A survey of lichens at Alfoxton Wood and Willoughby Cleeve, Somerset in 2024

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Report details

Acknowledgements

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Cover photo

Ancient Holly in Alfoxton Wood, intermediate in form between a coppice stool and a pollard.

Citation

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Summary

The brief for this survey was to complete a baseline assessment of lichens in Alfoxton Wood and Willoughby Cleeve in Somerset, particularly focusing on veteran hollies *Ilex aquifolium*. Ninety-three lichen species, eight lichenicolous fungi and four non-lichenised fungi were recorded during two days in March 2024. These included seven species with an elevated Threat status:

- **Critically Endangered** – *Karstenia nigra*.
- **Vulnerable** – *Bellicidia incompta*.
- **Near Threatened** – *Arthonia invadens*, *Karstenia chrysophaea*, *Karstenia dictyospora*, *Mycoporum lacteum* and *Zwackhia prosodea*.

A further eight species are classified as Nationally Rare, and 14 species are Nationally Scarce. Four species were recorded for the first time in Somerset – *Chaenothecopsis retinens*, *Graphis betulina*, *Micarea isidioprasina* and *Thelotrema lueckingii*.

The Southern Oceanic Woodland Index is 23 including Alfoxton Park (19 in the current survey), which is below the threshold of 30 suggested for consideration of the lichen assemblage as a SSSI interest feature in parts of south-west England. The score partly reflects local topography and stand structure, although the Quantocks are also on the boundary where the index threshold reduces to 20 and the local climate on the north side of the hills may be closer to sub-oceanic. The Pinhead Index is 11 (7 in the current survey), and above the threshold of 10 suggested for consideration of the assemblage as a SSSI interest feature. This reflects long-term continuity in the presence of dead wood and its current wide availability in the landscape.

The importance of the hollies in Alfoxton Wood as a population of veteran trees has not previously been recognised. There is no comparable feature elsewhere in Somerset and these trees should be left unmanaged. While the lichen assemblage lacks most of the rarities that might be found in more humid and well-lit locations, the occurrence of *Bellicidia incompta* on six trees and *Karstenia nigra* on four trees is regionally significant. Alfoxton Wood is also the only site for *Mycoporum lacteum* in Somerset, and the hollies and veteran oaks here support a well-developed Ancient Dry Bark Community.

The main management issue at Alfoxton Wood and Willoughby Cleeve is the age structure of the oak populations. Younger trees to replace the current generation of old trees are scarce, and the most recent Natural England Common Standards Monitoring assessments found these SSSI units (38 and 49) to be in unfavourable condition, partly because of a lack of tree regeneration. **This is not an issue that can be addressed within these units**, which are too small to allow space for the missing generation of trees and at the same time retain current levels of openness.

Efforts should instead be made to create large-scale landscapes in which old trees can develop. Younger oaks can be found in surrounding areas although not commonly. Holly is

much more widespread. This is causing shading, and a cutting program should encourage the development of well-lit lichen assemblages on oak, and the creation of free-standing Holly pollards will support future colonisation by the species dependant on lignum. A programme of Holly cutting and oak planting is therefore suggested, aiming to cut 1 hectare per year, and planting 10 oaks per year in open areas covered by bracken. At the end of a 40-year pollarding cycle this should mean numerous hollies have been pollarded to benefit lignum-associated lichens, and 400 open-grown oaks established, helping to address the continuity problem for oak on the north Quantocks.

A second issue in Willoughby Cleeve is the very large-scale programme of Holly felling in recent years, following concerns about recent mortality of oak pollards and the level of shade cast by dense Holly thickets. This has achieved a short-term improvement in the amount of light available, although very soon the dead Holly branches will cause the development of bramble thickets as many areas have become completely inaccessible to grazing, such is the volume of brash. The pressing issue here now is to **clear dead holly from within the canopy radius of any oak trees** where it has been left after felling and ensure that the woodland can be easily accessed by grazing animals.

There are five recommendations following this survey:

1. List lichens as a designated feature of The Quantocks SSSI, based on the assemblages and species reported in this survey.
2. Complete an additional day of survey in Alfoxton Wood to systematically search for *Bellicidia incompta* on Holly and Sycamore. Two additional trees with this species were found during a visit in January 2025 and given the large number of hollies in the wood, more time is needed to survey these.
3. Plan and implement a long-term programme of small-scale Holly cutting and oak planting in the north Quantocks, based on a 40-year pollard rotation cycle for the Holly.

