Haverhill Woodlands Lichen Survey

March 2023

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Report details

Acknowledgements

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Cover photo

Lapsed coppiced oak in North Wood, near Haverhill.

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Summary

This report describes a lichen survey at six woodlands in an agricultural landscape north of Haverhill in Suffolk. The aim of this survey was to identify the presence and location of acidophilous and nitrophilous lichens growing on acid-barked tree species. Records were made from oak trees in all six woodlands and the overall results were as follows:

- **Cadge's Wood** – 1 acidophyte and 7 nitrophyte indicators.
- **Howe Wood** – 1 acidophyte and 10 nitrophyte indicators.
- **Littley Wood** – 3 acidophyte and 8 nitrophyte indicators.
- **North Wood** – 3 acidophyte and 8 nitrophyte indicators.
- **Over and Lawn Woods SSSI** – 3 acidophyte and 7 nitrophyte indicators.
- **The New Plantation** – 2 acidophyte and 8 nitrophyte indicators.

The lichen communities in the woodlands surveyed have all been extensively modified by air pollution, with many species present tolerating elevated nitrogen levels. The trunk assemblage of most mature oak trees was species-poor, with extensive green algae present, probably as the result of bark acidification caused by historic sulphur dioxide pollution. In general, many of the woods were also shaded, either by lapsed hazel coppice, or by the higher density of trees on plantation sites.

Additionally, the survey was designed to provide a baseline assessment of lichens present on a range of tree species within the surveyed woodlands. 64 lichen, 14 lichenicolous fungi, and 2 probably non-lichenised fungi species were recorded, with the total species recorded at each site as follows:

- **Cadge's Wood** – 44 lichen and 4 lichenicolous fungi species.
- **Howe Wood** – 33 lichen and 5 lichenicolous fungi species.
- **Littley Wood** – 42 lichen and 9 lichenicolous fungi species.
- **North Wood** – 36 lichen and 2 lichenicolous fungi species.
- **Over and Lawn Woods SSSI** – 48 lichen, 8 lichenicolous fungi, and 2 probably non-lichenised fungi species.
- **The New Plantation** – 32 lichen and 5 lichenicolous fungi species.

Of the 80 species recorded during the current survey, 4 are categorised as Nationally Rare, and 13 as Nationally Scarce (including one species of International Responsibility). None of the species are protected under European legislation, Schedule 8 of the *Wildlife and Countryside Act 1981*, or listed as species of principal importance under Section 41 of the *Natural Environment and Rural Communities Act* 2006. All species recorded with conservation status have a threat assessment as either Least Concern, or Not Evaluated.

Contents

1 Introduction

1.1 Brief

The brief for this survey was to assess lichen assemblages in six woodlands in an agricultural landscape north of Haverhill in Suffolk. This was required to:

- Provide data on the presence of acidophyte and nitrophyte lichens on acid-barked trees at the edge and interior of each woodland.
- Record the lichen assemblages present, including the presence of conservation significant species.

1.2 Site details

The six woodlands included in the survey area and corresponding details from the Ancient Woodland Inventory (Natural England, 2023) are listed in Table 1.

Table 1. The designation, Ancient Woodland Inventory details (Natural England, 2023), and area of six woodlands north of Haverhill included in the lichen survey.

Site	O.S. grid reference	Designation	Ancient Woodland Inventory	Ancient Woodland Inventory parcels	Area (ha)
Cadge's Wood	TL 639 493	–	ASNW	24828	4.83
Howe Wood	TL 648 471	–	ASNW	35300	7.72
Littley Wood	TL 649 488	–	PAWS	37617	8.07
North Wood	TL 649 495	–	PAWS	13654, 13655	4.26
Over and Lawn Woods	TL 635 484	SSSI	ASNW	36881, 41354	43.58
The New Plantation	TL 651 499	–	PAWS	13657, 48327	4.92

Key – Designation: SSSI = Site of Special Scientific Interest. **Ancient Woodland Inventory**: ASNW = Ancient Semi-Natural Woodland; PAWS = Plantation on Ancient Woodland Sites.

2 Method

2.1 Fieldwork

2.1.1 Survey area

The location of the six woodlands surveyed is shown in Figure 1.

