

# A Survey of the Black Hairstreak Butterfly in North Buckinghamshire

The results of surveys of the distribution of Black Hairstreak, *Satyrrium pruni* in a complex of woodlands in the Bernwood Area.

June 2024

Natural England Research Report NERR115

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## Executive summary

A survey of the Black Hairstreak, *Satyrrium pruni*, was conducted in a complex of woodlands and associated habitats to provide supporting evidence for a proposal to designate a new Site of Special Scientific Interest (SSSI) in the Bernwood area.

Bernwood is a largely agricultural landscape of woodlands, pastures and ancient hedgerows situated between Bicester and Aylesbury in north Buckinghamshire. There are twelve stands of ancient woodland within the proposed SSSI boundary, including four existing SSSIs: Sheephouse Wood SSSI, Grendon and Doddershall Woods SSSI, Ham-Home-cum-Hamgreen Woods SSSI and Finemere Wood SSSI. Over two summers, 2018 and 2021, surveys were undertaken in each of these existing SSSI woodland blocks, areas of woodland not currently designated as SSSI and also in selected areas of connecting habitat to better understand the distribution of Black Hairstreak. In addition, areas of supporting habitat considered to have high likelihood that Black Hairstreak utilises the feature for at least part of its life cycle were identified by field survey and analysis of aerial photographs.

Two surveys were conducted by Tim Bernhard of Natural England in 2018 and 2021. During the 2018 survey, adult Black Hairstreak butterflies were observed in Grendon and Doddershall Woods SSSI and Ham Home-cum-Hamgreen Woods SSSI. Concentrations of sightings were noted at both sites and at nearby locations outside the current SSSI boundaries strongly suggesting that several discrete breeding colonies are present. The locations of all sightings were noted and other species recorded for reference. During the 2021 survey, weather conditions were less suitable for observing Black Hairstreak but records were noted in a number of locations. The location of good quality supporting habitat was recorded and mapped in the course of both surveys.

The information arising from these surveys was supplemented by additional work to identify the location of suitable supporting habitat for Black Hairstreak in parts of the complex not covered by the earlier work to record sightings of adults. These further surveys took place in 2021 and 2022. Additional information on the location of Black Hairstreak has been provided by reports of casual sightings made during invertebrate surveys in the area by staff of the Natural England Field Unit and records provided by Butterfly Conservation members who undertake annual surveys at various locations across the area.

This report summarises the results of this compilation of records of sightings of adult butterflies and the location of suitable supporting habitat. The work shows that Black Hairstreak is widely distributed in the survey area and concentrations of sightings are indicative of the presence of discrete breeding colonies. There is evidence that several discrete breeding populations are present in the survey area, and that some of the woods support several colonies. This confirms that collectively the Bernwood complex of woodlands and hedgerows forms an important national stronghold for Black Hairstreak. The work provides additional information on the distribution of supporting habitat across

the complex. It is hoped that this will help inform management to protect the existing habitat of high value, create new habitat linkage and to enhance habitat suitability for Black Hairstreak at Bernwood.



**Figure 1. This type of habitat structure where there is an extensive transitional zone of blackthorn, rose and bramble in sunny, sheltered locations along the edge of woodlands and in ride edges provides excellent supporting habitat for black hairstreak. The Bernwood area has particularly good representation of this favoured habitat, together with thick hedgerows made up mostly of blackthorn. Copyright Tim Bernhard & Natural England.**

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# Introduction

A survey of the Black Hairstreak *Satyrrium pruni* was conducted in a complex of woodlands to provide supporting evidence for a proposal by Natural England to designate a new Bernwood Site of Special Scientific Interest (SSSI). In the wider sense the area referred to as Bernwood is a largely agricultural landscape of woodlands, pastures and ancient hedgerows situated between Bicester and Aylesbury in north Buckinghamshire. There are twelve stands of ancient woodland within the proposed SSSI boundary, including four existing SSSIs. These are Sheephouse Wood SSSI, Grendon and Doddershall Woods SSSI, Ham Home-cum-Hamgreen Woods SSSI and Finemere Wood SSSI. Over two summers in 2018 and 2021, surveys were carried out in each woodland block and selected areas of connecting habitat to understand the distribution of Black Hairstreak across this habitat complex and to map areas of suitable supporting habitat. This report summarises both surveys, identifies the location of sightings of adult butterflies and maps all areas within the survey area which are considered highly likely to be supporting habitat for the Black Hairstreak. The work highlights the importance of areas currently outside of existing SSSIs in providing supporting habitat, areas likely to be of importance in providing linking habitat between colonies and identifies areas which were not previously known to support the species. There is a strong case for revising the boundary of SSSIs in the area based on the findings of this work.

## Species history in Britain

The Black Hairstreak *Satyrrium pruni* was discovered in Britain at Monks Wood (Cambridgeshire) in 1828 by an entomologist dealer, Mr Seaman. Initially it was misidentified as the White-letter Hairstreak (*Satyrrium w-album*) and was corrected by Edward Newman. It was later found to be abundant nearby at Ashton and Barnwell Wold in Northamptonshire. By the mid nineteenth century colonies had been discovered in several other woods in the region and by the turn of the twentieth century it was known from at least 15 sites, and from as far south as Linford Wood in Buckinghamshire. The famous Bernwood Forest colonies, near Oxford, were unknown until 1918, when W. F. Burrows announced that he had found it in Hell Coppice at Shabbington (Thomas J. , The Hairstreaks of Monks Wood, 1973).

It is possible that at least some of the subsequent discoveries of this species in Northamptonshire and north Buckinghamshire are colonies introduced by Lord Rothschild sometime between 1900 and 1917. Other early introductions include the re-establishment of a colony in Warboys Wood after its extinction there at the turn of the twentieth century (Thomas J. , The Black Hairstreak Conservation Report, 1975) and the replenishment of Monks Wood in about 1922 from the by then flourishing Warboys colony, after the Monks Wood site was beginning to recover from having been felled in the First World War (Maitland Emmet & Heath, 1989).

It is likely that the restriction of Black Hairstreak to the east Midlands Forest belt is a reflection of the history of woodland management in Britain (Thomas J. , 1974). For many centuries this region was unique in having coppice cycles that were long enough for a colony to be likely to survive. With changes in traditional woodland management in the twentieth century, many east Midlands woods became unsuitable for Black Hairstreak. Many potentially suitable habitats have developed beyond its historic range but due to the very poor power of dispersal of the species, these remain unoccupied, apart from artificial introductions in Surrey and West Sussex.

## Vernacular name

In 1828 the butterfly now referred to as White-letter Hairstreak was known as *Thecla pruni*, the Black Hairstreak. On the discovery of this species, (Curtis, 1824-1839) transferred both scientific and vernacular name to it. (Rennie, 1832) altered the latter to Plumb Hairstreak, but (Humphreys & Westwood, 1841) reverted to Black Hairstreak. However, (Wood, 1854), (Stephens, 1856) and (Newman, 1870-71) restored Black Hairstreak to *S. W-album* and called this species the Dark Hairstreak, although the name had already been used by (Harris, 1775) and others for the White-letter Hairstreak. After (Kirby, 1896) had gone back to the nomenclature used by Curtis, stability was achieved.

## Distribution

Black Hairstreak has been recorded from about 80 localities in Britain. Sixty-three of these are from the woods of the east Midlands forest belt, whilst the other 17 are widely distributed throughout the southern half of the country (Thomas J. , 1974). None of the latter is thought to be a native (naturally-established) colony.