Contents

1 Introduction

1.1 Brief

The brief for this survey was to complete a baseline assessment of lichens in Alfoxton Wood and Willoughby Cleeve in Somerset. This was required to:

- Document veteran hollies *Ilex aquifolium* supporting *Karstenia nigra* in Alfoxton Wood, which was first recorded there in January 2023.
- Search for other conservation significant lichens, particularly those associated with Holly.
- Based on the survey results, discuss possible management options for the benefit of lichen conservation in the area.

1.2 Site details

Alfoxton Wood and Willoughby Cleeve are in South Somerset (biological vice-county 5) on the northern side of the Quantocks Hills, south of Kilve village and within four kilometres of the Bristol Channel. Alfoxton Wood extends around a low hill west of the Holford Stream, rising from 90 m to 143 m. The greater part of the site is north-aspected, although a section of the hill faces south-east. The underlying rocks are comprised of the Devonian Avill Slates and Sandstones Member, producing acid soils. The tree canopy is formed from a mixture of Sessile Oak *Quercus petraea*, Ash *Fraxinus excelsior*, and Sycamore *Acer pseudoplatanus*. The oaks are mostly widely spaced, up to 20 m apart and at least partially open-grown, and the understorey contains many veteran Holly *Ilex aquifolium*.

Willoughby Cleeve lies approximately 600 m south-west of Alfoxton Wood. It is a steep-sided, broadly south-east aspected valley, on the north side of Hodder's Combe. The underlying rocks are hard sandstones of Devonian Hangman Sandstone Formation, with loamy brown earths in the valley bottom. The site contains at least 270 live Oak pollards and 50 standing dead trees and is unique in the Quantocks as an extensive area of ancient wood pasture (Alexander, 2017). The site lies within The Quantocks Common and is open to grazing by deer, sheep, and ponies. The understorey contains a dense thicket of Holly, parts of which have been recently cleared. This is mostly young growth, although a few veteran hollies are also present.

1.3 Designation

Alfoxton Wood and Willoughby Cleeve are designated as part of The Quantocks Site of Special Scientific Interest (SSSI). The SSSI citation notes the existence of oak pollards in

the Quantocks and describes “a magnificent stand of mature Sessile Oak” in Alfoxton Wood. It is also stated that the Quantocks support a rich lichen flora, including *Mycoporum lacteum* [*Tomasellia lactea*]. This suggests that lichens should be a SSSI feature, although these are not listed as such at present (Natural England, 2025).

The area is also within the Exmoor and Quantock Oakwoods Special Area of Conservation (SAC). The Annex I habitat that is a primary reason for the selection of the SAC is *91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles* (JNCC, 2025):

“*This site supports extensive tracts of old sessile oak woods in conjunction with heath. They are rich in bryophytes, ferns (including Dryopteris aemula) and epiphytic lichens, the latter often associated with old pollards, since parts are former wood-pasture rather than the oak coppice that is more common with this type. In the Barle Valley the woods also occur in mosaic with glades and small fields and the combination results in good populations of fritillary butterflies*”.

Pasture woodland, pollards and lichens are an especially significant part of the international importance of the Exmoor and Quantock Oakwoods SAC. On this basis Alfoxton Wood and Willoughby Cleeve are a key feature in the Quantock section of the SAC.

1.4 Background

Stands of veteran Holly are rare in Britain. The lichens that colonise bark and lignum on these are often highly specialised compared to those found on young trees. Species with elevated threat status that have been recorded on old hollies in Cornwall, Devon and Hampshire include:

- *Allographa pauciloculata* (VU) parasitising *Allographa anomala*.
- *Arthonia anglica* (EN).
- *Arthonia ilicinella* (NT).
- *Bacidia subturgidula* (CR) and *Bellicidia incompta* (VU) on lignum.
- *Calicium diploellum* (CR) associating with *Mycoporum lacteum* (NT).
- *Karstenia nigra* (CR) and *Karstenia chrysophaea* (NT) on damp lignum.
- *Pertusaria pustulata* (VU).
- *Synarthonia astroidestera* (NT).

