completely removed.
Community Engagement	Volunteer 'Balsam Bashes' Opportunity to educate community about invasive species, pollinators, and species competition.
Cost	Free.

Community Engagement Case Study

The Great Glamorgan Way project carried out three volunteers 'Balsam Bashes' in 2022. A large group of people working together to pull the plant up from the root was a time effective way of removing large patches of Himalayan balsam. The activity was low cost and easy to run. The success of the community engagement was evident when volunteers told us that they went on to carry out the activity at home and with their families. Therefore, the few volunteer days that the project provided have in fact had an impact on the wider surrounding area.

Public participation increased as the project continued with many volunteers returning for more. This was a popular activity that largely increased community engagement within the project and promoted wellbeing by encouraging people to go outdoors.

Other Schedule 9 Invasive Non-Native Species

There are a number of invasive non-native species (INNS), listed under schedule 9 of the Wildlife and Countryside act, which are a particular problem in South-Central Wales. Many of these were encountered along the Great Glamorgan Way during ecological surveys, the most common of which are summarised in the table below. Further details on INNS identification and management can be found on the Great Glamorgan Way website (https://greatglamorganway.co.uk/en_gb/ecology/). Some invasives can only be treated by injecting chemicals into the plant or stem, these operations must be carried out by a 'competence for herbicide use' certificate holder. If this is the case, the qualified individual may then compost, bury or burn the blackened stems according to Environment Agency guidance.

Name	Biodiversity Issues	Other Issues	Method	When to Remove	Cost
Giant hogweed (*Heracleum mantegazzianum*)	Large leaves cause a dense canopy which shades out native plants	Touching the plant sap causes photosensitivity to skin, leading to burn like boils when the skin is exposed to sunlight	Cause damage to the central root using the head of a spade For larger plants use chemical herbicides	Treat young foliage in April – May and retreat new growth August - September	Free - High
Himalayan balsam (*Ipatiens glandulifera*)	See previous page		Pull up from the root and crush the roots	April - June	Free
Japanese knotweed (*Reynoutria japonica*)	Grows in dense clumps, so it outcompetes and crowds out native UK plants	Can grow in small crevices, causing structural damage to buildings and roads	Chemical treatment by certificate holder	Any time	High
New Zealand pygmyweed (*Crassula helmsii*)	Fast spreading causing terrestrial and aquatic problems Grows in dense clumps, so it outcompetes and crowds out native freshwater plants	Dense clumps in freshwater systems can cause drainage issues and flooding	Shade with black polythene for around 3 months Fill in the pond and excavate a new one Chemical treatment	Any time	Low - High
Rhododendron	Fast growing, in dense clumps Outcompetes, crowds out and displaces native UK plants Extensive root system and leaf litter are toxic to other plants Carries *Phytophthora* fungus which affects other plants.		Cutting back with chainsaws and heavy machinery Chemical treatment	Any time	Medium - High

HABITAT MANAGEMENT FOR TREES AND SHRUBS

Tree Planting and Orchards

Alongside native hedgerow plating, native trees provide habitat for biodiversity as well as a great community resource.

Biodiversity benefits	Fruit trees produce flowers which are beneficial to pollinators Fruit provides food for invertebrates, birds and mammals Bark and roots provide nesting sites.
Timescale	November - February.
Method	Source locally produced, native fruit trees Remove any existing vegetation and grass to reduce competition Dig a hole which is a suitable size for the trees root system Ensure that the roots can be spread out Fill the hole back in with the soi which has been removed Compress the earth around the tree Provide about 1 litre of water soon after planting For small trees provide a biodegradable 60cm rabbit guard to protect from small grazing mammals. Consider fencing larger trees to protect from deer and livestock grazing. It can take several years for trees to fully establish and produce a large yield of fruit.
Location	Any location which will can remain as a long term orchard.
Maintenance	Clear vegetation away from the base of the tree to reduce competition. A mixture of tree types will require less maintenance.
Community Engagement	Educating community about sustainable and seasonal food resources Educating community about caring for an orchard.
Cost	High.

Maintaining Ancient and Veteran Trees

Deadwood, decaying bark and complex roots associated with ancient trees provide important habitat for a diversity of fungi, mosses, liverworts and lichen. *Parmelia minarum* is a rare lichen found on ancient Beech and Oak trees. The deadwood, fungi and lichen can support a wide range of invertebrates, especially wood-boring beetles and flies. Endangered species include stag beetles.

Cracks and crevices which form in the bark with age, form suitable nesting sites for bats and many woodland bird species. The diversity of invertebrates living within the tree bark, and it's associated fungi and lichen, provide a food source for bats and woodland birds.

Biodiversity benefits	Increased nesting and roosting sites for bats and birds Habitat for rare fungi and lichen, associated with long lasting habitat characteristics Habitat for invertebrates and rare beetles.
Timescale	Any time.
Method	Read the Woodland Trust tree inventory for species specifications; https://ati.woodlandtrust.org.uk/how-to-record/species-guides/ Measure the diameter of the tree trunk and take photos Record any possible ancient trees to the Woodland Trust
Location	Any.
Maintenance	Leave ancient trees in situ so that they can continue to provide valuable habitat, associated with the long term environment they provide.
Community Engagement	Educating community about how to identify ancient trees.
Cost	Free.

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