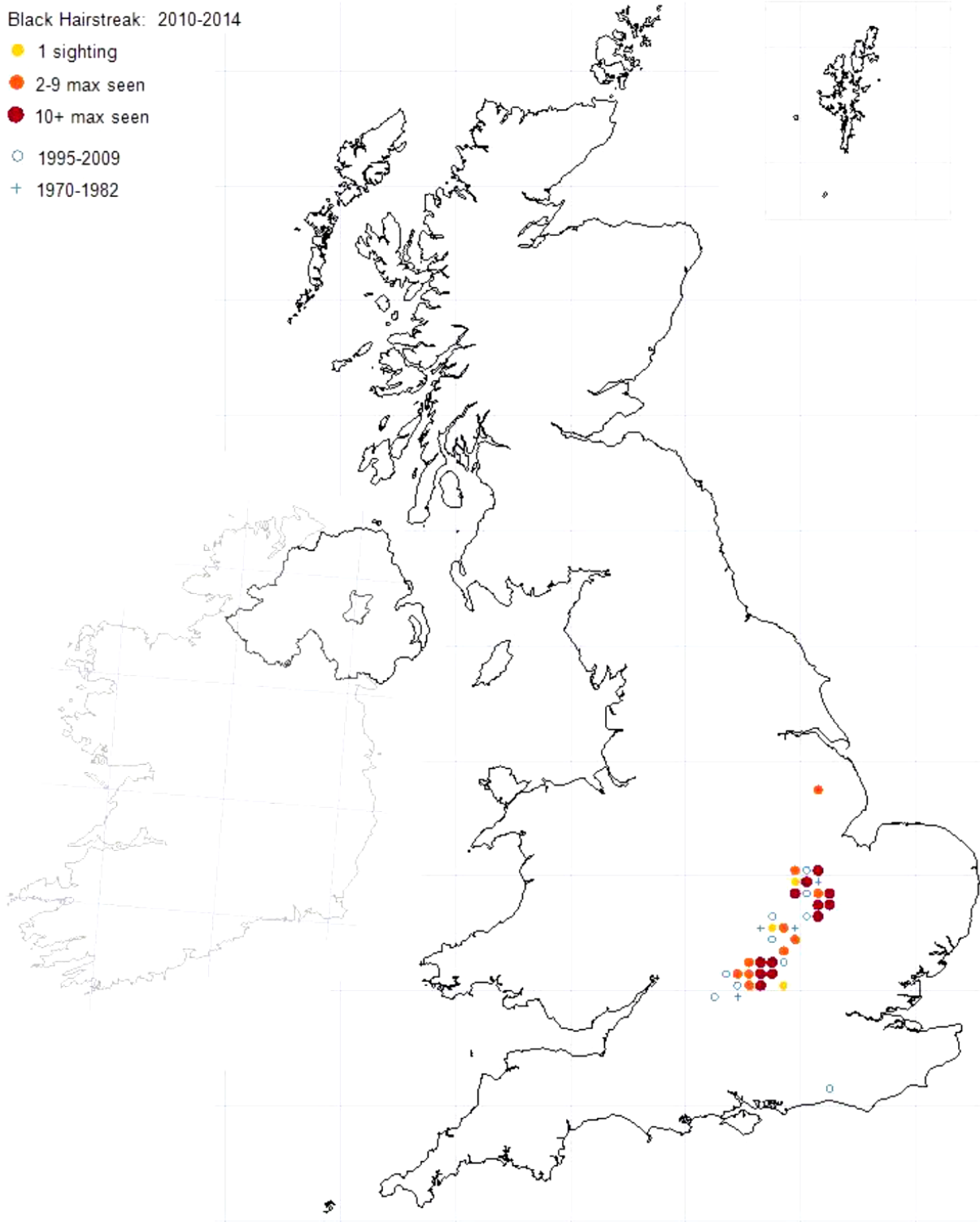
A.E. Collier's 1959 establishment in Surrey still survived in 1988, 36 years after the release, although much of the habitat was ultimately destroyed. Black hairstreak was introduced to Ditchling Common Country Park (part of Ditchling Common SSSI) in West Sussex about 30 years ago. This colony was thought to have died out but it has recently been confirmed to still persist.

The east Midlands records are from the basin of low-lying clay lands between Peterborough and south-west Oxford. At least 61 of these were established colonies, of which about 30 – 35 survived in the mid 1980s. This region is heavily wooded with many large woodland relics from the once more-or-less continuous forest of Bernwood, Grendon Underwood, Whaddon Chase, Whittlewood, Salcey, Yardley Chase, the Huntingdonshire Fen edges, Rockingham and Nassaburgh. Black Hairstreak has been recorded from all these forests and from about half of the component woods that exceed 50 acres in size.

The long-term national trend shows a moderate decline in distribution and a significant decline in abundance (Eeles, 2019). At a more local level annual recording by Butterfly



Conservation members also indicates a decline in distribution and losses of colonies are described from a number of locations, including in recent years (Hodges 2021).



**Figure 2. The known distribution of the Black Hairstreak (*Satyrrium pruni*) in Britain. (Reproduced courtesy of Ian Middlebrook, Butterfly Conservation).**

## Habitat and behaviour

Black Hairstreak is univoltine (ie produces only one brood per year) and flies from about 20<sup>th</sup> June to 10<sup>th</sup> July in typical years but as early as 10<sup>th</sup> June (Leeds, 1953), exceptionally as early as 25 May (Butterfly Conservation) in warm seasons. Adults survive until 25<sup>th</sup> July in cool years. Adults live and breed in small, discrete colonies and are extremely reluctant to disperse. Populations fluctuate synchronously from year to year at most British sites except where the habitat has dramatically changed. Numbers are generally higher after a warm May and early June due to better survival rates of pupae. The average size of a colony varies greatly between different sites, reflecting both the quality and extent of the supporting habitat.

In an average year, most colonies at typical sites consist of a few tens of adults. It is rare for populations to exceed c.1000 individuals even in the most favourable habitat conditions and after the warmest springs (Thomas J. , 1974) (Thomas J. , The Black Hairstreak Conservation Report, 1975).

The two sexes emerge in roughly equal numbers, with the first males appearing a few days before the females. Mating occurs from midday to mid-afternoon, with little courtship, but males exhibit social behaviour whereby they congregate in specific locations, often close to favoured nectar-feeding sites.

During the survey in June 2018, it was observed that females, once mated, would descend to low scrub vegetation a metre or so from the main hedge or woodland-edge habitat and remain immobile for several hours. This is possibly to escape the attention of other males in the main habitat area.

Adults are inactive in dull, cool weather and are notorious for remaining motionless, frequently for several hours, as soon as the sun disappears. Most of their lives are spent resting on the tops of trees or bushes. The wings never open for basking, instead the adult regulates its temperature by orientating the closed wings at varying angles to the sun. At other times adults walk slowly over the leaves, often drinking honey-dew secreted by aphids. Flights are rare, rapid and short, and in the typical gyrating 'hairstreak manner'. Adults are inconspicuous on bush or tree tops and colonies are easily overlooked. Occasionally, adults descend to feed on a wide range of flowers, especially Wild Privet *Ligustrum vulgare*, Dog-rose *Rosa canina*, Field rose *Rubus arvensis* and Bramble *R. fruticosus*. However, observations suggest that the presence of flowering Privet and other flowers is not essential for a colony's survival and it seems likely that honey-dew is by far the most important adult food source.

Colonies occur in small areas of woods or nearby hedgerows where Blackthorn grows in large, sheltered, sunny stands, or is at least a common shrub. The breeding and flight area may be as small as 200 square metres. The average size recorded in Britain in the 1970s was 7.5 acres whilst the average size of the woods containing them was 325 acres (Thomas J. , 1974). Small colonies exist under semi-open canopy, along exposed wood edges and nearby hedges, but high densities occur only where the Blackthorn is well

sheltered from strong winds, yet unshaded, for example in scrub, open rides and glades, or where a tall, dense hedgerow runs parallel to the bushy wood edge. Most colonies breed on stands of Blackthorn facing south or south-east. Some of the largest known have been supported by young stands of Blackthorn (3-10 year shrubs) but most on 20-60 year old bushes. This is probably because the adult's inclination to disperse is so low that it is very unusual for a new stand of shrubs to be reached before the plants are several years old.

## Life-cycle

The ovum is a dorsally compressed sphere 0.8mm wide and 0.4mm high, with surface covered with fine, raised reticulations forming a network pattern. Ova are a beautiful translucent blue-green when first laid, turning yellow brown or chestnut after a few hours, thereafter gradually fading to pale grey during winter, although often green with algae.

Ova are laid singly on the bark of Blackthorn bushes, generally on 1-4 year old twigs and usually on rough patches, sometimes at nodes. (Thomas J. , 1974) found an even distribution at all heights from 0.5 to 5.0 metres above ground, on smooth, clean bark as well as lichen-encrusted twigs, and on 2-50 year old bushes. In most British colonies, the female oviposits on Blackthorn *Prunus spinosa*, but Wild Plum *P. domestica* is equally favoured and has been recorded supporting entire colonies (Leeds, 1953).

Ova are laid in late June and early July. The embryo develops into a fully formed larva within three weeks but does not hatch until the following spring. Hatching is over a five week period (c. 20 March – 25 April). It is a laborious process, taking from 40 minutes to 72 hours (mean 24 hrs), depending on the temperature. The thick eggshell is not eaten, apart from a neat exit hole centred on the micropyle. It often remains on the twig for a year or more after hatching. In Monks Wood in 1971-73, 64 per cent of all ova hatched, the main cause of mortality being the parasitic wasp *Trichogramma evanescens* Westwood (Hymenoptera: Trichogrammatidae).

The larva when fully grown is c. 16mm long. There are four instars (developmental stages), altogether lasting 55-75 days. The first moult is on bark at a node, and later moults occur on silk pads spun on leaves; exuviae are not eaten. Appearance changes considerably and continuously as the larva grows, always forming an excellent camouflage with its background. Feeding occurs in daylight, always on the tenderest leaf-tips except in the first week when flower-buds are eaten.

Larvae remain on the same bush moving, on average, only 23cm away by the final instar and no more than 2m from the egg-site to pupate. In 1972-73 in Monks Wood, 8 per cent of hatched eggs survived to pupate, the main mortalities occurring in the third and fourth instars, almost certainly due to predation by birds (Thomas J. , 1974). The incidence of parasites is generally very low. G. E Hyde and Leeds both report that full grown larvae are killed by unusually severe May frosts.

The pupa is c.9.5mm long x 4.8mm at widest. The head is small and pointed and white, the thorax swollen, rounded and narrow at waist. It is black with a large white dorsal mark. The abdomen is large, humped and rounded with small sub-dorsal points, glossy and black. The pupa closely resembles a bird dropping. It rests exposed on the upper side of a *Prunus* leaf or more often, on an adjoining twig. This stage lasts 18-26 days, during which time up to c80% are killed, mainly by insectivorous birds.



