WOODLAND TRUST

Wood Wise

Autumn 2013

Woodland Conservation News

Woodland management for sun-loving butterflies

Blean Woods: heath fritillary – George Henry Wood: habitat creation – Heartwood: habitat creation & monitoring – Scotland: pearl-bordered fritillary & chequered skipper – South East Woodlands Project: pearl-bordered fritillary & Duke of Burgundy – Stratton Wood: small blue

Comma

Woodland & Butterflies

Peacock northeastwildlife.co.uk

Woodland offers a complexity of structure that supports a wide variety of species, perhaps more than any other terrestrial habitat in the UK. Butterflies are among the most iconic of these, yet many have suffered severe declines in recent times. This has been linked to a drop off in the use of woods and trees by humans.

In decline

The pearl-bordered fritillary has declined in distribution by 77 per cent and the Duke of Burgundy by 65 per cent since the 1970s. Both are colonisers of the early successional conditions provided by active management, such as coppicing. As traditional practices such as this died out, and indeed the active management of woods in general declined across the UK, many species that benefit from them have suffered.

Butterflies are increasingly being recognised as valuable ecological indicators. Due to their short life spans, foodplant specialisation, limited dispersal capabilities and reliance on climatic conditions, they are sensitive to environmental change and react rapidly to it. This makes them good representatives of the effects of such change on other species.

Habitat needs

Butterflies are day-flying heliophiles that require specific niche conditions and foodplants to prosper, but these can differ between species. Actions taken to benefit a suite of butterflies can have positive effects on many other plants and animals in woodland and other habitats. Most actions involve increasing the amount of sunlight and food sources available to them.

On the other side of the Lepidoptera argument, a recent study[i] showed a large percentage of woodland macro-moths are found in the darker cores of high forest habitats. Although the majority of the rare and declining moth species were also in the managed areas, as opposed to a large proportion of more generalist moths found in both the light and the darker areas. Moths, like butterflies, are cold-blooded and depend on external heat sources, but most moths are nocturnal and at night open areas lose their heat more quickly than those enclosed by trees. By remaining in the shelter of the wood it is thought moths utilise that retained heat, whereas butterflies are able to directly use the sun's heat during the day so favour more open areas.

Butterfly conservation

Many conservation organisations work to support Lepidoptera, and other pollinators. Among them Butterfly Conservation has been the strongest voice and has worked in partnership with a great many others, including the Woodland Trust, to safeguard the future of the UK's butterflies and moths.

The following case studies specifically focus on work to enhance predominantly sun-loving butterfly and moth numbers that are otherwise in rapid decline in woodland. Work such as this creates a more varied structure, a requirement that has been demonstrated for a range of species. However, there is a need to combine darker, core habitats with lighter edge and open space habitats to satisfy all woodland species' needs.

[i] Merckx, T., Feber, R., Hoare, D., Parsons, M., Kelly, C., Bourn, N. & MacDonald, D. (2012). Conserving threatened Lepidoptera: Towards an effective woodland management policy in landscapes under intense human land-use. *Biological Conservation, 149, p32-39.* ***http://theoeco.fc.ul.pt/publications/Merckx_2012_BioICon.pdf***

Blean Woods – heath fritillary

The Blean Woods complex is a network of sites in Kent, the majority of which are owned and managed by conservation organisations, such as the Blean Woods National Nature Reserve near Canterbury, partly owned by the Woodland Trust, RSPB, Natural England and 3 Local Authorities. This is a major stronghold for the heath fritillary butterfly, *Melitaea athalia*, and supports around 60 per cent of the UK population. In fact it is one of just four landscapes where this species can still be found in the UK. Butterfly Conservation has been monitoring the Blean for the species since 1980 and has built up a sound ecological understanding of its requirements.

Heath fritillary butterfly

The heath fritillary is one of the UK's most threatened Lepidoptera, declining by 73 per cent between 1984 and 2004. In the late 1970s it was thought to be close to extinction and conservation efforts were focused on preventing this, especially as the large blue butterfly, *Maculinea arion*, was declared officially extinct in the UK in 1979.

Heath fritillary Caroline Bulman

In the south east of England the heath fritillary is associated with woodland clearings, recently cut coppice coupes and areas of recent clearfell. At Blean 50 per cent of the population uses managed rides, 45 per cent coppice and 5 per cent clearfell. Coppice and clearfell is used for a short time immediately following management (two or three years), before conditions become too shady.

