Wye Valley
National Landscape

Woodland Butterfly Assemblage

Species Action Plan 2024 – 2029

To Accompany the

Wye Valley National Landscape Nature Recovery Plan

Dyffryn Gwy
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Wye Valley
National Landscape

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1. Background

In 2019, set against a backdrop of unprecedented concern for the future of the natural world, the National Association for Areas of Outstanding Natural Beauty (NAAONB) set in motion plans to significantly increase the scale and pace of nature conservation activity in Areas of Outstanding Natural Beauty (AONB's). The Wye Valley AONB Partnership, along with AONB's across the UK, signed up to the Colchester Declaration. This is an ambitious plan to recover nature in and beyond protected landscapes, build climate resilience and enhance engagement with people. Rebranding has since taken place and AONBs are now known as National Landscapes.

As part of this effort, each National Landscape has committed to adopting an IUCN threatened, or locally threatened, species and preparing and delivering a Species Action Plan, in the hope that by 2030 at least 30 species relevant to AONB's can be removed from the threatened list (NAAONB, 2019). The Wye Valley National Landscape has committed to adopting 5 locally significant species, each of which represent one of the AONB's Special Qualities, and/or indicate the health of a well-connected landscape. A woodland butterfly assemblage has been chosen to encourage sustainable woodland management, to support these species and increase the diversity within our wooded areas. Our woodland butterfly assemblage encompasses all woodland butterflies, but with a particular interest in locally distinctive and rare butterflies including the Wood white and pearl-bordered fritillary.

2. Introduction

The Wood white butterfly (*Leptidea sinapis*) is an endangered species which has faced an 82% decline in abundance between 1979 and 2019 and a 77% decline in its distribution (Butterfly Conservation, 2022). It is distinguished by its delicate white wings with subtle markings (as seen in figure 1). This butterfly inhabits sheltered environments, such as woodland glades or scrub and has been found in a few known locations across the Wye Valley National Landscape; notably Haugh Wood near Woolhope. The Wood white, like many other woodland butterfly species, faces significant threats such as habitat loss, degradation, and climate change.

Figure 1: The Wood white (Source – Butterfly Conservation, 2024)

The Wood white is a double-brooded species in the UK, producing two generations each year. The first brood typically emerges from late May to early June, with a second brood appearing in late July

to early August, particularly in southern regions. These broods can be distinguished by subtle differences in size and wing markings. The presence and success of the second brood can vary depending on location and weather conditions (UK Butterflies, n.d. 2025). Land management activities such as ride and glade management have important implications for the Wood White's bivoltine lifecycle, as poorly timed interventions can disrupt the second brood during key flight or breeding periods.

The Wood white's lifecycle (as seen within Figure 2) begins with the female laying her eggs on the caterpillar (larval) foodplant, which includes meadow vetchling (*Lathyrus pratensis*), bitter vetch (*Lathyrus linifolius)*, greater bird's foot trefoil (*Lotus pedunculatus*), bird's foot trefoil (*Lotus corniculatus*) and other leguminous plants (Warren and Bourn, 1998). The caterpillars grow from the eggs before overwintering in the chrysalis stage. In May the adult butterflies emerge, their upper wings are white with rounded edges and the males have a black mark on the edge of the forewing. Their undersides are white, with indistinct grey markings.

Figure 2: The Wood white lifecycle (Source – Butterfly Conservation, 2024)

The Wood white has a distinctive, slow flight pattern and stays close to the ground. It flutters delicately amongst woodland ride vegetation and scrub edges. The Wood white breeds in tall grassland or light scrub, in partially shaded or edge habitats. In Britain, most colonies breed in woodland rides and clearings, though a few large colonies occur on coastal undercliffs. A few smaller colonies also occur on disused railway lines and around rough, overgrown field edges (Butterfly Conservation, 2024).

The other butterfly specifically considered within this action plan is the Pearl-bordered Fritillary (*Boloria euphrosyne*). This species is one of the earliest fritillaries to emerge, typically on the wing from late April to June, and can be found in woodland clearings, sunny glades, or rough hillsides with bracken (Butterfly Conservation, 2024). The butterfly is often observed flying low to the ground, pausing to feed on nectar from spring flowers such as Bugle (*Ajuga reptans*). It can be distinguished by its two large silver 'pearls' and a row of seven outer 'pearls' on the underside of the hind wing, with red chevrons around the outer pearls and a small central spot on the hind wing.