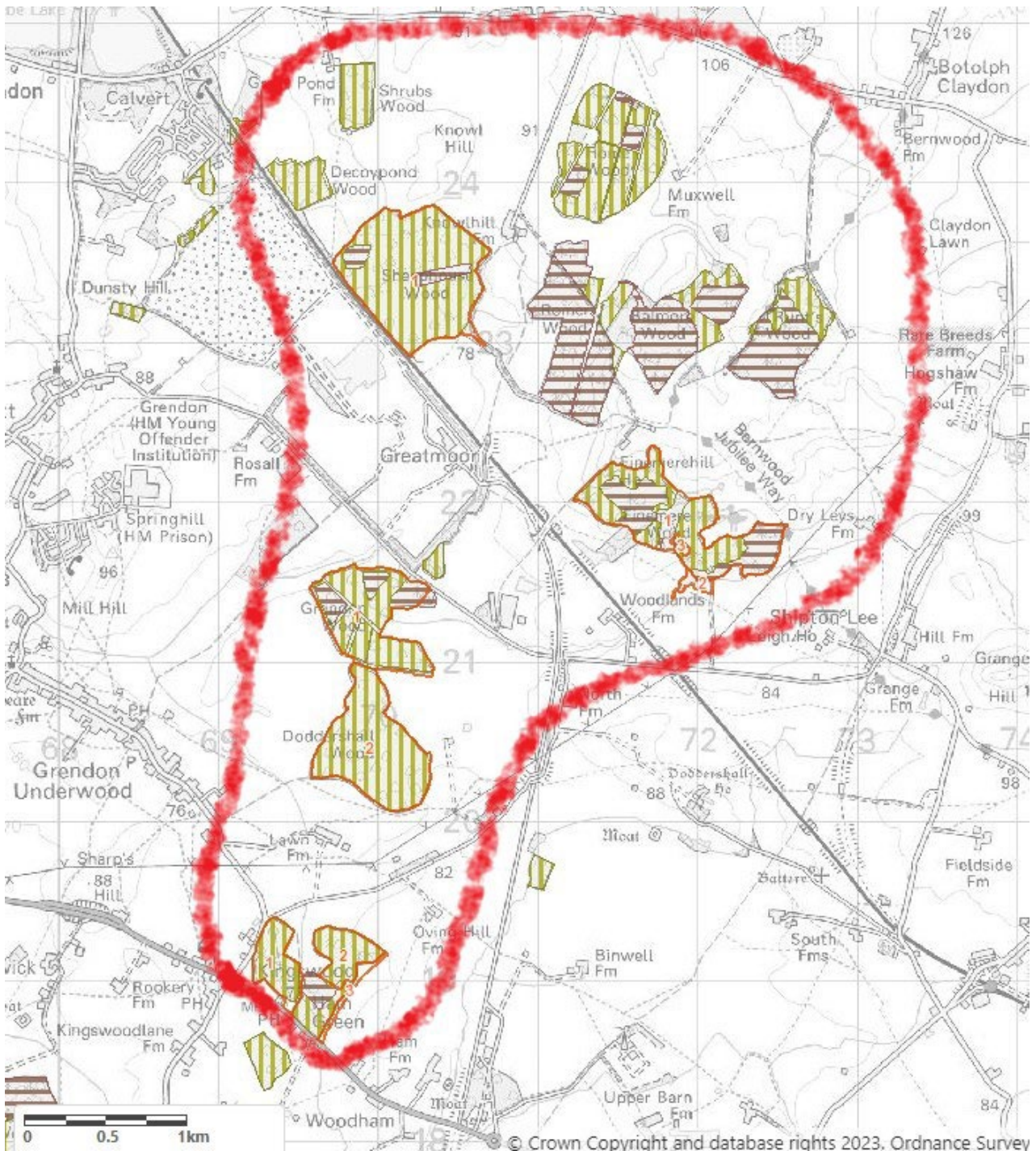
**Figure 3. Adult black hairstreak on blackthorn leaf. Photo taken in June 2021 in an area of high-quality habitat on the southern fringe of Hewin's Wood. Copyright: Trevor Mansfield & Natural England.**

# 2018 Survey

## Survey methodology

### The area surveyed

The 'area of search' was initially taken to be all of those areas which had been identified by other work undertaken by Natural England to locate habitats of high nature conservation interest in the Bernwood area, centred around the existing SSSIs of Ham Home-cum-Hamgreen Woods SSSI, Grendon and Doddershall Woods SSSI, Finemere Wood SSSI, and the non-SSSI areas of Decoypond Wood, Shrubs Wood, Home Wood, Runt's Wood and Romer, Greatsea and Balmore Woods. All of these areas either had a body of evidence suggesting that persistent breeding colonies of Black Hairstreak were present or were known to have potentially suitable supporting habitat. All of these areas had also been highlighted as being of high nature conservation interest because they are roosting sites of the rare Bechstein's bat. However, it quickly became clear that breeding colonies of Black Hairstreak exist outside of these woodlands and that additional areas of suitable supporting habitat are present. This is in the form of roadside hedgerow, field boundary hedgerow, riverside scrub and woodland edge. Therefore, a wider 'area of search' was used centred on the complex of woodlands but also taking in the nearby surrounding landscape to a distance of roughly 500 metres outside the woods and bounded by the A41 to the south and Calvert to Botolph Claydon road to the north. The scope of the study is roughly as shown in figure 3 below, an area of about 17 km<sup>2</sup>.



**Figure 4. The extent of the area of search for Black Hairstreak surveys and mapping of supporting habitat. Contains, or is derived from, information supplied by Ordnance Survey. © Crown copyright and database rights 2022. Ordnance Survey 100022021**

It is worth noting that some areas which may have been supporting habitat for Black Hairstreak but which were subsequently destroyed in connection with the construction of HS2, most notably a dense strip of lineside scrub between Sheeppouse Wood and the Greatmoor energy-from-waste site, could not be included in the survey. Other losses of Black Hairstreak habitat have been recorded in the local area in recent years.

The distribution of Black Hairstreak extends well beyond the area of search. The limitation of the surveys to the area outlined above is to provide evidence which would support (or challenge) the assumption that the habitat complex in the Bernwood area is a nationally important stronghold for the species.

## Use of previous records

Prior to the field survey, reference was made to records of sightings of Black Hairstreak provided to Natural England by Butterfly Conservation. Local volunteers undertake annual monitoring of all known locations of historical sightings of the species in Oxfordshire and Buckinghamshire where these are accessible via public rights of way or where agreement is in place to allow access to private land. Coverage of the area is patchy because of these access limitations and the information therefore only gives a partial indication of the distribution of the species and number of colonies. Reference was also made to freely available records of sightings on the National Biodiversity Network Gateway, but only a small number of these records are sufficiently detailed to allow identification of their location. Despite these limitations, this background information provides evidence of the presence of particularly important 'strongholds' for Black Hairstreak in the survey area, particularly at Grendon and Doddershall Woods, Finemere Wood, Hewin's Wood roadside and bridleway, and Oxford Lane at Ham Home-cum-Hamgreen Woods. It also provides evidence that at least one breeding colony is present at Sheephouse Wood SSSI, and that there is a high likelihood that further breeding colonies are present at Home Wood, at Three Points Lane in the vicinity of Runt's Wood and at the Romer/Greatsea Woods complex. The field survey was intended not only to improve understanding of the distribution of Black Hairstreak in the survey area by searching in parts of the area which have not previously been included in surveys by local recorders, but also to map the location and extent of areas of habitat with high potential to support the species. This information is important in order to gain an understanding of how well connected the local landscape is for this species.

## Definition of 'supporting habitat'

The term 'supporting habitat' is used here to mean an area with high frequency (or dominance) of Blackthorn exhibiting healthy growth (ie not moribund), with bushes over 1 metre tall, in south-facing or south-east facing locations, in full sun or dappled shade and with at least a degree of shelter from high winds. Such areas of habitat may include ride edge scrub, roadside, trackside or field edge hedgerow and woodland margin. Areas of habitat which were judged to be unlikely to support Black Hairstreak, even where Blackthorn is abundant, were not mapped as supporting habitat. This includes areas of woodland margin where Blackthorn is sparse and does not form a continuous linear thicket, hedgerows which show evidence of hard, annual cutting, patches of very old, leggy Blackthorn, and areas where Blackthorn is in shade for much of or most of the day, such as north- and north east-facing woodland edge. The areas judged to represent supporting habitat were identified by field survey supplemented by reference to aerial photographs. The aerial photographs used are dated 2021 and clearly show Blackthorn in

flower. In the majority of cases where areas of supporting habitat were identified using aerial photography these were subsequently checked through field survey where access permission allowed. Figure 5 below shows an example of the aerial photography images used to identify supporting habitat.



**Figure 5. An example of the aerial photography used to identify black hairstreak supporting habitat. The white flowers of blackthorn show up clearly along the south margin of Home Wood and in parts of the ride margins in the wood. Flowering blackthorn is also visible in the thick hedgerow to the south east of the wood. Aerial photography taken on the same date was viewed across the whole area of search. The date of the photography is 2023. Copyright 2015 Getmapping plc and Bluesky International Ltd**

### **Personnel**

The field surveys to locate sightings of adult Black Hairstreak were conducted by Tim Bernhard of Natural England. Tim has many years of experience of surveying for Black Hairstreak and has detailed knowledge of the ecology of this and other Hairstreak butterflies. Follow-up field surveys to locate supporting habitat of Black Hairstreak were conducted in 2021 by Simon Curson, Sophie Sykes and Trevor Mansfield of Natural England, following briefing by Tim Bernhard to ensure consistency in approach. A further day of field work to assess habitat suitability of areas not previously visited was carried out in December 2022 by Simon Curson, Trevor Mansfield and Graham Steven of Natural England. In addition, Graham Steven carried out research to locate previous records of Black Hairstreak held on Natural England files and on-line sources, and carried out interpretation of aerial photographs to locate potential supporting habitat.