Caterpillars of the heath fritillary usually feed on common cow-wheat, *Melampyrum pratense*, although occasionally germander speedwell, *Veronica chamaedrys,* and ribwort plantain, *Plantago lanceolata*, are eaten in the Blean. The butterfly has been found to require small recently cut coupes greater than 0.2 hectares, with a connecting open ride network and an abundance of cow-wheat.

Conservation action at Blean

Like other butterflies, the heath fritillary has suffered from a reduction in the active management of woods, especially a lack of coppicing. A partnership project was set up between Butterfly Conservation and the various organisations or public bodies that manage the Blean Woods complex to stop population decline of this endangered butterfly. The aim was to ensure coordinated active management of sites to support this threatened species.

Each year monitoring is carried out of all extant colonies from the year before, all blocks where new management has taken place over the preceding winter and any blocks where management has taken place over the last two years but have remained unoccupied. By recording the presence and abundance of cow-wheat an estimate of habitat suitability is made. This data then feeds into management plans to ensure a continuous succession of suitable habitat and foodplants.

The UK Biodiversity Action Plan target for the Blean Woods complex is to maintain 25 colonies of heath fritillary butterfly. Thanks to the project, since 2004 this target has been exceeded every year, with 31 colonies being recorded in 2010. The decline of the butterfly has been halted and reversed, and Blean Woods numbers have now positively recovered to pre-1980 levels.

Common cow-wheat WTPL

The partnership project has been very successful in reversing the decline of the heath fritillary butterfly and ensuring its survival, as well as benefitting a whole suite of other species. It is a large output project, but has required low input from most stakeholders (3 per cent of the overall management budget), and is a great example of what can be done with little resources to benefit wildlife. The project has also highlighted the need for annual monitoring for dynamic species that move through the landscape due to changing conditions.

George Henry Wood – habitat creation

George Henry Wood is a 33 hectare (ha) former arable bean field that has been transformed into a thriving mosaic of new native woodland and grassland thanks to the incredibly generous legacy of George Henry Sellars to the Woodland Trust, and indeed the many wildlife and people that enjoy it. George's desire to share his passion and love of nature has led to a wooded space that is a mere 100 metres east of his former village of Stretton. The design has proven to be very favourable to butterflies.

Stretton has a rich agricultural history that can be traced back to the 11th century. The majority of land surrounding Stretton originally belonged to a relative of William the Conqueror and would have been worked by the villagers. Over many centuries Stretton's community continued to be self-sufficient and lived off the land. However, in the more recent past changes in agriculture brought an end to smaller landholdings, with hedgerow boundaries being removed and larger fields being created.

Transformation

George Henry Wood's transition from agricultural field to an established mosaic habitat rich in biodiversity will be a gradual process. Acquired in 2006, this young site is only in its early stages and on-going planning and management is needed to ensure it reaches its full potential. The overall shape was dictated by the field boundary and road to the south. Before planting, the Trust needed to address the issue of deer, since a large number were using the pond and could have damaged newly planted saplings and sown meadows. This was prevented by erecting a fence that protected the designated areas but still allowed the deer access to the water source.

Field before planting WTPL

Grassland and wildflower meadows

Prior to planting any trees, 15 ha along the north and east boundaries were sown with a mixture of grass species and wildflowers, the species mix was carefully planned. George Henry Wood sits on a bed of Jurassic limestone and, following consultation with a range of experts, the decision was made to plant species suitable to limestone chalk grassland.

The ground was ploughed and harrowed in preparation for the seeds. In the areas due to be planted with trees, a mix of grass species was sown. In areas where natural regeneration was desired, along the rides and woodland edges, wildflower seeds were used. It was deemed to be important to establish a good basic ground flora before planting the trees. Species were chosen that were not too vigorous and would not swamp natural regeneration.

Field following planting WTPL

Grizzled Skipper Hugh Venables

The increased levels of floral biodiversity have had a particularly positive impact on local butterfly populations. The new flora was quick to establish and the formerly monotone brown fields are now a rich green blanket peppered with purple, white and yellow flowers. Several species of flora are considered ideal for pollinators and endorsed by the Royal Horticultural Society, including common vetch, *Vicia sativa ssp. sativa,* and wild carrot, *Daucus carota*. The increased complexity of the site offers butterflies the diverse resources they need, including basking spots and protection from predators.