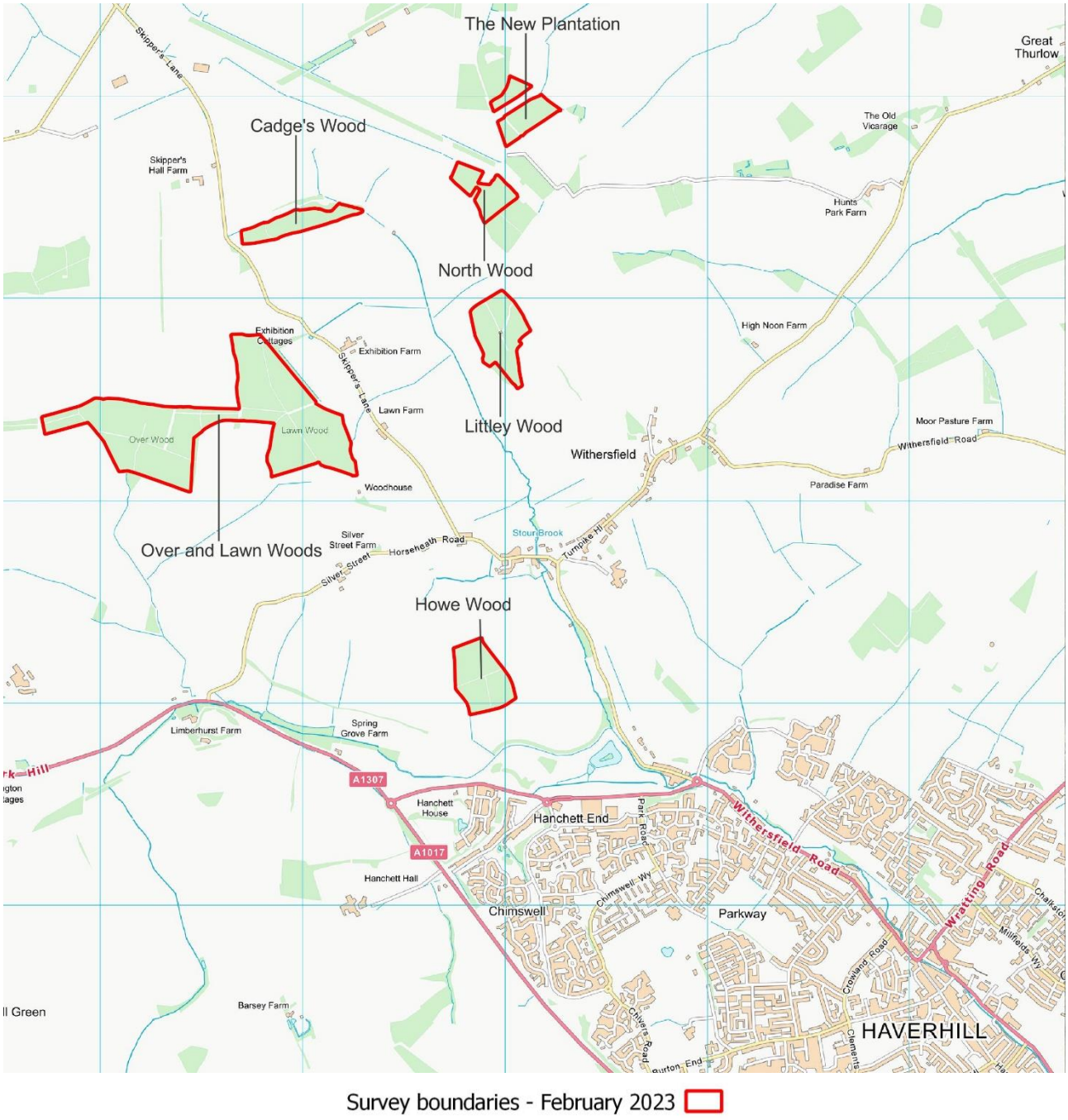

Figure 1. The locations of six woodlands north of Haverhill in Suffolk, surveyed for lichens in February 2023. Contains OS data © Crown copyright and database rights 2023.

2.1.2 Survey dates and weather conditions

Four days of fieldwork were completed during February 2023. The weather conditions during the survey are shown in Table 2.

Table 2. Weather conditions during lichen survey visits to woodlands north of Haverhill in February 2023.

Date	Maximum temperature (°C)	Rainfall (mm)	Maximum wind speed (mph)
17th February 2023	15	0	8
18th February 2023	13	0	14
19th February 2023	12	0	9
21st February 2023	10	0	4

2.1.3 Survey tracks

The survey routes were recorded as GPS tracks, and these are shown in Appendix 1.

2.1.4 Survey equipment

The survey equipment used is listed below:

- Lichen candelaris x10 magnification lens.
- Hammer, chisel, and knife for removal of specimens.
- Packaging for storage of specimens.
- Sodium hypochlorite (C).
- Potassium hydroxide 10% solution (K).
- Paraphenylenediamine (Pd) as Steiner's solution.
- Alonefire SV003 10W 365nm UV Torch.
- Compass.
- Garmin eTrex 32x GPS.
- Olympus TG5 camera.
- 1:25,000 Ordnance Survey map.

2.1.5 Species recording

Lichen locations were recorded using a Garmin eTrex 32x GPS, with an accuracy of +/- 3 metres. Taxonomic nomenclature follows the British Lichen Society (BLS) on-line Taxon Dictionary (British Lichen Society, 2023). Some lichen names differ in the BLS data entry spreadsheet as it has not been fully updated to match the Taxon Dictionary. These changes are summarised in Table 3.

Table 3. Species name changes between the current BLS taxon dictionary and previous published names.

Current name	Synonym
Alyxoria culmigena	*Opegrapha herbarum*
Alyxoria ochrocheila	*Opegrapha ochrocheila*
Alyxoria viridipruinosa	*Opegrapha viridipruinosa*
Arthonia atra	*Opegrapha atra*
Bacidina delicata	*Bacidia delicata*
Bacidina neosquamulosa	*Bacidia neosquamulosa*
Candelariella xanthostigmoides	*Candelariella reflexa*
Coenogonium pineti	*Dimerella pineti*
Diarthonis spadicea	*Arthonia spadicea*
Glaucomaria carpinea	*Lecanora carpinea*
Myriolecis hagenii	*Lecanora hagenii*

2.2 Site evaluation

2.2.1 Acidophyte and nitrophyte indicator lichen species

At each site the presence/absence of acidophyte and nitrophyte lichens was recorded, based on lists of indicator species in continental Europe, England, and Wales (van Herk, 1999 & 2002; Wolseley and others, 2006; Bosanquet, 2019). The indicator species are listed in Table 4. In addition, the position of the lichen species was noted as on the woodland edge or interior, and growing on a twig, branch, or trunk.

Table 4. Species considered to be acidophyte and nitrophyte indicator lichen species (van Herk, 1999 & 2002; Wolseley *et al*., 2006; Bosanquet, 2019).

Acidophyte indicator species	Nitrophyte indicator species
Chaenotheca ferruginea	*Amandinea punctata*
Cladonia species	*Arthonia radiata*
Evernia prunastri	*Caloplaca citrina*
Graphis species	*Caloplaca holocarpa*
Hypocenomyce scalaris	*Candelariella aurella*

Acidophyte indicator species	**Nitrophyte indicator species**
Hypogymnia physodes	*Candelariella xanthostigmoides*
Hypogymnia tubulosa	*Candelariella vitellina*
Lecanora aitema	*Candelariella xanthostigma*
Lecanora conizaeoides	*Lecanora muralis*
Lecanora pulicaris	*Lecidella elaeochroma*
Lepraria incana	*Myriolecis dispersa* grp. (incl. *M. hagenii*)
Ochrolechia microstictoides	*Phaeophyscia orbicularis*
Parmelia saxatilis	*Phaeophyscia nigricans*
Parmelia sulcata	*Physcia adscendens*
Parmeliopsis ambigua	*Physcia caesia*
Placynthiella icmalea	*Physcia dubia*
Platismatia glauca	*Physcia tenella*
Pseudevernia furfuracea	*Punctelia subrudecta*
Trapeliopsis flexuosa	*Rinodina gennarii*
Trapeliopsis granulosa	*Xanthoria candelaria*
Tuckermanopsis chlorophylla	*Xanthoria calcicola*
Usnea species	*Xanthoria parietina*
–	*Xanthoria polycarpa*