Figure 3: The Pearl-bordered Fritillary (Source – Butterfly Conservation, 2024)

The Pearl-bordered Fritillary is distributed across western and northern England, Wales, and Scotland, thriving in ancient woodland and upland habitats. Within Wales, it is primarily associated with habitats such as well-drained woodlands and coppiced areas where bracken and violets coexist. Its distribution in Wales has been increasingly fragmented due to habitat loss and changes in land management, including the decline of traditional woodland practices such as coppicing and controlled grazing.

The species' lifecycle is closely tied to its habitat and larval food plants. Adults emerge in spring to lay pale-yellow eggs near the common dog-violet (*Viola riviniana*), a key larval food plant. The eggs hatch after 10 to 14 days, and the caterpillars feed on violet leaves before hibernating in leaf litter during the winter. They resume feeding in early spring and pupate among the litter, with adults emerging shortly thereafter to begin the next generation.

The Pearl-bordered Fritillary faces several conservation challenges, including the degradation and loss of suitable habitats due to afforestation, changes in woodland management, and agricultural intensification. The re-establishment of traditional management practices, such as coppicing and rotational grazing, is vital for maintaining the open, sunny conditions required by the species and violets. The Pearl-bordered Fritillary was known as the woodman's friend, as it used to follow the woodworkers in the woods as they cleared areas for coppice. This butterfly is often confused with the Small Pearl-bordered Fritillary (*Boloria selene*), which has smaller, more uniform silver markings and prefers wetter habitats like marshy grasslands. The Small Pearl-bordered Fritillary also emerges slightly later in the season.

3. Current Status

The State of Nature Report 2023 demonstrates that the specialist butterflies indicator ended 18% below its starting value with the greatest change in the 1970s.

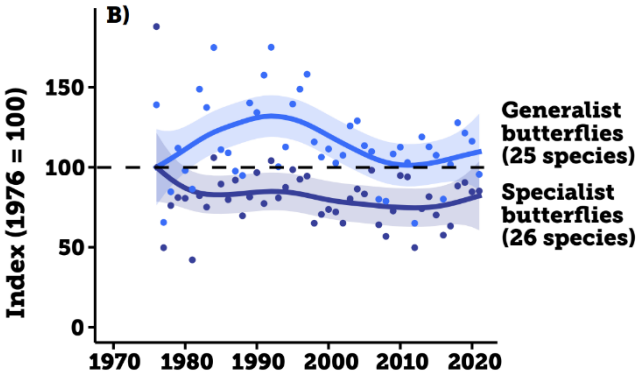

Figure 4: Change in average species' abundance in the UK (Source – State of Nature Report, 2023)

We have 55 species of butterfly in the UK (with a few more, occasional migrants), and the Wood white butterfly is one of the rarest and most threatened species (Butterfly Conservation, 2024). According to the revised Red List of British Butterflies (Fox et al., 2022) the Wood white is classified as endangered.

In Britain, the Wood white was formerly widely distributed in England as far north as Cumbria and in parts of south-east and north-west Wales. However, it has undergone a serious decline over the last 150 years and is now extinct in many northern and eastern counties (Warren and Bourn, 1998). As previously mentioned the Wood white butterfly has faced an 88% decline in abundance between 1976 and 2014, and an 89% decline in its distribution. Concern about the plight of the Wood white led to the production of a dossier in 2010, giving a snapshot of the species' status. Worryingly just 50 extant sites were identified, of which 13 may already have lost their colonies (Butterfly Conservation, 2024).

The Pearl-bordered Fritillary is classified as a priority species under the UK Biodiversity Action Plan and is listed as Near Threatened on the IUCN Red list for Britain. While it is not currently considered endangered, it has experienced significant declines in distribution and abundance due to habitat loss, changes in woodland management and the abandonment of traditional grazing practices. Between 1976 and 2019, its abundance decreased by approximately 34%, and its distribution at 88% (Butterfly Conservation, 2024). Historically widespread across the United Kingdom, the Pearl-bordered fritillary is now primarily found in western Scotland, parts of Wales, and localised areas in England, reflecting a significant decline in its distribution (Trees for Life, 2024).