Tree planting

In 2007, residents and members of the extended community were invited to plant the first trees to cover the remaining 18 ha. Planting circles were sprayed with glyphosate herbicide to create a small area of bare ground for trees to be planted into. This meant the trees would not be competing for water and root space with vegetation close by, but the rest of the land would still be covered in flora and therefore water lost through evaporation from the soil was reduced.

The site benefited from several species-rich hedges along the north and east boundaries, a Biodiversity Action Plan (BAP) habitat in the UK. Alongside planting of species such as field maple, *Acer campestre*, common dogwood, *Cornus sanguinea*, and hazel, *Corylus avellana*, natural regeneration of trees was encouraged through the use of seeds from the old oak, *Quercus robur*, and ash, *Fraxinus excelsior*, trees that aligned the hedgerows. Many trees offer butterflies and other insects good pollen/nectar sources.

Grizzled skippers, *Pyrgus malvae*, and dingy skippers, *Erynnis tages*, are both priority butterfly species under the UK BAP and woodland butterflies of concern. First spotted on site in 2011, these threatened species are benefiting from increased food resources and more egg laying opportunities among the wildflower meadows and developing woodland. Other species seen on site include the green hairstreak, *Callophrys rubi*. The presence of a variety of butterflies at this site indicates a healthy environment and ecosystem, one that will continue to improve over time.

Three quarters of Britain's butterflies are in decline; under threat from agricultural intensification, loss of food sources and climate change. Sustaining the wildflower meadows and wide rides at George Henry Wood, ensuring that they do not become overgrown or excessively shaded, will assist butterfly conservation. As the wooded areas mature and the saplings grow it is hoped other woodland specialists may also be attracted to the area.

George Henry Wood has been dedicated to the reestablishment of the type of broadleaved native woodland and limestone grassland typical of this landscape. It should become fully established over the next 50 years and offer a huge wealth of benefits to wildlife and people. This new woodland will eventually reduce habitat fragmentation caused by historical agricultural intensification – creating a link with the adjacent secondary woods and Stretton Wood to the north.

Heartwood – habitat creation & monitoring

Red admiral northeastwildlife.co.uk

The Woodland Trust's Heartwood near St Albans is an ambitious project to create England's largest new native forest from previously intensively farmed arable land. The site was acquired in 2009 and the project aims to plant 600,000 trees over ten years, creating 247 hectares (ha) of new woodland, with wide rides and glades, to add to the small pockets (17.8 ha) of existing ancient woodland on site. There will also be 10 ha of scrub and 79 ha of grassland and wildflower meadows created. This will result in a 347 ha habitat mosaic that will benefit the local wildlife and community.

From the very beginning the project gathered a team of dedicated volunteers. Monitoring of a range of species, including plants, lichens, mammals, birds and butterflies, began with strong involvement from the Hertfordshire Natural History Society (HNHS). This information will contribute to the growing body of data that shows how new woodland supports biodiversity and the changes that occur as the wood matures.

Monitoring of butterflies is being carried out by Andrew Steele and volunteers from the Herts and Middlesex branch of Butterfly Conservation. Initial baseline surveys of the existing woodland areas and arable fields were carried out in 2009. The woods, mostly former coppice that had not been cut for many years, were generally dark and did not support good numbers of butterflies. However, a few butterflies were recorded in the small clearing and east-west ride in Well Wood, and the pit area at the south end of Round Wood. The arable fields also proved to be poor for butterflies.