Most of these lichens also occur on other tree species, although *Calicium diploellum* has only been found on Holly. Many are light-demanding species that require numerous old or slow-growing trees, with frequent glades or broken edge habitat in sheltered and humid locations. Young Holly has greatly increased in British woodlands in recent times, possibly due to milder winters, and long-term reductions in grazing levels (Kirby and others, 2005). The increase in shade from dense shrub layers has been identified as a key issue

negatively affecting the conservation of woodland lichens (Sanderson, 2009). In contrast old Holly has suffered from losses due to coppicing after land enclosures and increases in winter deer and sheep browsing within surviving pasture woodlands. Before the current survey, *Mycoporum lacteum* and *Karstenia nigra* had been recorded at Alfoxton Wood. On this basis, further lichen recording focused on the numerous old hollies and other veteran trees in the area was deemed worthwhile.

2 Method

2.1 Desk study

The British Lichen Society database was searched for records from the survey area. Many records for the Quantocks are entered at monad level so it is not easy to be certain where some were made. Alfoxton Wood is in ST15.41 and includes at least some of the following:

- **1971** – Alfoxton Wood, Holford Glen, and Kelting Reserve. Rob Jarmen and Frances Rose. 37 records, including the first *Lobaria pulmonaria* in this area. In 1972 this is also recorded in Holford Glen, so the record may not have been inside the current survey area. Holford Glen lies to the south of Alfoxton Wood, and Kelting Reserve is Holford Kelting, a Somerset Wildlife Trust reserve to the north.
- **1975** – Alfoxton Park Woods. Frances Rose. Four records, including *Mycoporum lacteum* for the first time in Somerset.
- **1981** – Alfoxton Drive. Frances Rose. 11 records.
- **2010** – Alfoxton Wood. Somerset Lichen Group. 55 records. This visit is described as mostly covering woodland sloping down to the stream, which is probably Withing Wood on the east side of Alfoxton Drive.
- **2013** – Alfoxton Park. British Lichen Society. 100 records. Alfoxton Park is in ST1441, although the records include *Mycoporum lacteum*, which is not found in the park so at least some of the records are likely to have been from Alfoxton Wood.

Willoughby Cleeve is in ST14.40 and the name is used interchangeably with Hodder's Combe.

- **1913** – Hodder's Combe. Harry Parsons. One record.
- **1915** – Hodder's Combe. Walter Watson. Two records.
- **1972** – Hodder's Combe. Simon Davey. Two records.
- **1982** – Hodder's Combe. Kery Dalby. One record.
- **2013** – Hodder's Combe. British Lichen Society. 50 records.

There has also been a recent lichen survey in Alfoxton Park (ST15.41 & ST14.41) which lies to the west and adjacent to Alfoxton Wood (Orange, 2022).

2.2 Fieldwork

2.2.1 Survey area

The location of Alfoxton Wood (Unit 38) and Willoughby Cleeve (Unit 49) is shown in Figure 1. Alfoxton Wood is part of a larger SSSI unit that includes Withing Wood and Oyles Wood east of Alfoxton Drive, although these were not included in the current survey.

2.2.2 Survey dates and weather conditions

Two days of fieldwork were completed in March 2024. A few additional records were made during a visit in January 2025 to compile management recommendations. The weather conditions during the survey are shown in Table 1.

Table 1. Weather conditions during the lichen survey at Alfoxton Wood and Willoughby Cleeve in March 2024.

Date	Maximum temperature (°C)	Rainfall (mm)	Maximum wind speed (mph)
27th March 2024	10	1.4	S 17
30th March 2024	11	0	S 10

2.2.3 Survey equipment

The survey equipment used is listed below:

- Lichen candelaris x10 magnification lens.
- Pentax Papilio 8.5 x 21 binoculars.
- Knife for removal of specimens.
- Sodium hypochlorite (C).
- Potassium hydroxide 10% solution (K).
- Paraphenylenediamine (Pd) as Steiner's solution.
- Alonefire SV003 10W 365nm UV Torch.
- Compass.
- Measuring tape.
- iPhone 12 with the GPS OS Grid Reference App.
- Olympus TG5 camera.