2.2.2 Species conservation status

The conservation evaluation of each species is based on criteria in Woods & Coppins (2012) and Sanderson and others (2018), as follows:

- **IUCN Red List Threat Categories, Abbreviations: EX** – Extinct; **CR** – Critically Endangered (taxa that meet CR criteria and are at high risk of extinction in the wild); **EN** – Endangered (taxa that meet EN criteria and are at high risk of extinction in the wild); **VU** – Vulnerable (taxa that meet VU criteria and are at high risk of extinction in the wild); **DD** – Data Deficient (in most cases, species have recently been found in GB and there is insufficient data available for evaluation); **NT** – Near Threatened (when taxa do not qualify for CR, EN or VU status, but are close to qualifying least or is likely to qualify in the future); and, **LC** – Least Concern.

- **Other abbreviations: NE** – Not Evaluated (conservation status of the taxa has not yet been evaluated); **E** – Endemic (i.e. taxa recorded only from the British Isles), **IR** – International Responsibility (likely Britain supports 10% of the extant European and/or global population, however, further research is required); **NR** – Nationally Rare (taxa that are recorded from 1-15 hectads); **NS** – Nationally Scarce (taxa that are recorded from 16 – 100 hectads; **P** – Priority BAP species (taxa listed within the Biodiversity Action Plan); and, **S8** – Schedule 8 (taxa listed on Schedule 8 of the Wildlife & Countryside Act 1981).
- **Taxa on published lists of principal importance for the conservation of biodiversity: Eng** – England (taxa listed under Section 41 of the *Natural Environment and Rural Communities Act* 2006).

2.3 Constraints

No constraints were encountered during this survey.

3 Results

3.1 Acidophyte and nitrophyte lichen indicator species

3.1.1 Cadge's Wood

Cadge's Wood is a broadleaved woodland with frequent ash, field maple and hazel, and occasional oak (see Photo A2.1). The trees are a mixture of lapsed coppice stools and standards. In general the wood is shaded by the hazel coppice, and the hawthorn hedge forming the southern boundary.

Forty-four lichen species and four lichenicolous fungi were recorded in Cadge's Wood. These included one acidophyte and seven nitrophyte indicator species recorded on oak, which are summarised in Table 5. One acidophyte and three nitrophyte indicator species were recorded in the woodland interior, due to the level of shade. Oak trunks were mostly covered in algae and devoid of lichens.

Table 5. Acidophyte and nitrophyte indicator lichen species recorded on oak in Cadge's Wood in February 2023.

Species	Indicator category	Position at woodland edge	Position at woodland interior
Parmelia sulcata	Acidophyte	Tb	Tb
Arthonia radiata	Nitrophyte	Tb	–
Candelariella xanthostigmoides	Nitrophyte	Tb	–

Lecidella elaeochroma	Nitrophyte	Tb	–
Phaeophyscia orbicularis	Nitrophyte	Tb	Tb
Physcia tenella	Nitrophyte	Tb	Tb
Punctelia subrudecta	Nitrophyte	Tb	–
Xanthoria parietina	Nitrophyte	Tb	Tb

Key – **Position**: Tb = Branch.

3.1.2 Howe Wood

Howe Wood is a plantation woodland with frequent ash standards, field maple, hazel and hornbeam coppice, and occasional oak (see Photo A2.2). The north-east of the woodland is extensively planted with Scots pine, and overall it is shaded.

Thirty-three lichen species and five lichenicolous fungi were recorded in Howe Wood. These included one acidophyte and ten nitrophyte indicator species recorded on oak, which are summarised in Table 6. No acidophyte and four nitrophyte lichens were recorded in the woodland interior, due to the level of shade. Oak trunks were mostly covered in algae and devoid of lichens.

Table 6. Acidophyte and nitrophyte indicator lichen species recorded on oak in Howe Wood in February 2023.

Species	Indicator category	Woodland edge	Woodland interior
Parmelia sulcata	Acidophyte	Tb	–
Amandinea punctata	Nitrophyte	Tr	–
Arthonia radiata	Nitrophyte	Tr	–
Candelariella xanthostigmoides	Nitrophyte	Tr	–
Myriolecis hagenii	Nitrophyte	Tb	–
Lecidella elaeochroma	Nitrophyte	Tr	Tw
Phaeophyscia orbicularis	Nitrophyte	Tb, Tr	–
Physcia adscendens	Nitrophyte	Tb	–
Physcia tenella	Nitrophyte	Tb, Tr	Tw
Punctelia subrudecta	Nitrophyte	–	Tb
Xanthoria parietina	Nitrophyte	Tb, Tr	Tw

Key – **Position**: Tw = Twig; Tb = Branch; Tr = Trunk.

3.1.3 Littley Wood

Littley Wood is a broadleaved woodland with frequent ash, field maple and hazel, and occasional oak (see Photo A2.3). The trees are a mixture of lapsed coppice stools and standards. Some areas of the wood have been planted with beech and Scots pine, and in general it is shaded.

Forty-two lichen species and nine lichenicolous fungi were recorded in Littley Wood. These included three acidophyte and eight nitrophyte indicator species recorded on oak, which are summarised in Table 7. One acidophyte and five nitrophyte indicator species were recorded in the woodland interior, due to the level of shade. Oak trunks were mostly covered in algae and devoid of lichens.

Table 7. Acidophyte and nitrophyte indicator lichen species recorded on oak in Littley Wood in February 2023.

Species	Indicator category	Position at woodland edge	Position at woodland interior
Cladonia sp.	Acidophyte	Tr	–
Flavoparmelia caperata	Acidophyte	Tb	–
Parmelia saxatilis	Acidophyte	Tb	Tw
Arthonia radiata	Nitrophyte	Tw, Tb	–
Candelariella xanthostigmoides	Nitrophyte	Tb	–
Lecidella elaeochroma	Nitrophyte	Tb	–
Phaeophyscia orbicularis	Nitrophyte	Tb	Tw
Physcia adscendens	Nitrophyte	Tb	Tw
Physcia tenella	Nitrophyte	Tb, Tr	Tw
Punctelia subrudecta	Nitrophyte	Tb, Tr	Tw, Tb
Xanthoria parietina	Nitrophyte	Tb	Tw

Key – **Position**: Tw = Twig; Tb = Branch; Tr = Trunk.