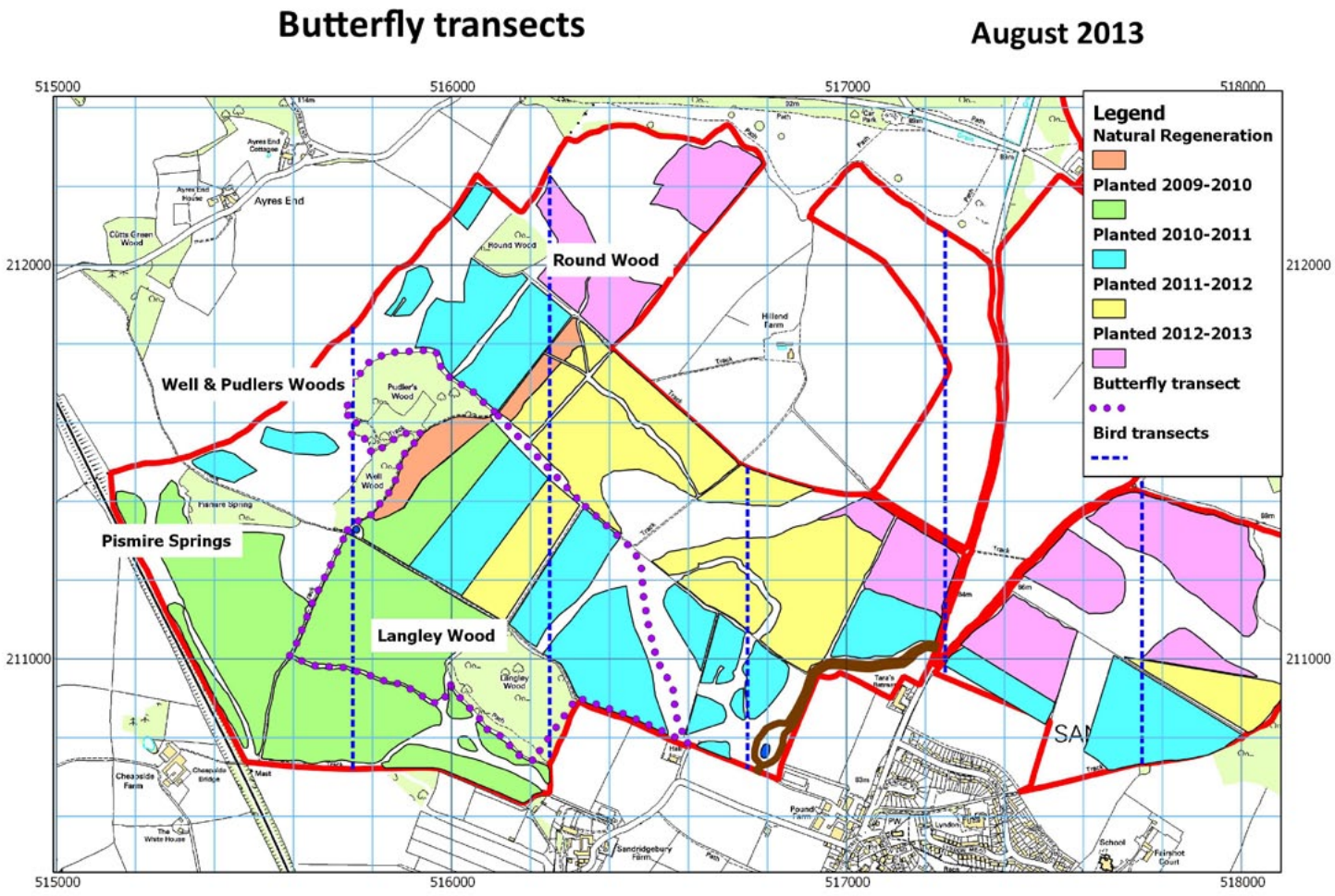
Since summer 2010, a set transect (see purple dotted line on map overleaf) has been regularly walked and the number of butterflies recorded using the standard Butterfly Conservation monitoring method (***www.ukbms.org***). It involves walking the route once every week from the start of April until the end of October and recording the number and species of butterflies. This method is particularly important for assessing the change in butterfly populations over time and the results can be compared with butterfly monitoring in the rest of the county.

Common blue northeastwildlife.co.uk

In 2010 and 2011, 22 species of butterfly were recorded. There was an increase in the number of marbled white, *Melanargia galathea*, Essex skipper, *Thymelicus lineola*, small skipper, *Thymelicus sylvestris*, red admiral, *Vanessa atalanta*, common blue, *Polyommatus Icarus*, and purple hairstreak, *Neozephyrus quercus*, butterflies. However, a loss was recorded for populations of small copper, *Lycaena phlaeas*, peacock, *Aglais io,* and comma, *Polygonia c-album*. Numbers of some species plummeted in 2012 due to the wet and cold summer the UK experienced.

In 2013 butterflies over the whole Heartwood site have been recorded once a month using the standard wider countryside monitoring method developed by Butterfly Conservation and the British Trust for Ornithology. These are the blue routes on the map and are the same as transects used for bird monitoring. Although it is useful to collect lists of the species present to increase knowledge of the site, systematic species monitoring is important to record change over time as the habitat evolves.

The Heartwood project is reconnecting fragmented areas of ancient woodland, which will allow woodland flora to spread. However, this may take a long time as the dispersal rate for many plants, especially some ancient woodland indicators, is very slow. As the new woodland and grassland areas mature and develop the range of species using them should increase over time.