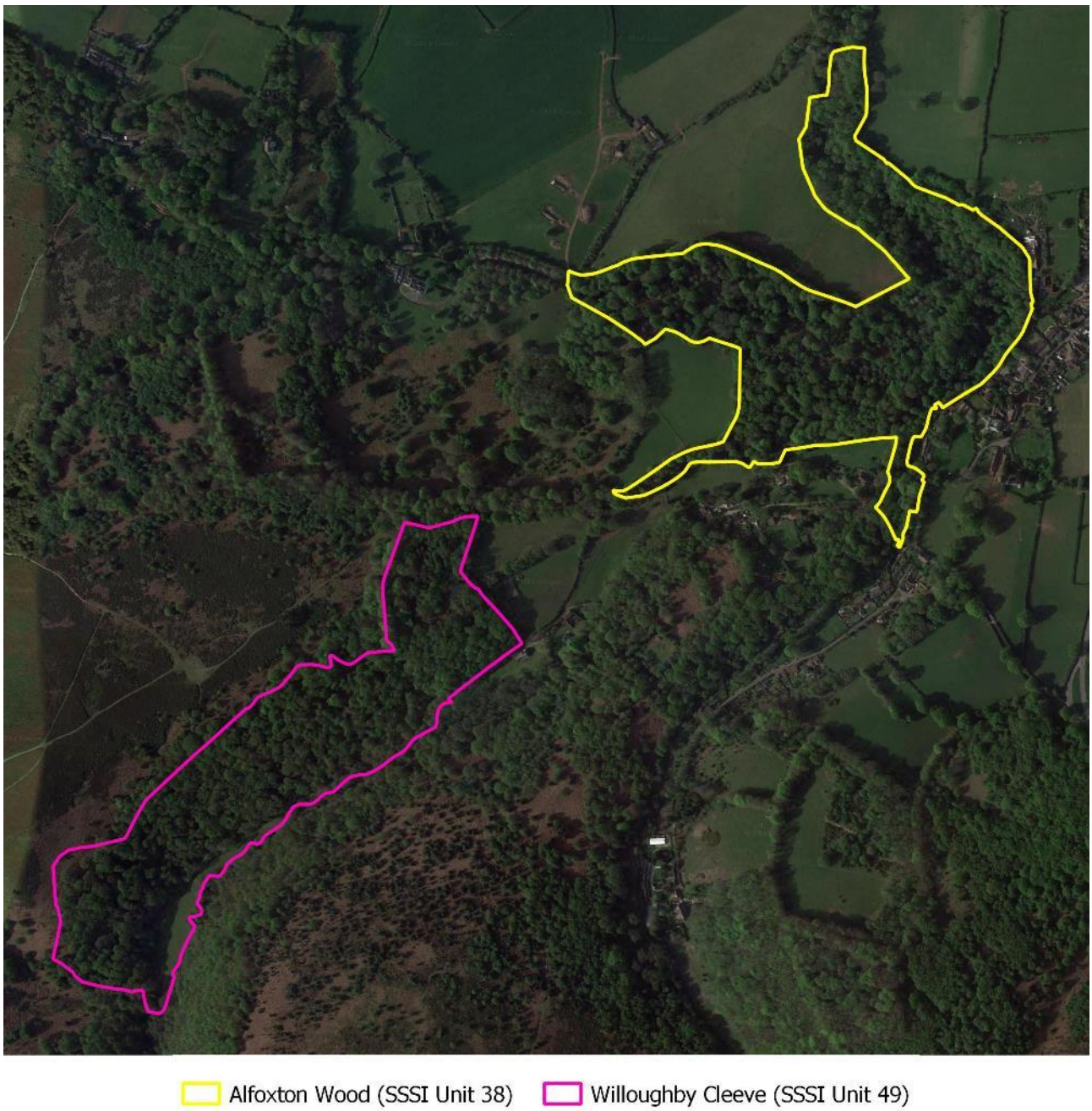

Figure 1. The areas surveyed at Alfoxton Wood and Willoughby Cleeve in March 2024. Contains OS data © Google, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies.

2.2.4 Species recording

Lichen locations were recorded using an iPhone 12 with the GPS OS Grid Reference App, accurate to approximately +/- 4 metres. These were checked against aerial photography during data entry. Taxonomic nomenclature follows the British Lichen Society (BLS) on-line Taxon Dictionary (British Lichen Society, 2025).