4. Current Factors Affecting the Species

The Wood white and other woodland butterflies have suffered significant habitat loss and fragmentation, with the decline of traditional coppicing in woodlands which has led to increased shade levels, following neglect or conversion to high forest systems. In the past, it seems likely that the Wood white was associated with coppicing which naturally created a range of shade conditions and a continuity of suitable edge habitat (Warren and Bourn, 1998). However, most woods where the butterfly survives are no longer coppiced and suitable habitat is only perpetuated in larger woods where there is a regular cycle of clear-felling and re-planting, or deliberate conservation management of wide rides (as seen in Figure 5).

Figure 5: Woodland ride in Haugh Wood, Herefordshire created for conservation purposes.

In Britain the Wood white traditionally bred in ancient deciduous woodland that had a long history of coppicing. The number of Wood white colonies rapidly declined in size and number as traditional coppicing ceased at most woodland sites (Worcestershire Biodiversity Partnership, 2018). The loss of ancient woodland and re-planting of ancient woodland with conifers has also affected the population. The even-aged nature of many existing woodland sites (the majority of which were extensively re-planted in the 1950s and 1960s) has increased shade levels in woodland rides above the Wood white's 50% threshold.

This fragmentation of woodland habitats (from densely shaded areas) can isolate populations of the Wood white butterfly, reduce genetic diversity, and hinder dispersal between suitable habitat patches due to their limited flight distance (further discussed below). Fragmentation can also increase the vulnerability of populations to environmental disturbances and limit their ability to adapt to changing conditions.

The Pearl-bordered Fritillary (*Boloria euphrosyne*) in the UK is also significantly affected by habitat loss and fragmentation, particularly due to the decline of traditional woodland management practices such as coppicing. Similar to the Wood white, the Pearl-bordered Fritillary historically thrived in woodlands with a range of habitat conditions created by periodic coppicing. The cessation of coppicing has resulted in increased shading of woodland clearings, reducing the availability of sunny areas required for the butterfly's life cycle, particularly for egg-laying and larval feeding on dog-violet (*Viola riviniana*) (Butterfly Conservation, 2024).

Much like the Wood white, the Pearl-bordered Fritillary now survives mainly in larger woodlands where there is either a regular cycle of clear-felling and replanting or deliberate conservation management of wide rides to maintain appropriate light levels (Warren and Bourn, 1998). The loss of ancient deciduous woodlands, combined with the re-planting of these areas with conifers, has further reduced suitable habitats, as conifer plantations create dense, shaded environments unsuitable for the fritillary. The increased shade in many re-planted woods, particularly those created in the 1950s and 1960s, has led to a reduction in available habitat and further fragmentation of populations.

This fragmentation can isolate colonies, reducing genetic diversity and hindering dispersal due to the butterfly's limited flight range. Populations in isolated patches are more vulnerable to environmental

disturbances and face challenges adapting to changing conditions, which further threatens their survival. In addition to habitat degradation, other factors such as agricultural intensification, the loss of unimproved grassland, and insufficient management of woodland rides for long-term habitat continuity compound the challenges faced by the Pearl-bordered Fritillary (UK Butterfly Monitoring Scheme, 2024). Effective conservation efforts are therefore critical in reversing these trends and maintaining suitable habitats for the species.

4.1 Haugh Wood Study

A study into the Wood white was conducted at Haugh Wood in the north of the Wye Valley National Landscape in Herefordshire (Clarke et al., 2011) which looked into the egg-laying habitat and adult dispersal in the area. Haugh Wood is a 350-hectare mixed woodland and designated Site of Special Scientific Interest (SSSI). Research was also conducted at the Wigmore Rolls woodland in the north of Herefordshire (outside of the Wye Valley National Landscape).

At Haugh Wood the population of adults were concentrated in one area in the north and one area in the very south of the wood. These areas were approximately 850 m apart at the closest point and much of the intervening habitat consisted of mature closed-canopy plantations with shady rides which supported only limited potential food-plants. A well shaded public road was a further potential habitat barrier, separating the north and south of the wood.