Scotland – pearl-bordered fritillary & chequered skipper

The pearl-bordered fritillary (PBF), *Boloria euphrosyne*, and chequered skipper, *Carterocephalus palaemon*, butterflies are two of six key woodland species identified by Forestry Commission Scotland (FCS) for action under the Scottish Forestry Strategy. Butterfly Conservation Scotland (BCS) has been working in partnership with FCS to implement the strategy and enhance the conservation status of both species.

The PBF is one of the most rapidly declining butterflies in Britain and Ireland. In Britain, its range diminished by 61 per cent between the two recording periods of 1970-1982 and 1995-2004. At 33 per cent, the decline in Scotland was much less than England and Wales, although still cause for concern. This lower rate of decline increases the significance of the Scottish populations. However, the current status of PBF in Scotland is unclear, primarily due to under-recording.

In the UK, the chequered skipper is only found in Scotland, becoming extinct in England in 1976, and only occurs within a 25 mile radius of Fort William. As with PBF, its status is also unclear. This is due to a lack of recorders in the more remote parts of Scotland where the butterfly occurs, the short survey period and the vagaries of the Scottish weather. It is also easily over-looked, as shown by it only being discovered in Scotland in 1939.

National survey established

In 2012 BCS coordinated a national survey of the chequered skipper. The aim was to target recording in 100 1km squares that were predicted, through computer modelling, to be the most suitable for the

Pearl-bordered fritillary Michael Kranewitter

butterfly in Scotland, but where it had not previously been recorded. The survey sparked lots of interest and over 50 volunteers took part. This resulted in 49 survey visits to squares, with the butterfly being recorded in over 40 per cent of visits. Out of the 100 targeted, 36 squares were surveyed and chequered skippers found in 15 of them.

It was also recorded in an additional 15 new 1km squares, where it was not previously recorded – these squares were not part of the targeted 100 squares. The results clearly demonstrate how overlooked and under-recorded the butterfly remains. The survey was repeated this year (2013) and further new squares discovered, but the full results are not yet available.

Both butterflies are spring species of woodland edges or clearings. The PBF requires sunny, sheltered sites, normally south-facing hillsides, as

Chequered skipper Harald Süpfle

both the adult and caterpillar require very warm micro-climates. Favoured sites tend to have short vegetation and light bracken, *Pteridium aquilinum*, cover, both vital for providing additional warmth. The caterpillar's primary foodplant is common dog-violet, *Viola riviniana*, although occasionally marsh violet, *Viola palustris*, is used.

The chequered skipper tends to be found in damper woodland but also requires sunny, sheltered sites, usually south-facing, as the adults and larvae require warm, almost humid micro-climates. Sites are usually below 200m. This species requires purple moor-grass, *Molinia caerulea*, as this is the caterpillar's main, if not sole, foodplant in Scotland.

Important environmental indicators

Butterflies are widely regarded as sensitive environmental indicators, being used to assess factors such as climate change and land use policies. They make ideal indicator species as they have annual life-cycles and react quickly to change, particularly compared to birds and other larger forms of wildlife. Butterflies also use the landscape at a fine scale, so changes in land use and farming practices have rapid impacts on them. Therefore numbers on individual sites can be used to assess the effects of land management.

More importantly there are tested, easy to use methods to count and monitor butterflies. These are coordinated through the UK Butterfly Monitoring Scheme run by Butterfly Conservation and the Centre for Ecology and Hydrology (**www.ukbms.org**). A butterfly transect is the most robust method. Butterflies are recorded along a fixed route of 1-3km, usually split into sections according to landscape or habitat features. Butterflies are counted in an imaginary box (5x5x5m) every week under prescribed weather conditions (above 17°C, or 13–17 °C in sunny weather, wind less than 6 on the Beaufort scale, and no rain). The results create an index of abundance for each species recorded, giving an overall trend, or indicator.

Another useful method is a timed count. It requires less commitment as only one is required in suitable weather conditions during the species' flight period. This works best where the colony occupies an easily definable area. The recorder walks in a zigzag fashion, evenly covering the area and counting individuals over a fixed time period, usually between 5 and 60 minutes. This gives a relative density per hour, e.g. six PBF per hectare per hour.

In the 2012 survey, despite poor weather, monitoring (mostly via timed counts and single species transects) was undertaken at 47 sites for PBF and 34 for chequered skipper. The results of this increased monitoring will provide an excellent baseline for recording in future years. This will also help to determine if the site advice, given by BCS, and resulting management on the NFE and by private landowners is enhancing the habitat for both butterflies.