2.3 Site evaluation

Lists of woodland indicator lichen species have been published to assess the diversity and conservation value of British woodland lichen communities within different climatic areas (Coppins & Coppins, 2002; Sanderson and others, 2018). Sanderson (2019a) suggests that:

"*These lists indicate habitat quality; the total number of species found is the important parameter. The indicator species are associated with late succession stands with veteran trees (old growth stands i.e. stands more than 200 years old), especially those stands with a past continuity of old trees. Woods that have been clear felled, but regenerated, within the last 200 years (young growth stands) are therefore likely to be poorer in lichen indicator species than less disturbed stands. The lichen ancient woodland indicator lists are different from similar ancient woodland indicator lists composed of vascular plants or bryophytes. The latter reflect ancient sites rather than stands and are much less affected by the management of the trees*".

Two woodland indices are applicable to The Quantocks SSSI – the Southern Oceanic Woodland Index, and the Pinhead Index.

2.3.1 Southern Oceanic Woodland Index

The Southern Oceanic Woodland Index (SOWI) includes 85 lichen species and is described by Sanderson and others (2018) as follows:

"*The list is designed to be applied across a wide swathe of southern Oceanic Britain. For the core areas of interest (associated with a strongly southern oceanic climate with clean air, in south-west England and north Wales), all sites with scores of 30 or more should be considered for notification. To the north and east of these areas, in south-east England, the rest of Wales and south-west Scotland (where the more strongly southern oceanic species are rare), all sites with scores of 20 or more should be selected*."

2.3.2 Pinhead Index

The Pinhead Index covers standing deadwood and large trees with dry bark crevices and is described by Sanderson and others (2018) as follows:

"Deadwood and living trees large enough to provide crevices sheltered from much of the direct rainfall, support communities of lichens and microfungi that produce powdery spore masses on the tops of pin-shaped fruitbodies. The total number of recorded Pinhead species in the genera: Calicium, Chaenotheca, Chaenothecopsis, Microcalicium, Mycocalicium and Sclerophora is used as an index score. All sites scoring 10 or over on the Pinhead Index should be considered for notification."

2.3.3 Conservation evaluation

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

- **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: S41** – England (taxa listed under Section 41 of the *Natural Environment and Rural Communities Act 2006*).

2.3.4 National Character Areas

In England, National Character Areas (NCAs) define the Area of Search in the selection of biological SSSIs (Bainbridge and others, 2013). Lichen assemblages can also be recognised as designated SSSI features if these form the richest site within an NCA, or based on the presence of individual Threatened or Near Threatened species (Sanderson and others, 2018). The Quantock Hills is NCA 144.

2.4 Constraints

No constraints were encountered.

3 Results

3.1 Summary

Ninety-three lichen species, eight lichenicolous fungi and four non-lichenised fungi were recorded during the current survey. Thirty-seven species have conservation status, and these are summarised in Table 2, including the survey areas where these species were recorded.

Table 2. The lichen species with conservation status recorded at Alfoxton Wood and Willoughby Cleeve in March 2024, including the survey areas where the species were recorded.

Taxon	Group	Threat status	Conservation status	Other status	Areas with records
Alyxoria xerica	L	LC	NS	–	A, W
Andreiomyces obtusaticus	L	NE	NR	–	A
Bellicidia incompta	L	VU	–	S41	A
Chaenotheca hispidula	L	LC	NS	–	W
Chaenothecopsis nigra	L	LC	NS	–	A, W
Cliostomum flavidulum	L	LC	NS	–	A
Cresponea premnea	L	LC	–	IR	A, W
Dichoporis taylorii	L	LC	NS	IR	A, W
Graphis betulina	L	NE	NR	–	A
Inoderma subabietinum	L	LC	–	IR	A
Karstenia chrysophaea	L	NT	NS	S41, IR	A
Karstenia dictyospora	L	NT	NS	S41, IR	W
Karstenia nigra	L	CR	NR	S41, IR	A
Lecanographa lyncea	L	LC	–	IR	A
Micarea doliiformis	L	LC	NS	–	A
Micarea isidioprasina	L	NE	NR	–	A
Micarea viridileprosa	L	LC	NS	–	W