## Field survey methodology to locate adult butterflies

The method deployed was to identify areas of potentially suitable supporting habitat, mostly on the south-facing edges of woodland rides and hedges, and to carefully search for resting or flying individuals of Black Hairstreak by slowly walking along sections of habitat. It should be noted that the surveyor, Tim Bernhard, had no previous knowledge of the sites and so it is unlikely that all areas with the potential to support Black Hairstreak were identified and surveyed. With hindsight, the methodology would have been significantly improved by including an earlier step to identify potential habitat and priority areas for survey in advance of the actual survey. However, even with this additional measure it is unlikely that all areas which have the potential to support Black Hairstreak could be surveyed during optimal survey conditions. Areas which appeared from visual inspection to be unlikely to support Black Hairstreak were not surveyed.

The number of Black Hairstreak at each survey location is given in the detailed reports provided below. This is the number of *confirmed* sightings of adult butterflies. Additional *ad hoc* sightings by Natural England personnel (which is a very small number) are noted in the site reports and are included in the mapping of the survey results.



**Figure 6. Tim Bernhard photographing an adult black hairstreak on blackthorn in the southern margin of Hewin’s Wood. Copyright: Trevor Mansfield & Natural England.**

## Survey limitations

Because of the nature of the Black Hairstreak it is practically impossible to locate all colonies in any given area with any degree of certainty. A high degree of serendipity is required to ensure that the surveyor is in the right place at the right time to observe butterflies in flight, due to the short flight period and its elusive behaviour, and with variables including weather conditions, date of emergence of adults and survival rate of pupae. The size and extent of colonies varies from a small number of individuals in a habitat patch of just a few metres in length to colonies of over 100 individuals utilising entire hedgerows. Also, it is very difficult to predict peak flight times of Black Hairstreak, which is increasingly variable in response to changing weather patterns linked to climate change. **For these reasons, the records of sightings included in this report should not be interpreted to mean that these are the only locations of Black Hairstreak in the survey area.**

During exceptionally warm weather in June 2018 it was observed that Black Hairstreak was not active during the heat of the day. They were active either early in the morning or late in the afternoon and early evening. On both survey dates the butterflies were observed to be flying and feeding from 16.30 and were still active at 20.00.

In 2018 Black Hairstreak had been reported to be on the wing in the Bernwood area from 1st June (Nick Bowles, pers. comm.) and so the date of the first survey is likely to represent the peak of the flight season.

## Date and location of 2018 survey

Tim Bernhard conducted field surveys looking for adult Black Hairstreak on 12 and 19 June 2018. These were at the privately-owned Grendon and Doddershall Woods SSSI and Ham Home-cum-Hamgreen Woods SSSI. Both of these sites have a long history of the presence of Black Hairstreak and both are widely regarded as being important national strongholds. Historically, surveys have been carried out at both sites by local members of Butterfly Conservation on an annual basis and significant numbers of adult butterflies are recorded in most years. Although these surveys were primarily of areas within the existing SSSIs some areas identified as having high potential to support Black Hairstreak outside the current SSSI boundaries were also surveyed where permission had been granted.

## Date and location of 2021 survey

Tim Bernhard conducted additional field surveys in 2021 on 16<sup>th</sup> and 17<sup>th</sup> June 2021. These were in parts of the area of search not covered previously at Decoypond Wood, Shrubs Wood, Romer, Greatsea and Balmore Woods, Runt's Wood, Sheepphouse Wood SSSI and Finemere Wood SSSI.

## Results of 2018 field survey

On the first day of the survey on 12th June, it was generally overcast with occasional light showers. The survey started at 14.00 at Grendon Wood (the northern section of Grendon and Doddershall Woods SSSI). The weather improved gradually and Black Hairstreak was observed flying high over Blackthorn bushes. Occasionally females would settle on lower shrubs such as Bramble *Rubus fruticosus*. Black Hairstreak was found to be widespread in suitable locations in Grendon Wood, but frequently flying fast and high amongst tree tops. Six females were observed settled motionless on low shrubs including Hazel *Corylus avellana* of about 1.5 m high, and from their behaviour it seemed that females regularly hide away from the attentions of males in similar places once they have mated.

Black Hairstreak was also observed along the roadside north of Grendon Wood (outside the current SSSI boundary), where there is abundant Privet *Ligustrum vulgare*. Much of this was in flower and appeared to be a favoured nectar source for this species. Often three or four adults would be feeding from the same flower spike and it is estimated that over **100** individuals were seen on the first visit (of about six hours). At the roadside a large number of Black Hairstreak were seen congregating around the canopy of a large Oak *Quercus robur* tree. All the individuals that were seen at close range were males and it would seem that they were using the tree for 'lekking' (possible communal mating behaviour) and were possibly also feeding on honeydew.



**Figure 7. One of the main rides in Grendon Wood, showing large Blackthorn bushes interspersed with mature Oak trees along the ride edges. This is good quality supporting habitat for Black Hairstreak. Copyright: Tim Bernhard & Natural England.**



**Figure 8. The southern edge of Grendon Wood, showing mature Blackthorn thickets forming the edge of the broad grass ride. This is excellent habitat for Black Hairstreak. Copyright: Tim Bernhard & Natural England.**



**Figure 9. In addition to the internal ride system the external edges of Grendon and Doddershall Woods have extensive areas of high-quality supporting habitat for Black Hairstreak in the form of a thick, continuous belt of Blackthorn. Copyright: Graham Steven & Natural England.**



**Figure 10. The extensive ride system in Grendon and Doddershall Woods provides excellent habitat connectivity for Black Hairstreak. Copyright: Graham Steven & Natural England.**



**Figure 11. One of the rides in Grendon Wood (left) showing low scrub frequently used by female Black Hairstreak to hide away from males which were frequenting the larger trees and shrubs. On the right is a view of the blackthorn hedge on the roadside north of Grendon Wood. The Privet blossom is a great attraction to Black Hairstreak here. Copyright: Tim Bernhard & Natural England.**

## Butterfly species observed on 12<sup>th</sup> June 2018 in Grendon Wood:

A total of **42** confirmed sightings were made of Black Hairstreak. Of these 17 were noted in south-facing woodland margin, the remainder in main rides. Other butterflies noted include 2 Small Heath *Coenonympha pamphilus*, 26 Meadow Brown *Maniola jurtina*, 9 Speckled Wood *Pararge aegeria* and 2 White Admiral *Limenitis camilla*.

The second survey was on Tuesday 19th June. The weather was warm, but generally cloudy with sunny spells. The survey began at Oving Hill Farm at the northern end of the feature known as Oxford Lane, which runs along the eastern edge of Ham Home-cum-Hamgreen Woods SSSI. The survey started at 11.45 in generally overcast and warm conditions. The survey was carried out using the same methodology as was deployed at Grendon Wood, again focussing on south-facing ride edges, 'glades', woodland edge and hedgerow. Particular attention was paid to Oxford Lane on the eastern edge of the site which has particularly good quality supporting habitat and ideal aspect and shelter. This has long been known as a stronghold for Black Hairstreak. Note that areas outside of the current SSSI boundary were surveyed as suitable supporting habitat extends further northwards than the boundary would suggest. Several Black Hairstreak were noted in this location outside the SSSI, suggesting that consideration should be given to amending the SSSI boundary so that it better reflects the distribution of supporting habitat.



**Figure 12. Part of Oxford Lane adjacent to Hamgreen Wood. The extensive mature Blackthorn along the edge of the wood and field edge, the high frequency of Privet and other flowering shrubs, the sheltered conditions and southerly aspect combine to provide high quality habitat for Black Hairstreak. This is a long-established and well-known 'hotspot' for the species. Copyright: Tim Bernhard & Natural England.**

## Butterfly species observed on 19<sup>th</sup> June 2018 at Ham Home-cum-Hamgreen Woods SSSI (plus land extending northwards along Oxford Lane):

A total of **16** confirmed sightings of Black Hairstreak were made in this location. Other butterflies noted include 64 Meadow Brown *Maniola jurtina*, 2 Silver-washed Fritillary and 2 White Admiral *Limenitis camilla*.



**Figure 13. A clearing in Hamgreen Wood. The sheltered conditions and abundant Bramble, Privet and Elder blossom create very good conditions for warmth-demanding invertebrates including Black Hairstreak. Copyright: Tim Bernhard & Natural England.**

At 14.00 on 19 June the survey was continued at a different location, along the roadside north of Grendon Wood and continued into Grendon Wood itself at 14.30, followed by Doddershall Wood at 15.00.

## Butterfly species observed on 19<sup>th</sup> June 2018 at Grendon Wood

A total of **21** confirmed sightings of Black Hairstreak were made along the roadside and a further **9** were noted in Grendon Wood. Other butterflies noted include 11 White Admiral *Limenitis camilla*, 3 Silver-washed Fritillary *Argynnis paphia* and 2 Small Heath *Coenonympha pamphilus*.