The results of a mark-recapture study which was undertaken as part of this research concluded that 75% of all individuals have observed ranges less than 400 m, suggesting that most individuals seem to remain within a limited area. Nevertheless, some individuals (mainly males) do undertake long directional movements (with a maximum distance of 2 km measured during this study), searching for mating opportunities.

A key objective for this study was to assess the ability of the Wood white to reach patches of new habitat. These findings at Haugh Wood suggest that although there is a strong tendency for adults to remain within a habitat patch, a proportion of both sexes do disperse. Potential habitat barriers such as shaded rides without nectar or food-plants, mature woodland or roads can be crossed, although the potential for crossing areas of totally unsuitable landscape such as arable land was not investigated.

Males seem to be able to move between areas that are 2 km or more apart, but females may have a more limited range. This study suggests that any newly available habitat within 400 or 500 m of present habitat will probably be found quickly by both males and females, but areas more than 1 km from suitable habitat would have a lower probability of rapid colonisation. Almost certainly much would depend on the intervening habitat, but this study suggests that if, even sub-optimal habitat, can be created to make ‘‘stepping stones’’ then the Wood white is very capable of colonising areas more than 1 km in distance.

The study observed that newly created clearings at Haugh Wood had a low abundance of larval food-plants, particularly violets, which are essential for the survival of the Wood white butterfly. This limited availability of food-plants likely restricted the ability of these areas to support a viable population. However, the study suggested that as these clearings continue to develop and vegetation regenerates, the abundance of food-plants could increase, making the areas more suitable for future

colonisation by the butterfly. Effective habitat management, including promoting the growth of larval food-plants and creating stepping stones, will be crucial for the long-term survival and expansion of the Wood white population at Haugh Wood.

5. Current Initiatives

5.1 Local protection, site management and programs of action

Butterfly Conservation have run several Wood white conservation projects across the UK, notably the Woodland Wings Project (2017-2020) and Saving the Wood white butterfly in the South East (2019-2022). These projects concentrated on managing the existing habitat of Wood white hotspots as seen in Figure 6 (including sites in the ancient woodlands of the Yardley Whittlewood Ridge in Northamptonshire, and the Weald area in South East England), creating new suitable habitat and raising awareness though public engagement (Figures 7 & 8). There was also a focus on monitoring the butterfly and moth populations as the projects progressed to enhance understanding of the Wood white and its dispersal and colonisation ability.

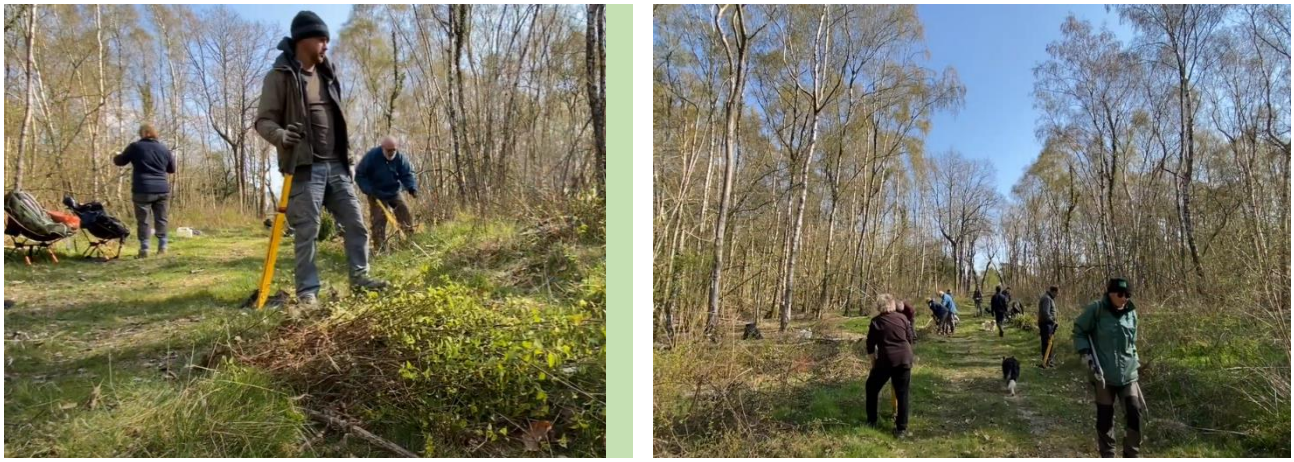

Figure 7: Volunteers managing woodland ride edges (Source – Butterfly Conservation, Saving the Wood white butterfly in the South East, 2024)