Taxon	Group	Threat status	Conservation status	Other status	Areas with records
Porina borreri	L	LC	NS	–	A
Porina byssophila	L	DD	NR	–	A, W
Porina coralloidea	L	LC	NS	IR	A
Rinodina roboris	L	LC	–	IR	A
Schizotrema quercicola	L	LC	–	IR	A
Snippocia nivea	L	LC	–	IR	A, W
Sporodophoron cretaceum	L	LC	–	IR	A
Thelopsis corticola	L	LC	–	IR	A, W
Thelotrema lueckingii	L	NE	NR	–	A, W
Zwackhia prosodea	L	NT	NS	S41, IR	A
Arthonia digitatae	LF	LC	NR	–	A, W
Arthonia invadens	LF	NT	NR	S41, IR	A
Chaenothecopsis pusilla	LF	LC	NS	–	W
Chaenothecopsis retinens	LF	NE	NR	–	A
Dactylospora parasitica	LF	LC	NS	–	W
Milospium graphideorum	LF	LC	NS	–	A
Milospium lacoizquetae	LF	LC	NR	–	A
Microcalicium ahlneri	F	LC	NS	–	A, W
Mycoporum lacteum	F	NT	NS	–	A
Stenocybe septata	F	LC	–	IR	A, W

Key – Group: L = Lichen; LF = Lichenicolous fungus; F = Non-lichenised fungus. **Threat Status**: CR = Critically Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; NE = Not Evaluated. **Conservation status**: NR = Nationally Rare; NS = Nationally Scarce. **Other status**: S41 = Section 41 Priority Species; IR = International Responsibility. **Areas**: A = Alfoxton Wood; W = Willoughby Cleeve.

3.2 Lichens recorded on Holly

A total of 26 species of lichen were recorded on veteran hollies in Alfoxton Wood, comprising 20 on corticolous and six on lignicolous substrates. The lichens growing on Holly in Willoughby Cleeve were much more limited with only six corticolous species recorded. Of the 26 species, one is classified as Critically Endangered, one as Vulnerable, two are Near Threatened, and a further eight are species with International Responsibility for conservation in Britain. These are summarised in Table 3, including records of the species made on other trees, and the areas where the lichens were found.

Table 3. Lichens recorded on Holly at Alfoxton Wood and Willoughby Cleeve in March 2024, including records made of the species on other trees, and the survey areas where these were recorded.

Taxon	Threat status	Conservation status	Other host trees	Areas with records
Alyxoria ochrocheila	LC	–	Q	A, W
Anisomeridium biforme	LC	–	Q	A
Arthonia radiata	LC	–	–	A
Bacidina phacodes	LC	–	Ac	A, W
Bellicidia incompta	VU	S41	Ap	A
Chaenothecopsis nigra	LC	NS		A
Coenogonium pineti	LC	–	Q	A, W
Coniocarpon cinnabarinum	LC	–	–	A
Cresponea premnea	LC	IR	Ap, Bt, Fg, Q	A, W
Dendrographa decolorans	LC	–	Q	A, W
Enterographa crassa	LC	–	Ac, Ap, Q	A, W
Enterographa hutchinsiae	LC	–	–	A, W
Gyalecta truncigena	LC	–	Q	A, W
Inoderma subabietinum	LC	IR	Q	A
Karstenia chrysophaea	NT	NS, IR	–	A
Karstenia nigra	CR	S41, NR, IR	–	A
Mycoporum antecellens	LC	–	–	A

Taxon	Threat status	Conservation status	Other host trees	Areas with records
Mycoporum lacteum	NT	NS	–	A
Porina borreri	LC	NS	–	A
Porina leptalea	LC	–	–	A
Pyrenula chlorospila	LC	–	–	A
Snippocia nivea	LC	IR	Ap, Q	A, W
Sporodophoron cretaceum	LC	IR	Q	A
Stenocybe septata	LC	IR	–	A, W
Thelopsis corticola	LC	IR	Q	A, W
Thelotrema lueckingii	NE	NR	Ap, Bt, Fg, Q	A, W

Key –Threat Status: CR = Critically Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern; NE = Not Evaluated. **Conservation status**: S41 = Section 41 Priority Species; NR = Nationally Rare; NS = Nationally Scarce; IR = International Responsibility. **Other host trees**: Ac – Field Maple; Ap = Sycamore; Bt = birch; Fg = Beech; Q = oak. **Areas**: A = Alfoxton Wood; W = Willoughby Cleeve.