## Butterfly species observed on 19<sup>th</sup> June 2018 in Doddershall Wood

13 confirmed sightings were made of Black Hairstreak, and other butterflies noted include 15 White Admiral *Limenitis camilla*.

At the start of the second day's survey, at 11.45, it was 23°C and humid. Black Hairstreak was evidently already past its peak flight season and there were noticeably fewer than the week before and in less good condition. There were freshly emerged species on the wing such as White Admiral, Large Skipper, Ringlet and Silver-Washed Fritillary. By the afternoon, whilst in Grendon Wood the weather conditions became more favourable for butterflies. More Black Hairstreak were observed along the roadside to the north and within the wood itself, sometimes present as groups of individuals flying high above Blackthorn bushes, Ash *Fraxinus excelsior* and Oak *Quercus robur* trees. In Doddershall Wood, the good quality grass rides provide excellent habitat for common butterfly species such as Meadow Brown, White Admiral and Ringlet. Black Hairstreak was less abundant in this wood on the day of survey. Several males were observed feeding on Bramble blossom and honeydew low down in vegetation.

The survey ended at 18.30 when Black Hairstreak was still observed nectaring on Privet along the roadside and along a hedgerow north of the roadside.



**Figure 14.** A view of one of the rides in Doddershall Wood. This is excellent habitat for a number of butterfly species including Black Hairstreak. Copyright: Tim Bernhard & Natural England.





**Figure 15. The rideside vegetation in Doddershall Wood often has a wide variety of trees and shrubs and good structural diversity providing a range of microhabitats for invertebrates. Copyright: Tim Bernhard & Natural England.**



**Figure 16. A view of the footpath north of the road above Grendon Wood, showing abundant Privet blossom. A significant number of Black Hairstreak were observed here. Copyright: Tim Bernhard & Natural England.**

# Results of 2021 Survey

The Bernwood woodland complex was visited twice during June 2021 to survey additional areas not included in the earlier work. The first site visit was conducted on 16th June 2021, by Tim Bernhard accompanied by Trevor Mansfield of Natural England. A second visit was made the following day, accompanied by Sophie Sykes of Natural England. An exceptionally cold spring meant that many butterfly species appeared more than a week behind their usual time of emergence. Further wet and cool conditions in June meant that species such as Black Hairstreak would have had reduced breeding opportunities (pers. comm. Nick Bowles, Butterfly Conservation).

Because of the late spring and the delayed season, there was some concern that Black Hairstreak would not be on the wing during this survey. However fairly good numbers were observed. These were almost exclusively 'fresh' males, with very few females seen. Most females emerge a week later than the first males and the peak flight period would probably have been about 10 days later, when the species would have been present in greater numbers.

## Day 1 – Wednesday 16<sup>th</sup> June

Weather conditions were warm and sunny to begin with, gradually clouding over in the afternoon followed by light rain. The maximum temperature was 26 degrees Celsius.

### Hewins' Wood (SP70345 21617)

This small wood, which is not currently designated as SSSI, consists of fairly dense mixed plantation with dense blackthorn scrub around the southern and eastern margins. The wood, particularly the associated bridleway and roadside hedges are regarded as an important Black Hairstreak stronghold by local Butterfly Conservation members who regularly survey this site.

A particularly valuable feature here is the woodland edge habitat consisting of dense, bushy Blackthorn which has grown to a width of up to five metres outside the boundary fence of the wood on the south and south east sides. The feature was confirmed to provide very good supporting habitat for Black Hairstreak, and is also likely to support a broad range of other invertebrates, small mammals, reptiles and birds. The grassland south of the wood may also be of value in providing nectar sources for various insect orders including Lepidoptera. A total of **13** adult Black Hairstreak were observed along this southern edge to the wood. Other species of butterfly observed include Meadow Brown *Maniola jurtina* (12) and Large Skipper *Ochlodes sylvanus* (1). At least one Black Hairstreak was observed to fly out from the woodland fringe across the area of grassland and towards the north edge of Grendon Wood.

### **Bridleway alongside Hewin's Wood (SP70393 21797)**

The bridleway which runs north-south alongside Hewin's Wood is an interesting 'habitat corridor' lined with mature deciduous trees along with 'ride-edge' type habitat consisting of dense growth of Blackthorn and Hawthorn *Crataegus monogyna*. There are also more open areas alongside the path with patches of low scrub dominated by Bramble and Dog-rose, which are potentially of value as sheltered nectaring areas for Black Hairstreak. Several (>5) individuals of Black Hairstreak were observed along this bridleway. Other species observed included Speckled Wood *Pararge aegeria* (3) and Meadow Brown (5).



**Figure 17. This belt of dense, mature Blackthorn along the southern edge of Hewin's Wood is excellent supporting habitat for Black Hairstreak. The adjacent meadow is rich in wildflowers providing nectar sources for invertebrates. Copyright: Tim Bernhard & Natural England.**



**Figure 18. A view of the habitat along the bridleway adjacent to Hewin's Wood. There is an abundance of mature Blackthorn and a variety of nectar sources. Several individuals of Black Hairstreak were noted along this habitat corridor. Copyright: Tim Bernhard & Natural England.**



**Figure 19. A section of the bridleway further north towards the railway line. Here the Blackthorn has largely become too shaded to be suitable for Black Hairstreak. However, this part does provide suitable habitat for common butterflies such as Speckled Wood and Ringlet. Copyright: Tim Bernhard & Natural England.**

#### **Romer, Greatsea and Balmore Woods (SP71238 22654)**

This is a moderately large complex of connected woodlands which are not currently designated as SSSI. The woods have few historical records for Black Hairstreak because of the very limited public access available.

Parts of the southern edges of these woods could not be surveyed due to fencing being in place in connection with HS2 mitigation works. However, based on observation of the more accessible parts it is assumed that much of these areas consists of habitat which has the potential to support Black Hairstreak as Blackthorn is abundant along the woodland edge. There are historical records of Black Hairstreak from 'Blackthorn at the southern edge' of Greatsea Wood (pers. comm. Butterfly Conservation).

Wide grass rides are present in the woods providing open habitat. However, there is a limited extent of Blackthorn scrub and no Black Hairstreak were observed here during the visit by Tim Bernhard. However, Pete Boardman of the Natural England Field Unit recorded a sighting in the broad grass ride between Romer and Greatsea Woods at SP713230 in June 2021. Thus, it is considered highly likely that Black Hairstreak utilise the

ride system based on the close proximity to good quality supporting habitat and it is possible that a breeding colony is present. Parts of the ride system are relatively species-rich and plants noted include Ragged Robin *Silene flos-cucui*, Devil's-Bit Scabious *Succisa pratensis* and Common Spotted-Orchid *Dactylorhiza fuchsii*. Butterflies recorded include the common species Meadow Brown (6), Speckled Wood (3) and Large Skipper (1). There is certainly scope to improve habitat suitability for Black Hairstreak and other warmth-demanding invertebrates through sensitive management of this woodland block.

The wide track which runs through Romer and Greatsea Woods at SP 71273 23315 was surveyed. The south-facing side has what is judged to be moderately good supporting habitat for Black Hairstreak, at least in places. There are also several woodland clearings adjacent to the track which offer scrubby, sheltered habitat conditions. Despite this apparent suitability for Black Hairstreak none were observed. It is considered possible that the species is present in low numbers based on the extent and condition of the supporting habitat.



**Figure 20. A view of the footpath which runs along the southern margin of Romer Wood. There are several veteran and near-veteran trees here. This woodland habitat is generally too shady for Black Hairstreak. It was not possible to survey the adjacent south-facing edge of the wood just out of view in this image, but Blackthorn is present. Copyright: Tim Bernhard & Natural England.**





**Figure 21. Stands of mature Blackthorn are present along the broad, grass rides in Romer Wood, providing potentially suitable habitat for Black Hairstreak. However, there is a lack of the continuous rideside scrub which typifies the best quality woodlands supporting the species. Copyright: Tim Bernhard & Natural England.**



**Figure 22. A view of a ride-edge clearing in Romer Wood with potentially suitable supporting habitat for Black Hairstreak. The rides could readily be enhanced to improve suitability, especially by reducing shading of the south-facing side. Copyright: Tim Bernhard & Natural England.**



**Figure 23. There are areas of structurally diverse woodland and broad rides in Romer Wood. This type of structure provides excellent habitat for a wide range of warmth-demanding invertebrates. Suitability for Black Hairstreak could readily be enhanced. Copyright: Tim Bernhard & Natural England.**

#### **Sheephouse Wood SSSI (SP70483 23410)**

This is a relatively large block of deciduous woodland with a network of wide to narrow grass rides, some of which are lined with mature Blackthorn, providing good quality supporting habitat for Black Hairstreak. There is a long history of the presence of Black Hairstreak at this wood and the species is referred to in the citation describing the special conservation interest of the SSSI.

Previously reported sightings (Butterfly Conservation, pers comm.) have tended to refer to areas alongside the bridleway on the eastern side of the wood, which was confirmed to have suitable supporting habitat, and alongside Three Points Lane which consists of a narrow strip of woodland with frequent Blackthorn in the understory. However, this may be a reflection of the restricted public access here. Based on observation there is a very high likelihood that colonies of Black Hairstreak are present in other parts of Sheephouse Wood as good quality supporting habitat is present along sunny ride edges. However, several parts of the ride system lack ride-edge scrub and parts are quite shady. It is also noticeable that the distribution of blackthorn in suitable condition to support Black Hairstreak is somewhat restricted. Several Black Hairstreak were seen (**4**) in the ride system. A large number of Meadow Brown (50+) were observed along the rides, as well as Speckled Wood (1) and Large Skipper (1). Overall, it is considered likely that persistent

breeding colonies of Black Hairstreak are present along the eastern edges of the wood and in localised areas of the main ride system, but there would be benefits in considering management interventions to increase habitat suitability in parts of the wood.