Figure 8: Community engagement (Source – Butterfly Conservation, Saving the Wood white butterfly in the South East, 2024)


Figure 9: Guided walks (Source – Butterfly Conservation, Saving the Wood white butterfly in the South East, 2024)

The 'Making A Stand For The Wood white' project employs several key methods to restore habitats. These include creating sunny woodland rides and glades for egg-laying and feeding, coppicing, and clearing overgrown areas to prevent shade and promote the growth of food plants like violets. The project also creates "stepping stones" of suitable habitat to improve connectivity between fragmented populations, allowing for easier dispersal and colonization of new areas. Regular monitoring tracks population success, and the project engages local landowners to ensure compatibility with land use. Additionally, it aims to oversee the reintroduction of the Wood white at four woodland sites over the next three years, further supporting recovery and expansion (Butterfly Conservation, 2024).

Forestry England has undertaken several important conservation projects at Haugh Wood. The projects primarily focus on habitat restoration and management to support rare butterfly species, including the Wood white. Key activities include coppicing and the creation of sunny woodland rides and glades, which are vital for butterflies that need open, sunny areas for egg-laying and feeding. By restoring these habitats, Forestry England enhances the conditions for butterfly species that rely on specific vegetation, such as violets, for survival. The creation of waymarked butterfly trails also encourages public engagement and education about the woodland's biodiversity.

5.2. Surveys, research and monitoring

The United Kingdom Butterfly Monitoring Scheme (UKBMS) is a long-running national monitoring initiative designed to track butterfly populations across the UK. Established in 1976, the scheme involves a network of trained volunteers who conduct regular butterfly counts at specific sites throughout the country. The monitoring takes place at standard locations, known as transects, where volunteers walk predetermined routes and count butterflies during the summer months.
The data collected through the UKBMS provides detailed information on the abundance and distribution of butterfly species, allowing scientists to monitor population trends over time. This long-term dataset is crucial for understanding how environmental factors, such as climate change and habitat loss, affect butterfly populations. The UKBMS is widely regarded as one of the most comprehensive butterfly monitoring schemes in the world and plays a central role in informing conservation efforts. The results help guide habitat management practices and support the identification of species and areas in need of protection.

The Butterflies for the New Millennium (BNM) recording scheme is a long-term citizen science project launched in 1995 by Butterfly Conservation, aimed at monitoring butterfly populations across the UK. The scheme focuses on collecting data about the distribution and abundance of butterflies, providing valuable information on species trends and supporting conservation efforts. Volunteers across the country are encouraged to record sightings of butterflies, contributing to a nationwide effort to map species distribution and monitor changes over time. The data collected through the BNM scheme has been used to track the impacts of climate change, habitat loss, and other environmental factors on butterfly populations. The scheme also helps to identify conservation priorities, informing habitat restoration efforts and species protection strategies. As one of the largest and most comprehensive butterfly recording initiatives in the UK, the BNM scheme has played a crucial role in advancing butterfly conservation by providing insights into the state of butterfly populations and the health of the broader environment.

The iRecord Butterflies app is a mobile application developed by Butterfly Conservation, in partnership with other organizations, to facilitate the recording and reporting of butterfly sightings across the UK. Launched to support citizen science, the app allows users to easily submit their butterfly observations, contributing valuable data to monitoring programs like the BNM recording scheme. The app provides users with an accessible way to log their sightings, including details on species, location, and date, helping to build an up-to-date picture of butterfly distribution and abundance. The iRecord Butterflies app also offers identification guides, making it easier for both amateur and experienced butterfly watchers to report accurate information. The data gathered through the app is used to inform conservation efforts, track population trends, and support the identification of areas where targeted habitat management may be needed to protect vulnerable species.