3.1.4 North Wood

North Wood is a broadleaved woodland with frequent ash, field maple and hazel, and occasional oak (see Photo A2.4). The trees are a mixture of lapsed coppice stools and standards. Some areas of the wood have been planted with beech and Scots pine, and in general it is shaded.

Thirty-six lichen species and two lichenicolous fungi were recorded in North Wood. These included three acidophyte and eight nitrophyte indicator species recorded on oak, which are summarised in Table 8. One acidophyte and four nitrophyte indicator species were recorded in the woodland interior, due to the level of shade. Oak trunks were mostly covered in algae and devoid of lichens.

Table 8. Acidophyte and nitrophyte indicator lichen species recorded on oak in North Wood in February 2023.

Species	Indicator category	Position at woodland edge	Position at woodland interior
Cladonia sp.	Acidophyte	Tb	–
Flavoparmelia caperata	Acidophyte	Tb	–
Parmelia sulcata	Acidophyte	Tb	Tb
Arthonia radiata	Nitrophyte	Tb	–
Candelariella xanthostigmoides	Nitrophyte	Tb	Tb
Lecidella elaeochroma	Nitrophyte	Tb	Tb
Phaeophyscia orbicularis	Nitrophyte	Tb	–
Physcia adscendens	Nitrophyte	Tb	–
Physcia tenella	Nitrophyte	Tb	–
Punctelia subrudecta	Nitrophyte	Tb, Tr	Tr
Xanthoria parietina	Nitrophyte	Tb, Tr	Tb

Key – **Position**: Tb = Branch; Tr = Trunk.

3.1.5 Over and Lawn Woods SSSI

Over and Lawn Woods SSSI is a broadleaved woodland with frequent ash, field maple and hazel, and occasional oak, birch, aspen, hawthorn, and sweet chestnut (see Photos A2.5 and A2.6). The trees are a mixture of lapsed coppice stools and standards, with one lapsed pollard oak on the south side of Lawn Wood. In some parts of the wood the hazel coppice is very dense.

Forty-eight lichen species, eight lichenicolous fungi, and two non-lichenised fungi were recorded in Over and Lawn Woods. These included three acidophyte and seven nitrophyte indicator species recorded on oak, which are summarised in Table 9. Overall the species recorded at the woodland edge and interior were similar, due to the broad rides within the wood allowing greater light levels for some oak trees. Oak trunks were mostly covered in algae and devoid of lichens.

Table 9. Acidophyte and nitrophyte indicator lichen species recorded on oak in Over and Lawn Woods SSSI in February 2023.

Species	Indicator category	Position at woodland edge	Position at woodland interior
Cladonia sp.	Acidophyte	–	Tr
Parmelia saxatilis	Acidophyte	Tb	Tw
Parmelia sulcata	Acidophyte	Tb	Tw
Arthonia radiata	Nitrophyte	Tw, Tb	Tw
Lecidella elaeochroma	Nitrophyte	Tw, Tb	Tw, Tb
Phaeophyscia orbicularis	Nitrophyte	Tw, Tb	Tw
Physcia adscendens	Nitrophyte	Tw, Tb	Tw
Physcia tenella	Nitrophyte	Tw, Tb	–
Punctelia subrudecta	Nitrophyte	Tw, Tb, Tr	Tw, Tb
Xanthoria parietina	Nitrophyte	Tw, Tb	Tw, Tb

Key – **Position**: Tw = Twig; Tb = Branch; Tr = Trunk.

3.1.6 The New Plantation

The New Plantation is a plantation woodland with frequent oak, and a lesser component of sycamore, hazel, ash, and hawthorn (see Photo A2.7). There has also been replanting with tree species including oak, hornbeam, and wild cherry. These replanted areas currently have an open character as the planted trees are still saplings, with more dense tree cover around the perimeter. A second block was also surveyed just to the north. This wooded area is a mixture of planted conifers, with oak, ash, field maple and poplar.

Thirty-two lichen species and five lichenicolous fungi were recorded in The New Plantation. These included two acidophyte and eight nitrophyte indicator species recorded on oak, which are summarised in Table 10. Overall the species recorded at the woodland edge and interior were similar, probably due to improving light levels following recent felling of conifers. Oak trunks were mostly covered in algae and devoid of lichens.

Table 10. Acidophyte and nitrophyte indicator lichen species recorded on oak in The New Plantation in February 2023.

Species	Indicator category	Position at woodland edge	Position at woodland interior
Flavoparmelia caperata	Acidophyte	Tb, Tr	–

Species	Indicator category	Position at woodland edge	Position at woodland interior
Parmelia sulcata	Acidophyte	Tb	Tb
Amandinea punctata	Nitrophyte	Tr	–
Arthonia radiata	Nitrophyte	Tw, Tb	Tw
Candelariella xanthostigmoides	Nitrophyte	Tb, Tr	–
Lecidella elaeochroma	Nitrophyte	Tw, Tb	Tw
Phaeophyscia orbicularis	Nitrophyte	Tb	Tb
Physcia tenella	Nitrophyte	Tw, Tb	Tw
Punctelia subrudecta	Nitrophyte	Tb, Tr	Tb
Xanthoria parietina	Nitrophyte	Tb, Tr	Tb

Key – **Position**: Tw = Twig; Tb = Branch; Tr = Trunk.

3.2 Species conservation status

Eight species of lichen and nine species of lichenicolous fungus with conservation status were recorded in the current survey. These species and the published conservation status are summarised in Table 11 for each wood surveyed.

Table 11. Lichen and lichenicolous fungi species with conservation status recorded at six woodlands near Haverhill in February 2023.