**Figure 24. There is excellent habitat for warmth-demanding invertebrates in Sheephouse Wood, with well-structured scrub in sheltered, sunny locations and abundant Blackthorn growing with Rose and Bramble. However, this type of habitat structure is somewhat restricted in distribution. Copyright: Tim Bernhard & Natural England.**



**Figure 25. Another view of one of the main rides in Sheephouse Wood showing varied structure with mature Blackthorn scrub which may be supporting habitat for Black Hairstreak. There is good evidence to suggest that breeding colonies are present in the main ride system, but these may be small and localised. Copyright: Tim Bernhard & Natural England.**



**Figure 26. The south-east-facing side of Decoypond Wood has a dense fringe of mature Oak trees but there is potential supporting habitat for Black Hairstreak present as Blackthorn is very frequent in the margin. Copyright: Tim Bernhard & Natural England.**

### **Decoypond Wood SP695239**

This wood, which is not currently designated as SSSI, differs in character from the other woodlands in the survey as it has a dense structure and lacks the rides typical of most of the woods. It is situated a short distance north west of Sheephouse Wood SSSI. There appear to be no historical records of the presence of Black Hairstreak but this may be a reflection of lack of public access. There is a record of a sighting dated 2011 ((Butterfly Conservation pers. comm.) from a hedge at SP694243 which is 150 metres north of Decoypond Wood, suggesting that there was a breeding colony present in the vicinity, at least at that time. Aerial photographs show that a thick hedge in this location still has abundant Blackthorn but it has poor linkage to the surrounding landscape. Similarly, there is a hedgerow between Decoypond Wood and Sheephouse Wood with abundant Blackthorn but parts are in poor condition. Also, the southern side of this hedge has been planted with a broad strip of trees as part of the mitigation package for the HS2 construction work, which will pose a threat to future suitability for Black Hairstreak due to the inevitable increase in shading.

There was no evidence of suitable supporting habitat for Black Hairstreak in the main body of Decoypond Wood. However, the south-eastern edges provide potentially suitable Black Hairstreak habitat as mature Blackthorn is frequent along the sunny woodland margin, especially the section furthest from the railway. In addition, there is a strip of scrubby woodland jutting out from the south east corner and extending alongside the railway towards Sheephouse Wood, potentially providing an important habitat link between the woods (this was subsequently removed during HS2 construction work).

In summary, Decoypond Wood is judged to have limited potential to support Black Hairstreak. Suitable supporting habitat is currently limited and suffering poor connectivity. Interventions are needed to ensure that habitat connectivity for Black Hairstreak is maintained.

### **Shrubs Wood SP698245**

This relatively small wood, which is not currently designated as SSSI, is situated to the north of Sheephouse Wood and it is relatively isolated in the landscape. There appear to be no historical records of the presence of Black Hairstreak but this may be because there is no public access.

Tim Bernhard was not able to include this wood in his surveys due to time constraints and the wood was visited only briefly by members of the Natural England Field Unit in 2021 conducting invertebrate surveys. However, the wood was visited in July 2021 by Simon Curson, Sophie Sykes and Trevor Mansfield of Natural England to determine the extent of supporting habitat for Black Hairstreak.



**Figure 27. The southern margin of Shrubs Wood has a short length of well-structured mature Blackthorn in a sunny location with high potential for Black Hairstreak. Copyright: Trevor Mansfield & Natural England.**

Shrubs Wood has a single north-south central ride. This is mostly narrow and heavily shaded by tall, mature trees but there are some areas which are less heavily shaded and have more structured edges although mature Blackthorn is rather scarce. Current habitat suitability for Black Hairstreak in the body of the wood is therefore judged to be poor. A considerable amount of work to widen the rides and promote the growth of shrubby ride edge habitat would be required to produce habitat suitable for Black Hairstreak. The

western and eastern edges of the wood have frequent blackthorn but this is mostly rather sparse and does not form the dense thickets favoured by Black Hairstreak. However, at present there is one area at Shrubs Wood which is considered to have good quality suitable supporting habitat for Black Hairstreak. This is at the southern edge of the wood where there is good quality, well-structured transitional habitat with abundant Blackthorn interspersed with other flowering shrubs. This habitat is in close proximity to an area of tall grassland with a high frequency of flowers including knapweed and creeping thistle, and so is likely to provide good supporting habitat for warmth-demanding invertebrates.

It is worth noting that Blackthorn is abundant in an ancient hedgerow running north-south approximately 120 metres west of Shrubs Wood, and this links to Decoypond Wood. This offers high potential to form a high-quality ecological link between the woods with appropriate input.



**Figure 28. A view of the bridleway south of Runt's Wood showing well-structured mature hedgerow with abundant Blackthorn together with flowering Field Rose, an important nectar source for Black Hairstreak. Copyright: Graham Steven & Natural England.**

## **Day 2 – Thursday 17<sup>th</sup> June 2021**

Weather conditions for day 2 were not as good as the previous day, with heavier cloud, some light rain, and occasional sunny spells. The maximum temperature was 19 degrees Celsius. As these conditions were not ideal, fewer butterflies were observed.



### **Romer Wood and Greatsea Wood (SP70801 22819)**

At the southern margin of Romer/Greatsea Wood and extending westwards outside the woodland there is good quality habitat consisting of a broad margin of well-structured scrub and hedgerow with a south-facing aspect. All of this feature is considered to have high potential to support Black Hairstreak as Blackthorn is abundant and there is frequent Bramble and Rose, although no Black Hairstreaks were seen. Other butterfly species observed included Meadow Brown (50+) and Speckled Wood (10).

### **Three Points Lane SP721228**

A long section of the bridleway which runs alongside and to the south-east of Runt's Wood stretching for over 1 kilometre is lined on both sides with mature Blackthorn and has high quality supporting habitat for Black Hairstreak. Parts are shady and less suitable but overall, this area is considered to represent one of the highest quality and most extensive areas of supporting habitat for Black Hairstreak in the survey area. There is good provision of nectar sources including Dog Rose, Bramble and Privet. Despite relatively poor survey conditions Black Hairstreak (**6**) was seen flying at the tops of the bushes. Speckled Wood was also seen (4). The section between the south west corner of Runt's Wood and a small unnamed wood to the south west has abundant, bushy growth of Blackthorn and other shrub species. Judging by the high suitability of this habitat patch it is considered highly likely that there are breeding colonies of Black Hairstreak here. There is more high quality habitat further to the south beyond the small wood.

In addition to the records made by Tim Bernhard there was an additional confirmed sighting of Black Hairstreak (**1**) recorded in June 2021 by Pete Boardman of the Natural England Field Unit at SP718225. This is at the southern end of this section of bridleway close to the connection with the adjoining bridleway.

Local Butterfly Conservation members undertake annual surveys of Black Hairstreak along this section of bridleway and it is regarded by them as an important local stronghold.

The evidence suggests that there are breeding colonies of Black Hairstreak in several locations along this section of bridleway. There is very good quality supporting habitat present over a significant distance and there is good connectivity to other areas with high potential to support Black Hairstreak. It is therefore highly likely that this feature is of importance both in supporting breeding colonies and in acting as an important habitat link in the landscape. Even so, it is worth stating that there are clear opportunities to further increase habitat connectivity between the bridleway and nearby woods and hedgerows with supporting habitat for Black Hairstreak. For example, there is a section of good quality hedgerow, central point SP 72372 23393, which may once have formed a habitat link between the bridleway and the eastern side of Balmore Wood. Part of this feature appears to have been lost and this area of good quality supporting habitat is now somewhat isolated in the landscape. There is an opportunity here to restore habitat connectivity for Black Hairstreak and other species.

### **Runt's Wood (SP72287 22784)**

This wood is not currently designated as SSSI. It is a rather dense wood with several grass rides. However, it is the woodland edges which have greatest potential to be supporting habitat for Black Hairstreak. There is particularly suitable habitat present at the south and south-eastern edges of the wood. There is an abundance of Blackthorn providing a well-structured fringe, interspersed with other shrubs and small trees including Sallow (*Salix caprea*) and Oak, together with frequent Bramble and Rose. Butterfly species observed here include Meadow Brown (5), Speckled Wood (2) and Small Tortoiseshell (*Aglais urticae*) (2). Despite promising survey conditions no Black Hairstreak were noted but it was confirmed to be present close by southwards along the bridleway. There are other patches of good quality supporting habitat in the vicinity of Runt's Wood but currently poorly connected to other areas of supporting habitat. This is particularly noticeable to the east of the wood where there is a long section of bushy hedgerow with abundant Blackthorn which is not currently connected to Runt's Wood or the section of Three Points Lane which supports Black Hairstreak. There is an opportunity to significantly improve habitat linkage for Black Hairstreak through hedgerow planting here.