Duke of Burgundy Neil Hulme

South East Woodlands Project – pearl-bordered fritillary & Duke of Burgundy

The South East Woodlands (SEW) project (2007-2011) was a successful initiative spearheaded by Butterfly Conservation, with a range of partners including the Woodland Trust, and covering a massive 83,561 hectares (ha). Working at a landscape scale in Kent (Denge Woods – 31,253 ha), East Sussex (Rother Woods – 34,945 ha) and the Hampshire/Wiltshire border (Tytherley Woods – 17,363 ha), the project sought to reverse the decline of a suite of priority butterfly and moth species, including the pearl-bordered fritillary, *Boloria euphrosyne*, Duke of Burgundy, *Hamearis lucina*, dingy skipper, *Erynnis tages*, and grizzled skipper, *Pyrgus malvae*.

Butterflies are good environmental indicators and can represent the health of woodland habitats and the wider wildlife that populate them. A key issue for species favouring early successional and more open woodland habitats has been the decline in active management of woods across the UK during the last century. This has resulted in the closing over of these areas.

Butterflies in crisis

Since the 1970s the pearl-bordered fritillary (PBF) butterfly has declined by 77 per cent across the UK, and the Duke of Burgundy (DoB) by 65 per cent. During the course of the project both butterflies were monitored on their known sites and searched for in all suitable habitats. Both species need sunny, sheltered habitats where their larval foodplants grow in conditions suitable for their caterpillars; PBF requires common dog-violet, *Viola riviniana*, whereas DoB needs primrose, *Primula vulgaris*, or cowslip, *Primula veris*.

Historically these butterflies were associated with coppiced sites, but few of these are now actively managed as such. More recently PBF has been strongly associated with bracken, *Pteridium aquilinum*, in woodland clearings and rides, and in the early regeneration stages of conifer clearfell. Whereas DoB is found in permanent, scrub-rich woodland clearings and ride edges, and both species still survive in a few actively managed coppice sites.

Landscape scale action

The overall aims of the landscape scale SEW project were to:

1. Promote best practice woodland management for a broad suite of species, in order to increase management across the landscape and improve biodiversity.
2. Target specialised habitat management for key species, e.g. PBF and DoB, build habitat networks and increase local populations.
3. Engage communities in local conservation action and active volunteering to benefit woodland biodiversity.

Supported by funders including the Heritage Lottery Fund and the Tubney Charitable Trust, Butterfly Conservation gave free advice and management assistance throughout the project. The project officers worked closely with partner organisations, land owners/managers and the public to plan and implement sustainable woodland management. They found that there was great willingness, among a range of audiences, to work towards improving woodland biodiversity when adequate information and support was provided. The project also looked beyond the woodland edge to cover non-woodland habitats such as grassland and farmland.

Numerous management techniques were used to increase woodland structural diversity across the project area. Habitats were restored or created through a range of activities: derelict coppice was cleared, non-native conifer plantations felled, rides widened, clearings cut and grazed, scrub managed and deer were controlled. This provided a network of open, sunny clearings, wide rides, mature woodland, scrub of varying ages, regenerating woodland and coppice.

DoB larva in regenerating coppice Dan Hoare

The Woodland Trust's Denge and Pennypot Wood (49.7 ha), Kent, was included in the project. This site had benefitted from the creation of a large circular three zone wide ride habitat in the mid-1990s, thanks to a Forestry Commission Butterfly Challenge Grant. The SEW project enabled the Trust to refine and improve this area, as well as providing a funding stream to coppice areas of scrub and uneconomic coppice around an important DoB colony, butterfly numbers have responded very positively. It also created wide ride habitat links that connected neighbouring woods within the Denge complex and its ride network. A partnership continues between the Woodland Trust and Butterfly Conservation where volunteers monitor the site each year and provide feedback to help guide future work.

Another Trust wood, Brede High Woods, contributed to the Rother Woods element of the project in East Sussex. Advice and volunteer support was provided to enhance the programme of ride widening and coppicing of hornbeam. This produced an open sunny corridor through the wood,

Woodland clearing at Denge supporting DoB Dan Hoare

connecting the ride network to a remnant of grassy meadow. Silver-washed fritillary, *Argynnis paphia*, white admiral, *Limenitis Camilla*, and grizzled skipper were among the butterflies to benefit from this. The wood was also used as a demonstration site, hosting workshops for land managers and a large family fun day attended by 130 people, as well as moth trapping events and guided walks.