Taxon	Group	Threat Status	Rarity status	Cadge's Wood	Howe Wood	Littley Wood	North Wood	Over and Lawn Woods	The New Plantation
Alyxoria viridipruinosa	L	LC	NS	✓	–	✓	–	✓	–
Bacidina neosquamulosa	L	LC	NS	–	✓	–	–	–	–
Catillaria nigroclavata	L	LC	NS	✓	✓	✓	✓	✓	–
Chaenotheca hispidula	L	LC	NS	–	–	✓	–	–	–
Lecanora barkmaniana	L	LC	NS	–	–	–	–	✓	–
Lecanora hybocarpa	L	NE	NR	✓	✓	–	✓	✓	✓

Taxon	Group	Threat Status	Rarity status	Cadge's Wood	Howe Wood	Littley Wood	North Wood	Over and Lawn Woods	The New Plantation
Strigula jamesii	L	LC	NS	✓	✓	✓	–	–	–
Strigula taylorii	L	LC	NS, IR	✓	✓	✓	–	✓	–
Arthonia parietinaria	LF	NE	NS	–	–	–	–	✓	–
Didymocyrtis epiphyscia	LF	NE	NR	–	✓	–	–	–	–
Heterocephalacria physciacearum	LF	LC	NS	✓	✓	✓	–	✓	✓
Illosporiopsis christiansenii	LF	LC	NS	–	–	✓	–	✓	–
Lichenochora weillii	LF	NE	NR	–	–	✓	–	–	–
Lichenodiplis lecanorae	LF	LC	NS	–	–	✓	–	–	–
Paranectria oropensis	LF	LC	NS	–	–	✓	–	–	–
Pronectria oligospora	LF	NE	NR	–	–	–	–	✓	–
Unguiculariopsis thallophila	LF	LC	NS	✓	✓	✓	✓	✓	✓
TOTAL	–	–	–	**7**	**8**	**12**	**3**	**10**	**3**

Key – Group: L = Lichen; LF = Lichenicolous fungus. **Conservation status**: NR = Nationally Rare; NS = Nationally Scarce; IR = International Responsibility.

4 Discussion

4.1 Atmospheric pollution

The results of this survey demonstrate a preponderance of nitrophyte lichens on oak twigs and branches. Mature oak trunks had very poorly developed lichen assemblages, often only represented by a *Lepraria* species, with the bark otherwise covered in green algae (see Photo A2.8). As oak trees age, growth and replacement of bark slows, and so the trunk assemblage may reflect the historically high levels of air pollution which were prevalent in the 1960s and 1970s. This is likely to have resulted in limited recolonisation of sulphur dioxide-sensitive lichens, for example as demonstrated at formerly polluted sites in London over 21 years (Bates *et al*., 2001). During the current survey patchy algal cover was observed on all trunk aspects, and was densest around 220 degrees, corresponding to the prevailing south-west wind direction.

Younger oak trunks at The New Plantation, as well as oak twigs and branches in general, have been colonised by the *Xanthorion* community which is an assemblage of lichens characteristic of nutrient-enriched and basic bark. These have grown where sulphur dioxide levels have fallen in the atmosphere but ammonia levels remain high. Ammonia deposition in O.S. grid reference TL 64 48, the centre of the survey area, was modelled at 1.97 µg m^{-3} as an annual average over 3 years (2018-2020) (APIS, 2023). The modelled ammonia deposition at this location represents an exceedance of 0.97 µg m^{-3} , which is significantly above the critical level threshold of 1 µg m^{-3} which is published as the level above which empirical evidence indicates a response of sensitive species within acidophyte lichen communities (Cape *et al*., 2009). Additionally many mature trees in the woodland interiors were within dense understorey, and such shaded conditions do not encourage the development of diverse lichen assemblages.

4.2 Species conservation status

Seventeen species of lichen or lichenicolous fungi with conservation status were recorded during the current survey. None of the species are protected under European legislation, Schedule 8 of the *Wildlife and Countryside Act 1981*, or listed as species of principal importance under Section 41 of the *Natural Environment and Rural Communities Act 2006*. The threat status of the species has been assessed as Least Concern, or Not Evaluated (Woods & Coppins, 2012). This reflects the fact that these lichens are not declining, or that insufficient data is available to make an assessment for species recently added to the British list. The status of specific species and more generally are further discussed below.

***Lecanora hybocarpa* (NE, NR)**

This species has been vastly under-recorded until recently. Historically mistaken for *Lecanora chlarotera*, microscopical examination of thin sections using polarising filters has allowed lichenologists to more accurately record *Lecanora hybocarpa*. As this species has long been subject to mis-identification, its status as Nationally Rare is not appropriate.

***Strigula taylorii* (NS, IR)**

Records for this species have increased as it has expanded its range in recent years. Although it may no longer warrant Nationally Scarce status in Britain, it will remain as a species of International Responsibility.

Nationally Scarce status is also probably not justified for the other lichens recorded in this survey, apart from *Chaenotheca hispidula*. These species have spread north and east, and there is increased knowledge of identification by recorders. This also partly applies to the three Nationally Rare and six Nationally Scarce species of lichenicolous fungi. Until recently the majority of these have been poorly recorded, and all have widespread hosts with records widely scattered across Britain. This suggests that with a greater level of recording the present rarity status might not be maintained.

References

APIS. 2023. Air Pollution Information System [online]. Available from:

https://www.apis.ac.uk (Accessed: 28.02.2023).

Bates, J.W., Bell, J.N.B. & Massara, A.C. 2001. Loss of *Lecanora conizaeoides* and other fluctuations of epiphytes on oak in S.E. England over 21 years with declining SO2 concentrations. Atmospheric Environment 35: 2557-2568.

Bosanquet, S.D.S. 2019. Lichen surveys to investigate ammonia impacts. NRW Evidence Report No: 298, 126 pp, Natural Resources Wales, Bangor.

British Lichen Society. 2023. Lichen Taxon Dictionary [online]. Available from:

https://britishlichensociety.org.uk/resources/lichen-taxon-database (Accessed: 28.02.2023).

Natural England. 2023. Ancient Woodland (England). [online]. Available from:

https://www.data.gov.uk/dataset/9461f463-c363-4309-ae77-fdcd7e9df7d3/ancient-woodland-england (Accessed: 28.02.2023).