The Garden Butterfly Survey is a citizen science initiative run by Butterfly Conservation, aimed at monitoring butterfly populations in garden environments across the UK. Launched in 2009, the survey encourages individuals to observe and record butterflies in their gardens during the summer months. Participants are asked to count and identify butterflies in their gardens over a set period, typically once a week, and report their findings through an online portal. The data collected through the Garden Butterfly Survey provides valuable insights into how butterfly populations are responding to changes in urban and suburban habitats, such as shifts in plant availability, climate, and garden management practices. By focusing on gardens, the survey helps to fill gaps in national monitoring efforts, especially for species that thrive in human-modified landscapes. The survey also helps to raise awareness about the importance of creating butterfly-friendly habitats and promotes actions such as planting nectar-rich flowers and reducing pesticide use.

5.3. Key Practices and Considerations

5.3.1 Bracken Management for Pearl-bordered Fritillary Habitat

Bracken is a vital component of suitable habitat for the Pearl-bordered Fritillary and should be managed carefully, not eradicated. In woodland settings, Bracken-dominated clearings and rides provide ideal breeding conditions, especially when the Bracken is sparse and interspersed with violets—particularly Common Dog-violet, the butterfly's primary larval food plant. The Pearl-bordered Fritillary requires areas with warm, dry microclimates, and Bracken litter plays a key role in creating these conditions by forming insulating layers of dead fronds that retain warmth and shelter the violets

used by caterpillars. While dense Bracken stands can suppress ground flora and reduce habitat quality, light Bracken cover in sunlit areas can offer an excellent structural matrix for both food plants and shelter. Management should aim to thin Bracken mechanically or by grazing, avoiding total removal, to create a patchy sward of Bracken, grasses, and violets. Ensuring a mosaic of vegetation height and maintaining leaf litter continuity is essential. This approach supports larval development, aids adult thermoregulation, and encourages connectivity between breeding sites—critical for sustaining metapopulations across woodland landscapes.

5.3.2 Coppicing and Deer Management

Coppicing is a traditional woodland management technique that creates a dynamic, structural diversity within woodlands—essential for many threatened butterflies such as the Pearl-bordered Fritillary and the Wood White. These species rely on the open, sunny conditions found in early-stage coppice, where nectar sources and larval food plants can thrive. However, in areas with high deer populations, the regrowth of coppiced stools is often severely hindered by browsing, which can undermine habitat restoration efforts. Deer can strip young shoots before they establish, reducing ground flora diversity and shading out vital food plants like violets and legumes. To ensure successful coppice regeneration, protective measures must be integrated into management efforts. These can include deer fencing, the strategic placement of brash over stools, or the use of natural barriers. Funding for coppicing must also account for these additional measures, as they are critical to maintaining habitat quality over time. Without adequate deer management, coppicing may fail to deliver the conditions required for butterflies to breed, feed, and disperse effectively within woodland landscapes (Clark et al, 2011).

Beyond coppiced areas, deer influence the broader woodland ecosystem in ways that can significantly affect butterflies and other wildlife. High deer densities can lead to the removal of the shrub layer, altered tree species composition, and suppressed natural regeneration—consequences that reduce the structural and botanical diversity essential for woodland Lepidoptera. In contrast, low levels of browsing can sometimes be beneficial, particularly in maintaining open glades or suppressing dense scrub. In some cases, slower regrowth in lightly browsed coppice can extend the period during which conditions remain suitable for species like the Pearl-bordered Fritillary. However, these outcomes require careful monitoring, as prolonged browsing can also shift vegetation towards species-poor, grass-dominated swards. Additionally, deer grazing on key nectar and larval plants—such as Bramble for many invertebrates and Honeysuckle for the White Admiral—can directly reduce butterfly breeding success. Where impacts are severe, integrated strategies may be necessary, including large-coupe cutting to deter browsing, coordinated action across landholdings, selective culling, and well-designed fencing. Ultimately, deer management should be tailored to support woodland habitat goals, ensuring the delicate balance needed to sustain diverse butterfly communities (Clark et al, 2011).