3.3 Data for Threatened species

3.3.1 *Bellicidia incompta* (VU, S41)

Bellicidia incompta was found in Alfoxton Park on lignum of four hollowing veteran hollies, and in wound tracks on two Sycamores (see Photo A1.1). These trees are summarised in Table 4, including the grid reference, tree species, tree diameter at 1.3 m (dbh), the height above ground of the thallus, and its aspect on the trunk.

Table 4. The grid reference, tree species, tree dbh, height above ground and aspect of thalli of *Bellicidia incompta* at Alfoxton Wood in March 2024.

Grid reference	Tree	Tree dbh	Thallus height above ground	Thallus aspect on trunk	Photos
ST15263.41303	Holly	40 cm	120 cm	270º	A1.4, A1.5
ST15726.41294	Holly	25 cm	40 – 80 cm	60º	A1.6, A1.7
ST15284.41207	Holly	20 cm	20 – 80 cm	135º	A1.8, A1.9
ST15269.41223	Holly	28 cm	190 cm	190º	A1.10, A1.11
ST15222.41338	Sycamore	74 cm	140 – 160 cm	170º	A1.12, A1.13
ST15362.41827	Sycamore	59 cm	40 cm	300º	A1.14, A1.15

3.3.2 *Karstenia nigra* (CR, S41, NR, IR)

Karstenia nigra was found in Alfoxton Park on damp lignum of four veteran Hollies, and on three of these it was growing close to *Karstenia chrysophaea* (see Photos A1.2 and A1.3). The distribution was limited despite the wide availability of veteran hollies with exposed lignum, perhaps because the trees on the higher slopes are more exposed to drying winds. The trees are summarised in Table 5, including the grid reference, tree species, tree dbh, height above ground of the thallus, and its aspect on the trunk.

Table 5. The grid reference, tree species, tree dbh, height above ground and aspect of thalli of *Karstenia nigra* at Alfoxton Wood in March 2024.

Grid reference	Tree	Tree dbh	Thallus height above ground	Thallus aspect on trunk	Photos
ST15178.41409	Holly	83 cm	25 – 75 cm	230 – 265º	A1.16, A1.17
ST15167.41400	Holly	46 cm	170 cm	190º	A1.18, A1.19
ST15182.41404	Holly	44 cm	100 cm	190º	A1.20, A1.21
ST15337.41261	Holly	74 cm	145 cm	235º	A1.22, A1.23

3.4 Southern Oceanic Woodland Index

The SOWI based on the current survey is 19. The index can be applied to areas of interconnected woodland up to about 100 ha and including data from within the last 25

years. On this basis the index including data from the adjacent Alfoxton Park is 23. The index calculation is provided in Appendix 2.

3.5 Pinhead Index

The Pinhead Index based on the current survey is 7. The index can be applied to areas of interconnected woodland up to about 100 ha and including data from within the last 25 years. On this basis the index including data from the adjacent Alfoxton Park is 11. The index calculation is provided in Appendix 2.

4 Discussion

4.1 Lichen communities at Alfoxton Wood and Willoughby Cleeve

Epiphytic lichens, which grow on bark and dead wood of trees, form distinct communities that are shaped by environmental factors. These include the age of trees, the texture and pH of the bark, the aspect and angle of growth of the trunk, nutrient enrichment from external sources, and habitat continuity. Together, these features allow the formation of distinctive species assemblages (James, Hawksworth & Rose, 1977). The most important communities recorded during the current survey are discussed below.

Base-rich Bark Community (*Lobarion pulmonariae*)

The Lobarion community inhabits base-rich bark (pH 5 to 6) and associated bryophytes, often developing under intermediate conditions of light and humidity. This community can survive on relatively few trees at a site and was best developed in the survey area on the oaks at Alfoxton Wood, particularly better-lit trees on the east side of the hill. Species recorded included *Arthonia vinosa*, *Bacidia biatorina*, *Pachyphiale carneola*, *Porina coralloidea*, *Sporodophoron cretaceum* and *Thelopsis corticola*. Fewer species were found in Willoughby Cleeve as the relatively recent growth of young Holly here has caused considerable shade across large areas, which relatively few lichens can tolerate. Conserving this community requires the maintenance of well-lit but sheltered conditions on successive generations of mature trees.