Cape, J.N., van der Eerden, L.J., Sheppard, L.J., Leith, I.D. & Sutton, M.A. 2009. Evidence for changing the Critical Level for ammonia. Environmental Pollution 157 1033–1037.

Sanderson, N.A., Wilkins, T.C., Bosanquet, S.D.S. & Genney, D.R. 2018. Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 13 Lichens and associated microfungi. JNCC, Peterborough.

van Herk, C.M. 1999. Mapping of ammonia pollution with epiphytic lichens in The Netherlands. The Lichenologist 31:1, 9-20.

van Herk, C.M. 2002. Epiphytes on wayside trees as an indicator of eutrophication in The Netherlands. 285-289 in: Nimis, P.L., Scheidegger, C. and Wolseley, P.A. (eds.) Lichens – Monitoring Lichens.

Wolseley, P.A., James, P.W., Theobald, M.R. & Sutton, M.A. 2006. Detecting changes in epiphytic lichen communities at sites affected by atmospheric ammonia from agricultural sources. The Lichenologist 38:2 161-176.

Woods, R.G. & Coppins, B.J. 2012. A Conservation Evaluation of British Lichens and Lichenicolous Fungi: Species Status No. 13. JNCC, Peterborough.

Appendix 1 Survey tracks

Figure A1.1. GPS track for lichen survey at Cadge's Wood on 17th February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

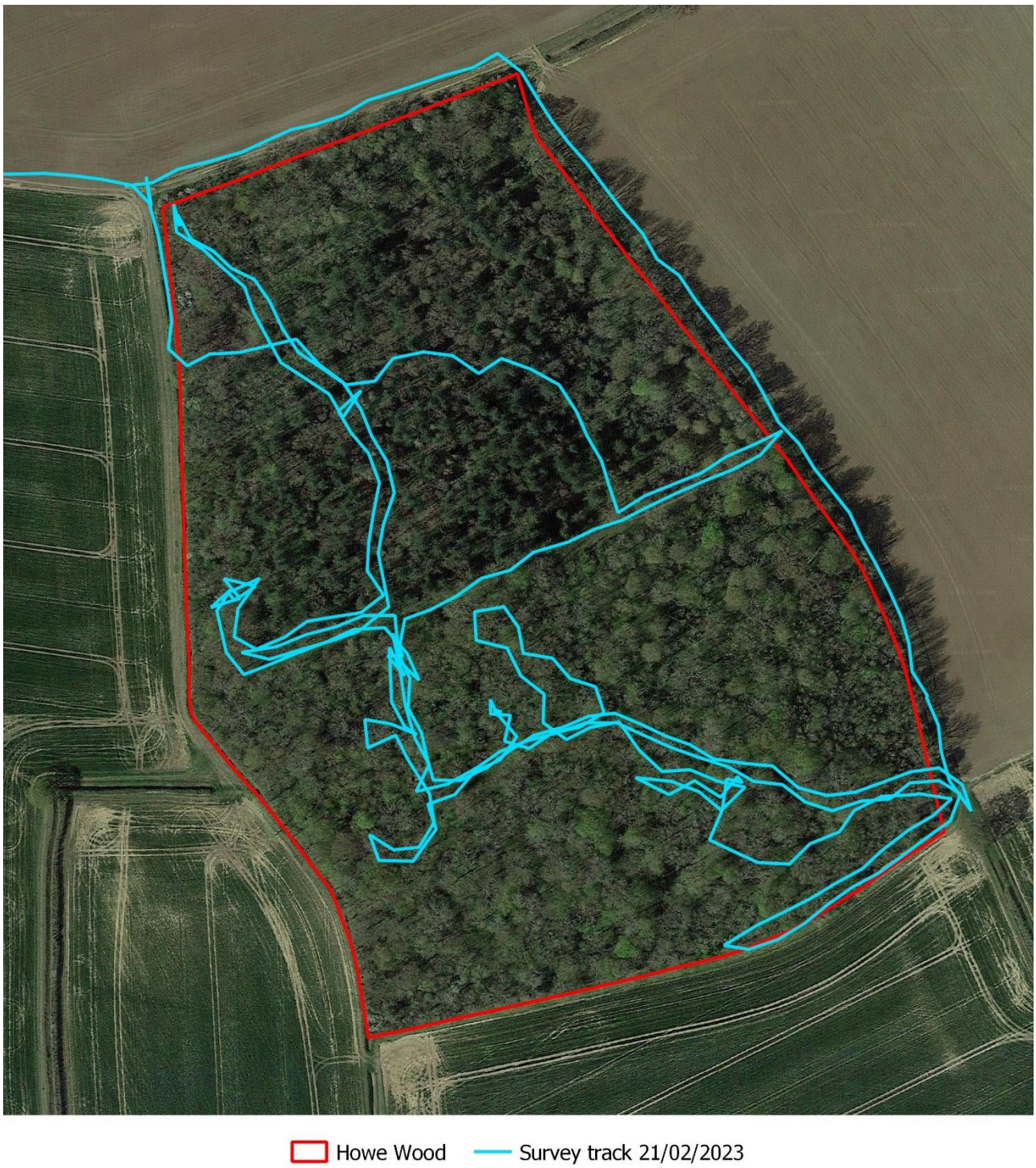

Figure A1.2. GPS track for lichen survey at Howe Wood on 21st February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