5.3.3 Bramble Management

As a prolific nectar source, Bramble flowers support a wide array of pollinators and are frequently visited by adult butterflies throughout the summer. The plant also provides essential cover and foraging habitat for other woodland species, including Dormice. However, without careful management, Bramble can quickly become dominant—particularly in the years following coppicing—forming dense thickets that outcompete key ground flora such as violets, which are critical larval food plants for both the Pearl-bordered Fritillary and Wood White (Clark et al., 2011).

To prevent Bramble from suppressing these important food plants, it is essential to include Bramble control within wider woodland management plans. This is particularly important in coppice coupes and along rides and glades, where Bramble can quickly colonise newly open ground and reduce floral diversity. Rotational cutting of Bramble, ideally timed to avoid the flowering period, can help maintain a mosaic of low, flower-rich vegetation and open conditions needed by early successional butterfly species. Ride and glade management should similarly be informed by Bramble growth, ensuring these linear features remain open, sunny, and diverse in ground flora. While high deer densities can cause damage to woodland structure, light browsing may incidentally help suppress excessive Bramble growth, providing a useful ecological service in some contexts. As with all components of butterfly habitat management, the goal is not eradication but balance—ensuring that Bramble remains part of a diverse, structured woodland landscape that supports a wide range of Lepidoptera and associated species.

5.3.4 Invasive Species Management

Invasive species pose a significant threat to woodland biodiversity in the Wye Valley National Landscape, particularly impacting specialist butterflies like the Pearl-bordered Fritillary and the Wood White. Invasive non-native plants such as Rhododendron ponticum, Cherry Laurel (Prunus laurocerasus), and Himalayan Balsam (Impatiens glandulifera) can rapidly outcompete native ground flora, including violets and legumes essential for butterfly larvae (Natural Resources Wales, 2023). These dense, shade-casting species suppress light levels and limit floral diversity, undermining the early successional conditions vital for many woodland butterflies (Wye Valley National Landscape, 2025).

Invasive animals also contribute to habitat degradation. Grey Squirrels (Sciurus carolinensis) strip bark and damage regrowth in coppice woodlands, while Muntjac Deer (Muntiacus reevesi) browse heavily on young vegetation, disrupting natural regeneration processes. Such pressures can drastically alter woodland structure, delaying or preventing the development of open glades and rides that butterflies depend on (Woodland Trust, 2025).

To mitigate these impacts, coordinated, landscape-scale action is essential. Active monitoring and targeted removal of invasive species, combined with ongoing habitat management, will help ensure that butterfly populations can thrive within this nationally important landscape.

5.3.5 Scalloping and Ride and Glade Management

Effective ride and glade management is a cornerstone of woodland butterfly conservation in the Wye Valley National Landscape, providing the warm, sheltered conditions and diverse vegetation structure required by species such as the Pearl-bordered Fritillary, Wood White, and other specialist invertebrates. To maximise the ecological value of these features, scalloping—cutting wide, gently curving bays into the edges of rides and glades—should be incorporated into management plans. This approach breaks up harsh, linear woodland edges, creating a greater variety of microhabitats and increasing edge length, which in turn supports a wider range of nectar sources, larval food plants, and basking sites.

Furthermore, connecting rides and glades within a woodland is highly beneficial, as continuous or linked open habitat allows butterflies to disperse more easily between breeding areas, enhancing metapopulation resilience. Joined networks of open space also benefit other invertebrates, birds, and flora that depend on light and structural diversity. Management should therefore aim to create and

maintain a mosaic of scalloped rides and interconnected glades through rotational cutting, selective tree removal, and control of aggressive vegetation such as Bramble where it threatens floral diversity. This targeted habitat connectivity strengthens ecological networks and ensures woodland butterflies can thrive in a changing landscape (Clark et al., 2011).

6. Conservation Visions

To enhance opportunities for the Wood white, Pearl-bordered Fritillary and other woodland butterflies across the Wye Valley National Landscape:

- Working with partners and landowners to ensure that woodland butterfly habitat is considered within all management decision making.

More potential habitat to be created and connected to enhance opportunities for the Wood white, Pearl-bordered Fritillary and other woodland butterflies within the Wye Valley National Landscape:

- Working with partners, landowners and stakeholders to expand and join up new habitat in the Wye Valley National Landscape including establishing rides and glades in new and existing woodland, and managing scrub.