Positive outcomes

At the end of the project habitat condition had improved at 160 sites, with 73 per cent of all woodland sites monitored showing evidence of active management. The most frequent form of management focused on ride widening and cutting, but coppicing and thinning were also common.

The project's funding mechanisms were:

- Economic forestry – through sales of timber, firewood, woodchip, charcoal and coppice products.
- Grant aid from the Forestry Commission England's English Woodland Grant Scheme – £550k was allocated to site management throughout the project.
- Grant aid from Natural England via the Entry Level Stewardship and Higher Level Stewardship schemes – for non-woodland habitats.
- Funding from the Landfill Communities Fund (SITA Trust, etc.) and the High Weald AONB Sustainable Development Fund – £136k came from these sources.
- Direct funding from some landowners.
- Forty volunteer conservation work parties and a total of 1080 days project involvement was given freely by volunteers, including wildlife surveys and running events for the public, totalling an equivalent of £87k in labour.

In the Denge Woods landscape only 11 DoB individuals were recorded on two sites in 2007. Positively, by 2010 173 individuals were recorded across ten different sites, increasing from two occupied 1 km squares to nine. Although this increase was in part due to two previously unrecorded colonies being discovered, it was also thanks to improvements in management and colonisation of restored areas and woodland creation sites brought about by the SEW project.

Between 2007 and 2008, 16 new patches of habitat were created for PBF in the Tytherley Woods landscape. Within four years these had already provided suitable breeding habitat and 75 per cent of them had been colonised by PBF. These areas also quickly supported numbers of other important woodland butterfly species, such as DoB, small pearl-bordered fritillary, *Boloria selene*, dingy skipper, argent &sable, *Rheumaptera hastate*, and drab looper, *Minoa murinata*.

Key lessons

Butterfly Conservation found the key lessons from the SEW project were:

- If given information and support, a significant and receptive audience of land and woodland

managers and professionals, and the general public are willing to get involved in improving woodland biodiversity.

- Combining information delivery, targeted grant aid and support for economic forestry can increase woodland management on a dramatic scale. However, economic forestry alone cannot deliver the highest quality habitat.
- Threatened species can respond quickly to improvements in woodland management, providing it delivers suitable habitat networks.
- The role of a project officer can be very beneficial in acting as a hub to unite existing land management mechanisms.
- Partnership working and expertise sharing are highly beneficial.
- Volunteers are invaluable in delivering a successful project with limited resources.

This is a strong model for other landscape scale projects, combining extensive habitat creation with targeted management for the most threatened species, with monitoring by volunteers to measure wildlife responses.

Stratton Wood – small blue

Stratton Wood is a 53.7 hectare (ha) Woodland Trust wood, located at the north-eastern edge of Swindon, right beside the A419. The site's layout creates a mosaic of native broadleaved woodland, meadows and grassland. Despite its close proximity to a major commuting route, Stratton plays host to numerous species of butterfly, including our tiniest resident the small blue, *Cupido minimus*.

Site geology

Small blues are a Biodiversity Action Plan species that typically frequent chalk and limestone grasslands; a more common habitat of southerly terrains.