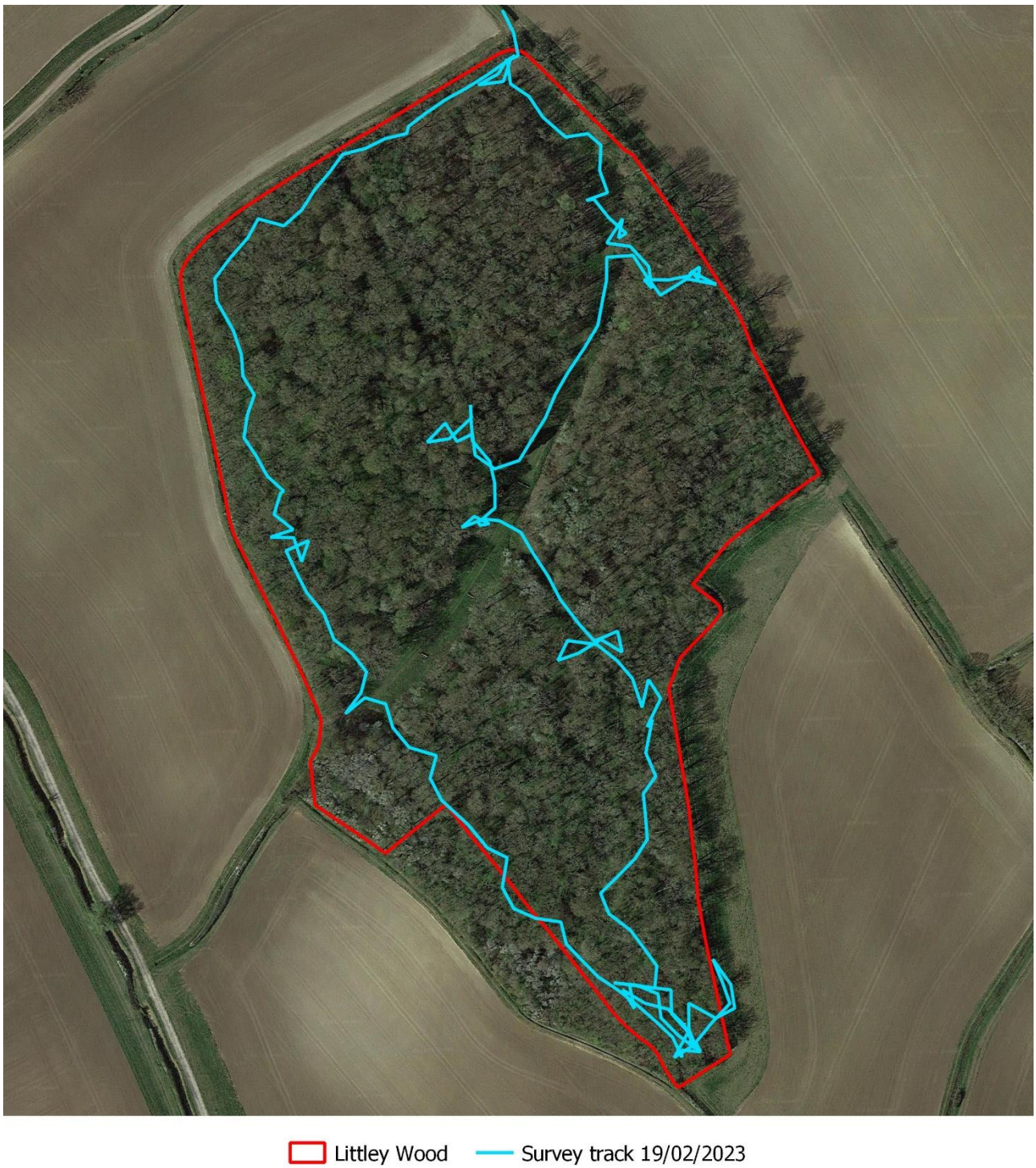

Figure A1.3. GPS track for lichen survey at Littley Wood on 19th February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

Figure A1.4. GPS track for lichen survey at North Wood on 19th February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