To see a sustainable increase in the Wood white, Pearl-bordered Fritillary and other woodland butterfly populations across the Wye Valley National Landscape:

- Encouraging stakeholders to undertake surveys to determine woodland butterfly populations and monitor the progress of conservation efforts. Collate survey data in map format.

7. Conservation Actions

ACTION	HOW
Raise awareness of the decline of woodland butterflies and the potential for a recovery in their numbers through appropriate action.	- Host events, visits, talks and workshops for the general public, schools and/or established community groups. - Work with partners and groups to spread the message. -Use butterflies as the indicators of good woodland management. - Promote good practices relating to habitat management for woodland butterflies.
Monitor the population of the Wood white, Pearl-bordered Fritillary and other woodland butterflies.	-Offer training programs to equip volunteers and landowners with necessary skills for effective monitoring. - Encourage partners, volunteers and the general public to carry out surveys (at known established sites and potential new sites). - Record signs and sightings of butterflies, and submit records to the relevant local environmental records centre.

	-Incorporate specialist surveys targeting the Wood white and Pearl-bordered Fritillary. -Explore opportunities to conduct eDNA surveys to identify the various species present before and after restoration and enhancement work. -Collaborate with researchers and conservationists to assess quality of habitats for target species. -Map and demonstrate current distribution of Wood White, Pearl-bordered Fritillary and other Woodland butterflies to get baseline data.
Encourage habitat connection through management of woodland ride edges, creation of new woodland rides and glades and encouraging suitable habitat into new woodland planting.	- Work with farmers and landowners to encourage good woodland management practices to improve habitat connectivity. -Provide farmers and landowners with guidance and advisory resources. -Encourage landowners to create new woodland rides and glades to connect isolated habitats. -Collaborate with experts to design and implement effective ride and glade management strategies. -Encourage and facilitate long term management to prevent overgrowth. -Run awareness campaigns to educate farmers, landowners and the public about the importance of managing ridge edges and glade creation. - Encourage the inclusion of rides, glades and open habitats into new woodland design plans.
Encourage farmers and landowners to adopt good woodland management practices.	-Provide farmers and landowners with woodland management guidance and advisory resources. -Signpost towards grants and other financial support for landowners interested in environmentally friendly woodland management practices. -Foster collaboration between landowners, conservation organisations and local authorities. -Offer practical training sessions on the implementation of good woodland management techniques. -Recognise and celebrate landowners who adopt sustainable woodland practices through awards, certification schemes or publicity. Use sites as case studies for other landowners to visit.
Encourage communities to better manage their gardens and urban areas for butterflies.	-Engage local media to highlight conservation efforts and the importance of woodland butterfly populations. -Develop and distribute a local butterfly guide that highlights key species. -Establish a 'butterfly champions' network to encourage community engagement.

8. Role of the Wye Valley National Landscape Team

- Support, advise, facilitate and co-ordinate conservation action for the Wood white, Pearl bordered fritillary and other woodland butterflies, both leading on and through partnerships with other stakeholders.
- Engage with and support landowners and managers, encouraging best practice in managing and creating butterfly habitat to enhance opportunities for populations.
- Promote woodland butterfly conservation within other wildlife conservation organisations and encourage the provision of advice to the general public and practical support for landowners.
- Enthuse the general public to take part in surveying and providing records of butterfly sightings.
- Monitor habitat extent and butterfly populations, to enable progress reporting.
- Encourage the planting of new woodland where it doesn't conflict with other Special Qualities of the National Landscape, and encourage the creation of suitable woodland butterfly habitat within it.

9. Marking Progress

We will mark progress through:

- Woodland butterfly records: When there are more records of woodland butterflies in the National Landscape, indicating a population increase or an improvement in survey efforts.

- Woodland butterfly habitat: When there is more available habitat and better connectivity in the National Landscape where woodland butterflies are being recorded, indicating opportunities for the expansion in range of woodland butterfly species.

- Woodland butterfly measures: When new measures are successfully implemented to support woodland butterflies e.g. more woodland rides restored and created.

- Woodland butterfly understanding and conservation efforts: When information about woodland butterflies is widely available to everybody, and their habitat in the National Landscape is being enhanced.

10. References and further information

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