**Figure 29. The south-west corner of Runt's Wood where there is a junction between a bridleway and permissive footpath. The well-structured shrubby woodland edge here has abundant mature Blackthorn and has high potential to be supporting habitat for Black Hairstreak. Copyright: Tim Bernhard & Natural England.**



**Figure 30. A view of the southern edge of Runt's Wood which has a more or less continuous fringe of Blackthorn. Copyright: Tim Bernhard & Natural England.**



**Figure 31. Although the main body of Runt's Wood is mostly unsuitable for Black Hairstreak there are patches of potentially good supporting habitat such as this section of ride edge in one of the main rides. There are opportunities to extend this type of feature through sympathetic management. Copyright: Tim Bernhard & Natural England.**



**Figure 32. A section of good quality hedgerow at the edge of the bridleway which runs along the north edge of Runt's Wood. No Black Hairstreak were noted here but based on the quality of the feature it has high potential to support the species. Copyright: Tim Bernhard & Natural England.**

### **Balmore Wood SP71917 22900**

Balmore Wood is part of the larger Greatsea/Romer complex. Much of this wood, which is not currently designated as SSSI, appears to be unsuitable for Black Hairstreak. Most of it is modified and it has areas of recent felling and replanting. There are grassy areas but little in the way of scrub or well-structured rides. However, the south eastern margin of the wood has a narrow strip which juts out from the rest of the wood. This forms an important habitat link between Balmore Wood, Runt's Wood and nearby areas via Three Points Lane. The south-facing woodland margin of the narrow woodland strip at grid reference SP 72177 22959 has abundant mature Blackthorn together with frequent nectar-sources including Field Rose (*Rosa arvensis*). Black Hairstreak (2) was noted along this edge. Based on the good quality and high suitability of the habitat here it is highly likely that there is a breeding colony of Black Hairstreak in this woodland margin or very close vicinity. This good quality supporting habitat extends for a distance of about 274 metres along the woodland margin. Unfortunately, this does not extend further around the whole of the southern edge of the wood. Even so, this is an important area of Black Hairstreak supporting habitat.

There do not appear to be historical records of Black Hairstreak from Balmore Wood, possibly because of the restricted public access, but there is a concentration of records from the closest section of Three Points Lane.



**Figure 33. An excellent section of well-structured woodland on the south-eastern margin of Balmore Wood where it almost joins Runt's Wood (visible in the background). This is an important habitat link between the two woodlands and was confirmed to support Black Hairstreak. Copyright: Tim Bernhard & Natural England.**



**Figure 34. In contrast, the south and south-eastern edges of the main body of Balmore Wood have a lack of suitable supporting habitat for Black Hairstreak. Copyright: Tim Bernhard & Natural England.**



**Figure 35. The interior of Balmore Wood has wide rides, but these are shady and there is a lack of ride-edge scrub. Blackthorn is rare. Habitat suitability for Black Hairstreak is therefore low. Even so there are opportunities to improve habitat suitability. Copyright: Tim Bernhard & Natural England.**

## Home Wood SP716241

This wood, which is not currently designated as SSSI, is at the northern edge of the woodland complex. It is relatively more isolated in the landscape than most of the other woodlands. Even so, there is a history of Black Hairstreak presence. Although there is no public access to the wood local Butterfly Conservation members have recorded Black Hairstreak in hedges connected to the wood from the public footpath just east of the site and speak of 'other colonies nearby'. This is strongly suggestive that there is at least one persistent breeding colony here.

Tim Bernhard was not able to include this wood in his surveys due to time constraints but the wood was subsequently visited by Sophie Sykes, Trevor Mansfield and Simon Curson of Natural England in 2021. In addition, Pete Boardman and other members of the Natural England Field Unit visited Home Wood in June 2021 and recorded a sighting of Black Hairstreak (1) at SP716241 in one of the main rides.

Although parts of Home Wood have been modified through management for commercial forestry there is good quality habitat present of high value to warmth-demanding invertebrates. The main rides are broad and have areas of ride-side scrub with abundant Blackthorn in sheltered, sunny locations. Of particular note is the presence of continuous linear features of good quality supporting habitat for Black Hairstreak which, taken together, make this part of the Bernwood habitat complex of very high value for the species. These consist of a continuous belt of dense, bushy Blackthorn around the south eastern margin of the wood stretching for 450 metres. This is just a few metres from a further stretch of good quality habitat in the form of a thick field hedgerow which stretches for 298 metres towards Muxwell Farm and links to other hedges. This is very close to the main east-west ride in Home Wood which has 440 metres of continuous good quality supporting habitat. Combined, this is one of the most extensive areas of near-continuous supporting habitat for Black Hairstreak in the Bernwood complex.

Given that Home Wood appears to be managed on a commercial basis it will be important to ensure that its value for Black Hairstreak is taken into consideration when planning operations. There are opportunities to further enhance its value by increasing its linkage to nearby woodlands and hedgerows.



**Figure 36. A view of part of the main east-west ride in Home Wood showing the good quality habitat present. This has good connectivity to other areas of good quality supporting habitat for Black Hairstreak. Copyright: Trevor Mansfield & Natural England.**



**Figure 37. Home Wood has a continuous belt of dense, Blackthorn thicket all around the south-eastern quadrant of the wood. This is of very high value in providing habitat linkage across the landscape for Black Hairstreak. Copyright: Trevor Mansfield & Natural England.**



### Finemere Wood SSSI SP71354 21937

This interesting woodland is managed as a nature reserve by the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT). The southern edge of the wood from the River Ray to the western corner has a continuous, well-structured fringe of mature Blackthorn broken up only by a small block of recent tree planting. This woodland margin stretches for around 880 metres and provides very good supporting habitat for both Black Hairstreak and Brown Hairstreak (*Thecla betulae*). Finemere Wood has long been regarded as an important stronghold for Black Hairstreak and this species is specifically mentioned in the SSSI citation. The site is surveyed annually by local butterfly enthusiasts and Black Hairstreak is regularly recorded from both the internal ridge edges and the southern woodland margin. There is specific management carried out for the benefit of Hairstreak butterflies in the form of rotational 'coppicing' of Blackthorn (pers. comm. Butterfly Conservation).

Several (4) Black Hairstreak butterflies were seen along the southern woodland margin. The habitat here is highly suitable for the species and it represents one of the most extensive areas of supporting habitat encountered in the survey.



**Figure 38.** The southern edge of Finemere Wood has an extensive fringe of blackthorn providing very good supporting habitat for Black Hairstreak. The blackthorn here has both the mature growth favoured by Black Hairstreak and new suckers growing into the meadow which are favoured by Brown Hairstreak. Copyright: Tim Bernhard & Natural England.



**Figure 39. The internal ride system in Finemere Wood is limited to two main rides and there is a limited extent of rideside scrub suitable for Black Hairstreak. Even so there is clear evidence of persistent breeding colonies in the wood, as well as around the southern margin. Copyright: Graham Steven & Natural England.**

## Results

Table 1 below shows the number of confirmed sightings of Black Hairstreak recorded during the surveys carried out by Natural England at each location and presence of suitable supporting habitat.

**Table 1. Summary of confirmed sightings of Black Hairstreak arising from field survey carried out between 2018 and 2021.**

Site name	No of confirmed sightings	Supporting habitat present yes/no
Ham Home- cum-Hamgreen Woods (+Oxford Lane)	16	yes
Grendon Wood rides and margins	51	yes
Roadside hedgerow north of Grendon Wood	100+	yes
Dodderhall Wood rides	13	yes
Hewin's Wood south margin	13	yes
Hewin's Wood bridleway	5+	yes
Sheephouse Wood	4	yes
Decoypond Wood	0	Yes (limited)
Shrubs Wood	0	Yes (very limited)
Romer & Greatsea Woods	1	Yes (limited)
Three Points Lane	7	yes
Runts Wood	0	Yes (limited)
Balmore Wood	2	Yes (limited)
Home Wood	1	yes
Finemere Wood	4+	yes

Maps showing the combined results of field surveys to record the presence of Black Hairstreak, field surveys to locate suitable supporting habitat for Black Hairstreak and aerial photo analysis to locate other areas of suitable supporting habitat are presented at annex 1.

## **Conclusions**

The field work undertaken in 2018 and 2021, and the additional work to investigate previous records and the extent of supporting habitat in the area, provides clear evidence that the Bernwood habitat complex is of exceptional importance for the Black Hairstreak. Through this work it has been demonstrated that the woodlands and hedgerows in the area of search make a significant contribution towards the maintenance of the local meta-population and that the colonies here are important in a national context. Ensuring the protection and maintenance of the population in the Bernwood area will be critical for the long-term survival of this species in the UK. The work has significantly enhanced our understanding of the location of Black Hairstreak breeding colonies and its supporting habitat through investigation of areas not previously surveyed for this species. The work has shown that suitable supporting habitat is widely distributed across the area. It has also identified that some colonies may be isolated in the landscape and that there are opportunities to improve habitat suitability in several locations through management interventions such as ride-widening and improved management of ride edges. The work also highlights the desirability of increasing habitat connectivity across the landscape through specific management such as hedge planting and relaxation of cutting of woodland margins. Such measures will have additional benefits for other wildlife, including bats.