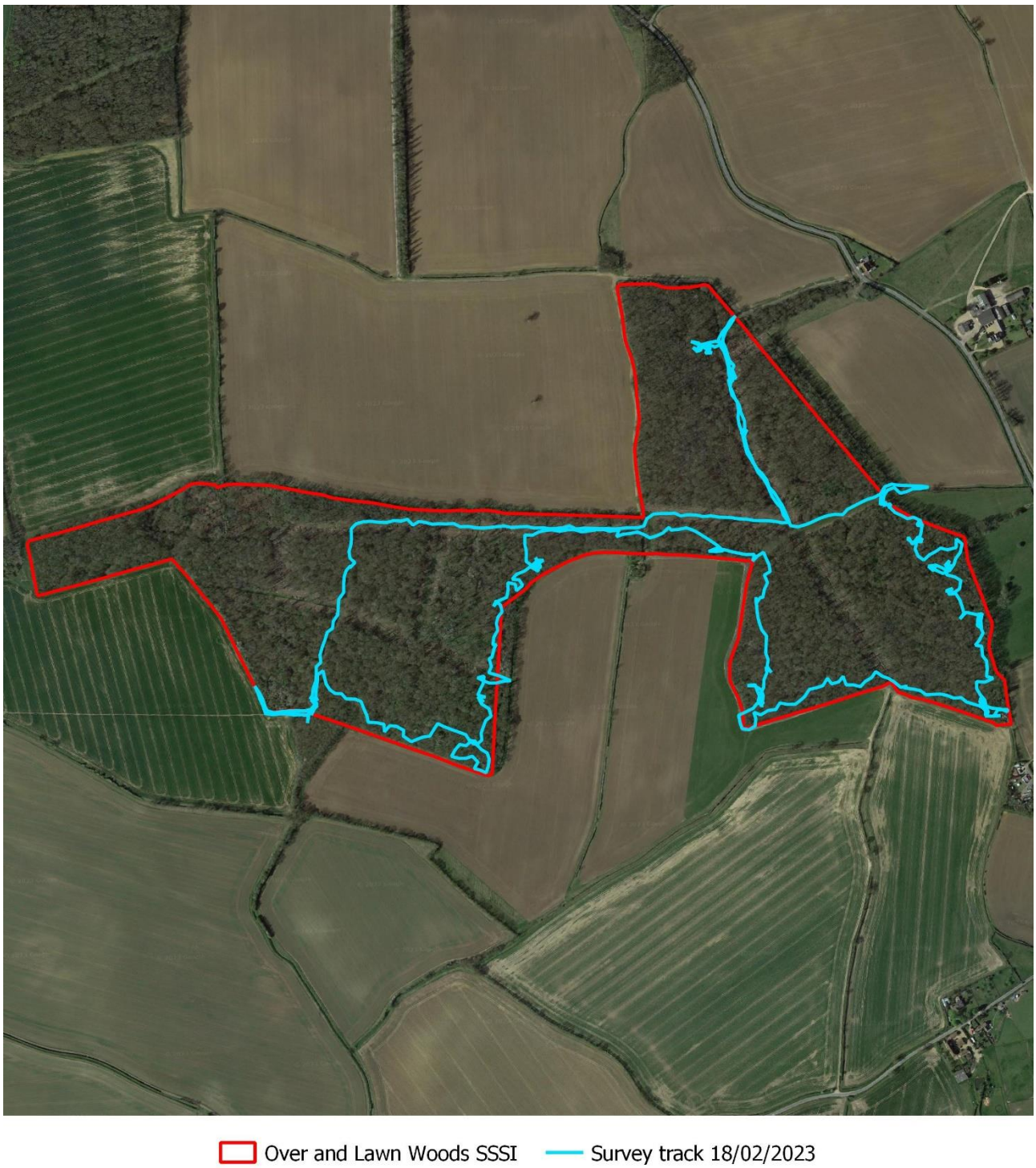

Figure A1.5. GPS track for lichen survey at Over and Lawn Woods SSSI on 18th February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

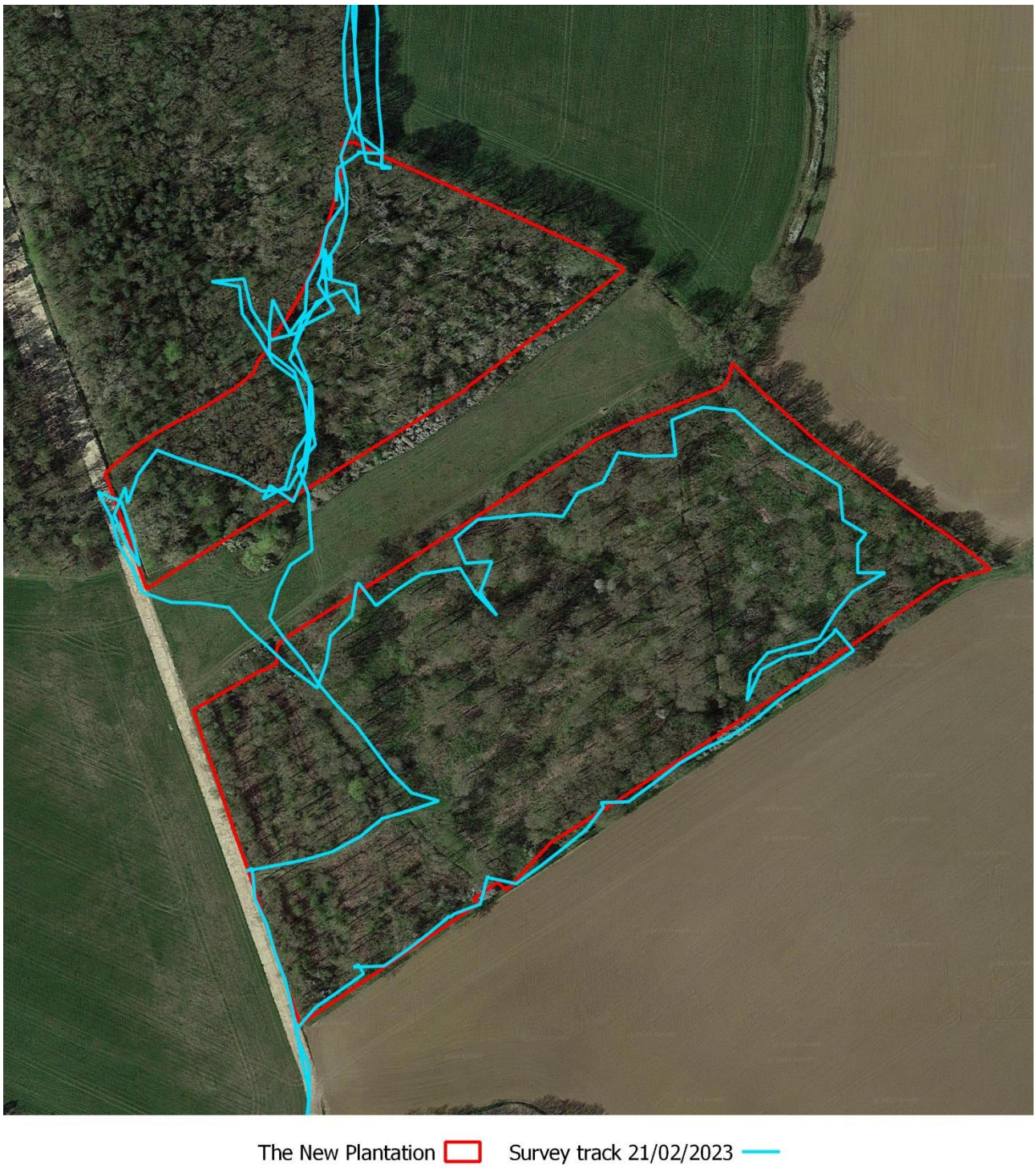

Figure A1.6. GPS track for lichen survey at The New Plantation on 21st February 2023. Imagery © 2023 Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

Appendix 2 Photos

Photo A2.1. Cadge's Wood, viewed east at TL 6401 4941. There is a dense understorey of lapsed hazel coppice throughout the wood.

Photo A2.2. Howe Wood, viewed south at TL 6477 4711. A group of shaded oak trees on the west side of the wood.

Photo A2.3. Littley Wood viewed north at TL 6506 4856. Most of the wood has a dense understorey and is shaded.

Photo A2.4. North Wood viewed south at TL 6489 4945. Most of the wood has a dense understorey and is shaded.

Photo A2.5. Over and Lawns Wood SSSI, viewed north at TL 6387 4830. Most of the wood contains a dense understorey of lapsed hazel coppice.

Photo A2.6. Over and Lawns Wood SSSI, viewed north at TL 6383 4866. There are wide rides within the wood, although these have recently been cleared of woody understorey species.

Photo A2.7. The New Plantation viewed north at TL 6517 4998. Most of the southern compartment of this wood has been felled and replanted, although oaks were scattered around the woodland perimeter.

Photo A2.8. Oak trunk in Littley Wood showing abundant green algae with the only lichen present a *Lepraria* species growing in bark crevices.