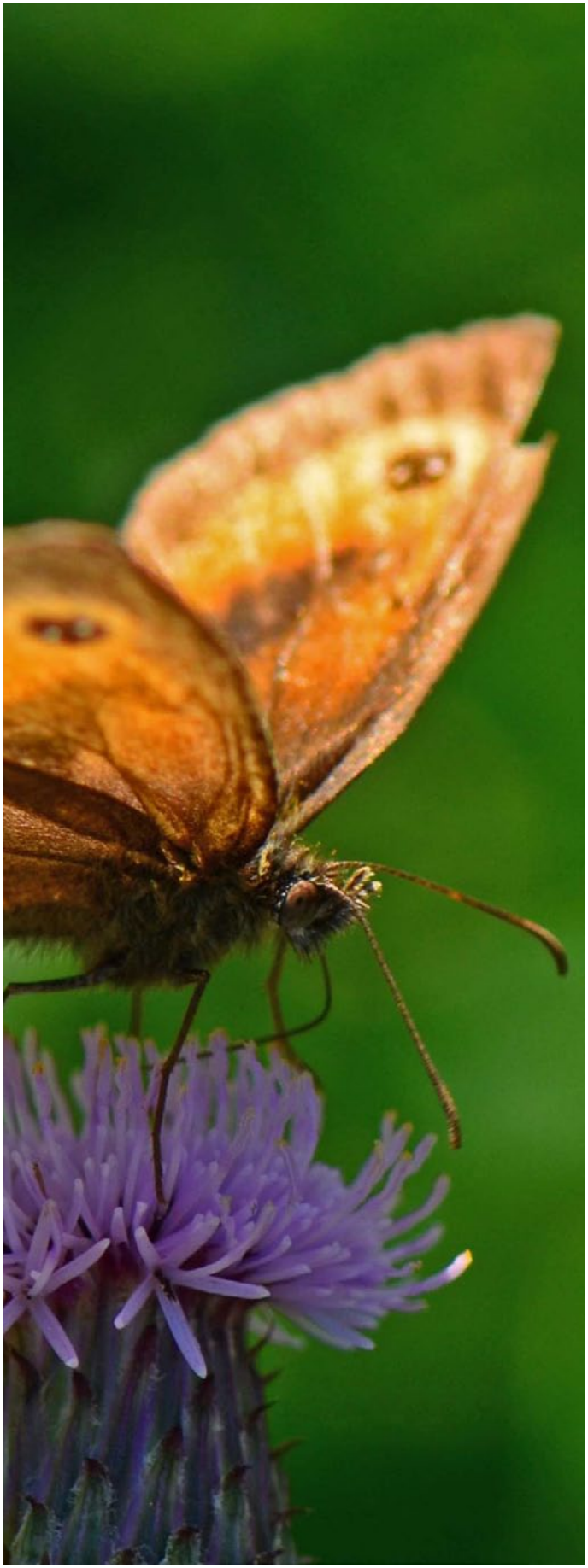
Fortunately for the small blue, the reserve lies on a belt of coral rag limestone. The site's geology allows it to support plants similar to those found in chalkier soils further south, including kidney vetch, *Anthyllis vulneraria*, the sole food source of small blue caterpillars. The Trust endeavors to maintain England's most northerly population of small blues through careful management, sensitive mowing regimes and prevention of nutrient build up on the meadows in which they reside.

Wildflower meadow success

One of Stratton's key features and hotspots for butterflies are the two meadows located approximately 800 metres from the entrance. Originally left unplanted due to signs of archaeological interest, Stratton's established meadows cover an area of approximately 5 ha and offer food and shelter to many different taxa. The sites are floristically diverse and contain many generous nectar providers including musk mallow, *Malva moschata*, meadow cranesbill, *Geranium pretense*, and meadow buttercup, *Ranunculus acris*.

The medley of fine grasses and wildflowers creates opportune habitat for ground nesting birds, as well as abundant food sources for bees and butterflies. In

Small blue larva WTPL



Gatekeeper Hannah Cole

peak season many species of butterfly including the green-veined white, *Pieris napi,* gatekeeper, *Pyronia tithonus*, comma, *Polygonia c-album,* and large white, *Pieris brassicae*, can all be observed refuelling on the wildflowers as they travel around the site.

The butterflies are not just confined to the meadows at Stratton; the mosaic-like nature of the site and increased amount of edge habitat ensures visitors have a good chance of seeing butterflies along the network of paths and broad rides. To further enhance habitat heterogeneity and promote biodiversity new scrapes were machine dug in June 2013. These seasonal ponds and their associated plant life, barely three months old, have already started attracting a plethora of insects.

Future plans

This autumn the Trust is working in partnership with Wiltshire Wildlife Trust's Wiltshire and Swindon Food Champions Local Food Project as well as with Swindon Borough Council to plant a small orchard. The orchard will add to the diversity of habitats onsite, as well as engaging local people with the site through the establishment and maintenance of the treese as well as benefiting from the fruit in future years. A number of local Wiltshire apple varieties including celt, corsley pippin and choristor boy as well as cherry, *Prunus spp.* plum, *Prunus spp.* and quince, *Cydonia oblonga* are being planted. The presence of pollinators such as butterflies and bees will be a critical component for a healthy harvest and in exchange for pollination the flowering fruit trees will provide an additional food source to these insects.

Due to Stratton's steady increase in butterfly numbers over the years transect surveys are now in process thanks to dedicated volunteer, Geoff Whittle, with the first report due imminently. Records like this aid understanding of butterfly distribution and can highlight the health of species populations, particularly those of conservation concern as well as help inform decisions taken regarding the management of the site as a whole.

Marbled white northeastwildlife.co.uk

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