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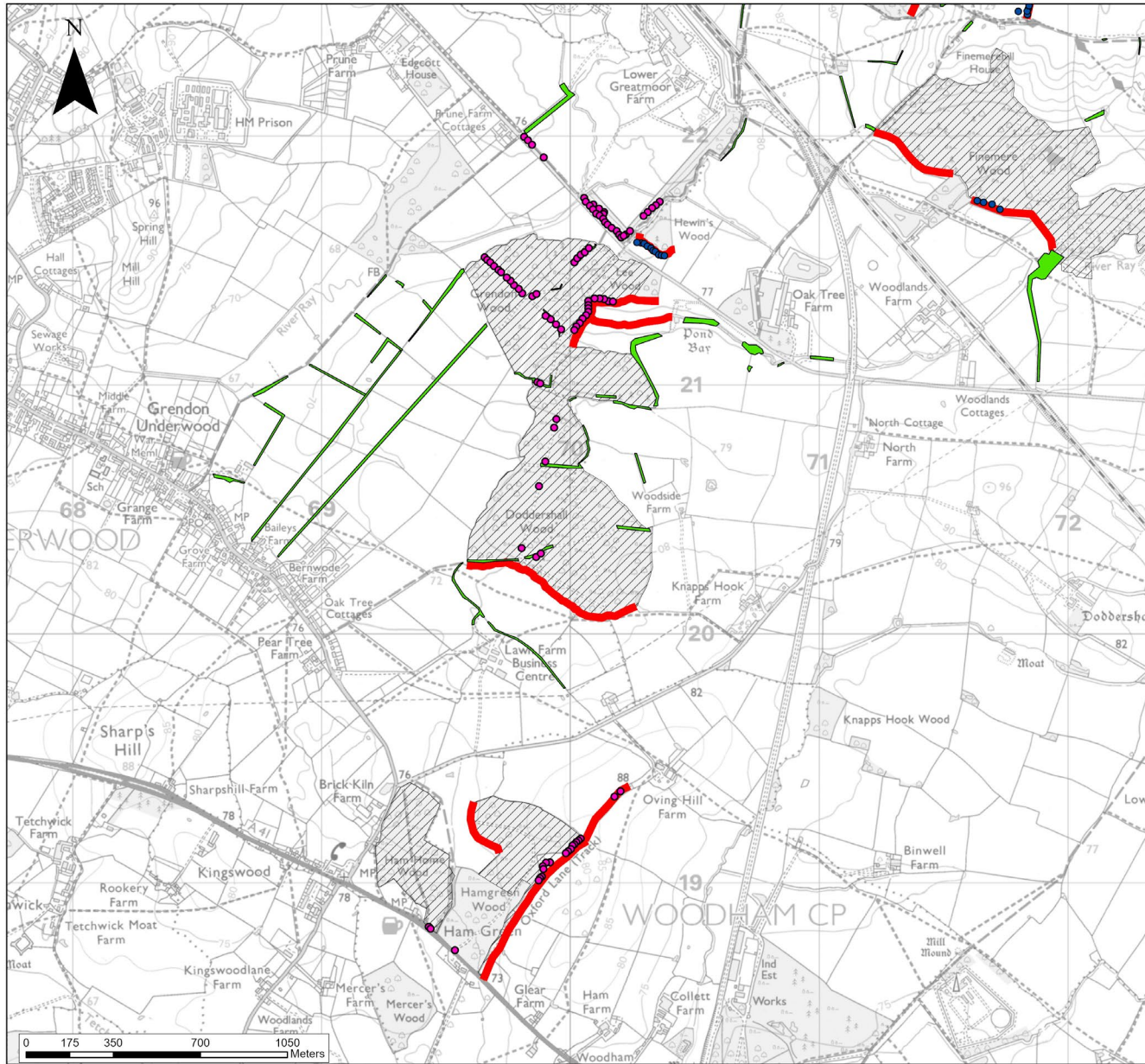
# APPENDIX 1

## Maps showing combined evidence of Black Hairstreak confirmed sightings and supporting habitat.

The maps on the following pages show good quality black hairstreak habitat (shown **Red**) identified through field survey, additional areas of good quality judged to be highly likely to be supporting habitat for black hairstreak identified through analysis of aerial photographs (shown **Green**) and confirmed sightings of adult Black Hairstreak based on field survey 2018 (**Purple** dot), and 2021 (**Blue** dot).

Each dot on the maps represents a sighting of an adult butterfly, except in the case of the roadside north of Grendon Wood where there were multiple overlapping records based on groups of individuals.

The concentration of sightings in a number of separate locations indicates that there are several discrete breeding populations.



**Bernwood South**

Black Hairstreak sightings

Survey year

- 2018
- 2021

■ Suitable habitat (aerial photography analysis)

■ Suitable habitat (field based assessment)

▨ Sites of Special Scientific Interest (England) © Natural England

Areas assessed as suitable habitat for Black Hairstreak butterfly are hedgerows or woodland edges or patches of scrub with a southerly aspect and with a significant element of mature Blackthorn (*Prunus spinosa*) (or likely to grow to maturity).

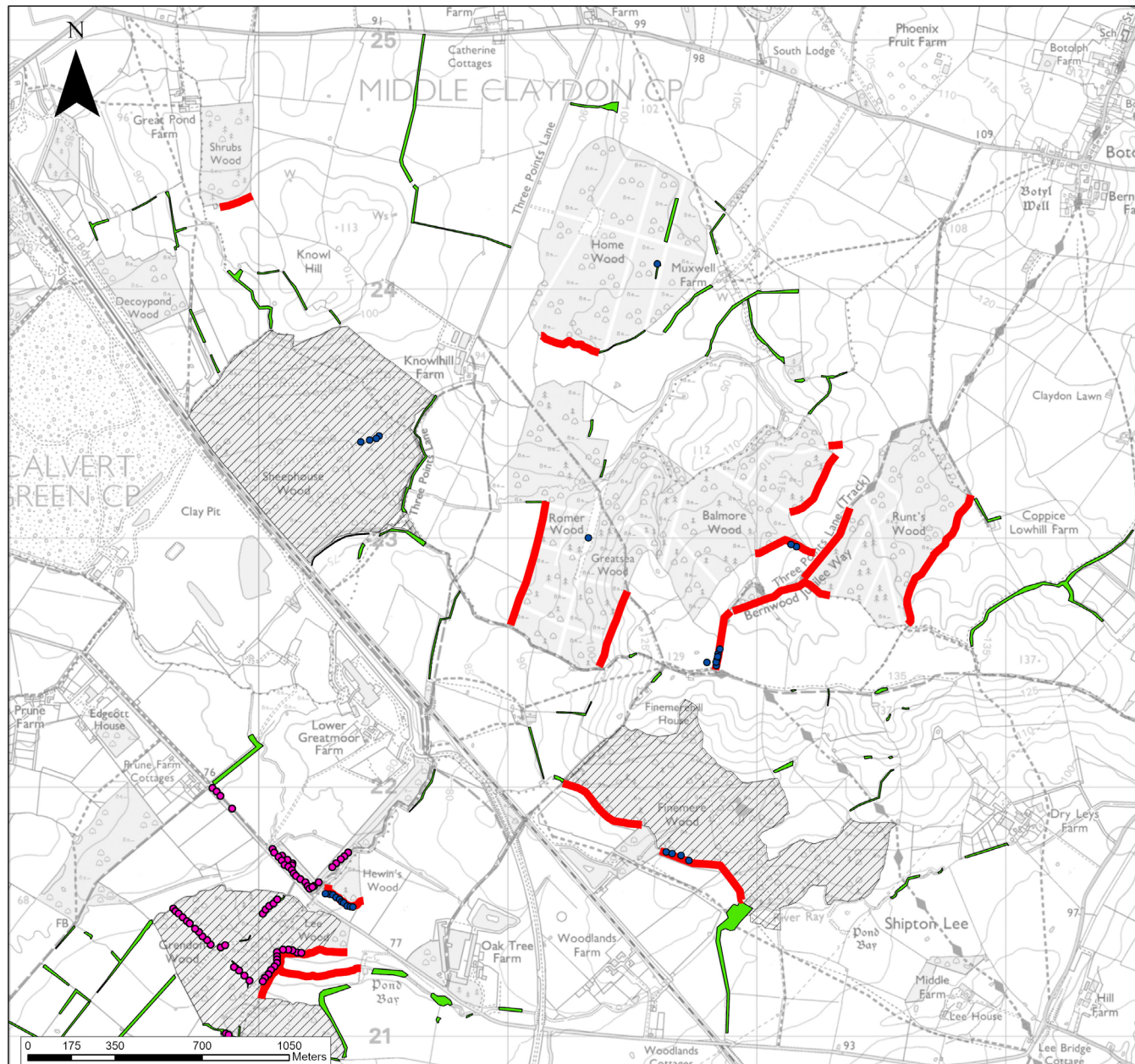
Field based assessment undertaken in 2022.

Aerial photography analysis undertaken in 2023.



Map created on 09/04/2024 by EF, Natural England

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## Bernwood North

Black Hairstreak sightings

Survey year

- 2018
- 2021

■ Suitable habitat (aerial photography analysis)

■ Suitable habitat (field based assessment)

▨ Sites of Special Scientific Interest (England) © Natural England

Areas assessed as suitable habitat for Black Hairstreak butterfly are hedgerows or woodland edges or patches of scrub with a southerly aspect and with a significant element of mature Blackthorn (*Prunus spinosa*) (or likely to grow to maturity).

Field based assessment undertaken in 2022.

Aerial photography analysis undertaken in 2023.

Map created on 11/04/2024 by EF, Natural England

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