Ancient Dry Bark Community (*Lecanactidetum premnae*)

This community is strongly associated with veteran oaks and old-growth woodland and is a post-climax community of trees aged between 300 and 400 years old. The associated species are found on ageing brittle bark that does not retain moisture, in niches sheltered from direct rainfall, and depend on dew to obtain moisture. In general only a few lichen

species are present at any given time on dry-barked veteran trees, and these often form extensive crusts. Species recorded in this community were predominantly found on Oak but also recorded on Holly and Sycamore. These included *Cresponea premnea*, *Lecanographa lyncea*, *Milospium graphideorum*, *Inoderma subabietinum* and *Sporodophoron cretaceum*. In addition to the *Lobarion* community, the Ancient Dry Bark Community is the most important association recorded in the survey area. Its long-term future relies on management to prolong the life of existing veteran trees and targeted management to plant or recruit younger trees in the areas surrounding Alfoxton Wood and Willoughby Cleeve.

Dry Lignum Community (*Calicietum hyperelli*)

Specialist lichens occur in the Dry Lignum Community on the dry, acid lignum of vertical standing deadwood such as trunks or aerial dead branches, and on the sheltered undersides of large fallen trunks. Species recorded during the current survey included seven pinhead lichens, most occurring on the lignum of Sessile Oak but *Chaenothecopsis nigra* was also recorded on Holly lignum. The community was well-developed in Alfoxton Wood and Willoughby Cleeve, reflecting the large number of veteran trees at these sites, and the lack of any management to remove dead wood.

4.2 Southern Oceanic Woodland Index

The SOWI score for Alfoxton Park, Alfoxton Wood and Willoughby Cleeve is 23. This partly reflects the low light levels on the mostly north-facing aspect of Alfoxton Wood, and excessive shading experienced by lichen communities on oak in Willoughby Cleeve due to the tall understorey of Holly. Some species in the area have been lost – *Lobaria pulmonaria* and *Ricasolia laetevirens* have not been seen since 1972. It is not clear where these lichens occurred, with the most precise locality name available being Holford Glen. Although the index value is below the threshold of 30 suggested for consideration of the lichen assemblage as a SSSI interest feature in parts of south-west England, the Quantocks are on the boundary where the threshold reduces to 20 and the local climate on the north side of the hills may be closer to sub-oceanic. Additionally this is the richest site in the Quantock Hills NCA (144) which is the relevant Area of Search.

4.3 Pinhead Index

The Pinhead Index score of 11 for Alfoxton Park, Alfoxton Wood and Willoughby Cleeve is above the threshold of 10 suggested for consideration of the pinhead assemblage as a SSSI interest feature. Horner Wood has the highest score in Somerset, with 14 species having been recorded since 2000 (Sanderson, 2017). The Pinhead Index for Piddle Wood and Pridley Plantations in the Blackdown Hills was 10 (Windle & Bacciu, 2023) and the score for Nettlecombe Park was 9 (Bacciu & McGill, 2022). The pinhead assemblage in

the north Quantocks results from long-term continuity in the presence of dead wood and this being widely available at present. This is also reflected in the nationally important saproxylic beetle assemblage found in Alfoxton Park (McGill, 2022).

4.4 New, rare, or interesting records

4.4.1 Lichens

Bellicidia incompta (VU, S41)

Bellicidia incompta is a specialist of high pH wound tracks on bark or lignum of mainly veteran trees. In Somerset it has previously been found at Porlock Hill, Dunster Park, Pixton Park, and in Neroche Forest. The occurrence at Alfoxton is the first record for the Quantocks, and the occurrence on six trees is important for two reasons. Firstly *Bellicidia incompta* has declined significantly over the past 50 years as its traditional hosts elm *Ulmus* sp., and now Ash have been decimated by fungal pathogens. As a result the threat status is likely to be upgraded to Endangered status in the next red-list review for lichens. Secondly, outside of the New Forest, it is rarely recorded from more than one tree at any given locality, making it vulnerable to local extinction. As well as the loss of individual trees to fungal diseases and safety felling, *Bellicidia incompta* is threatened by increasing ammonia pollution, shading from uncontrolled growth of ivy, and the development of dense understorey resulting from reductions in grazing.

Karstenia dictyospora (NT, S41, NS, IR)

Karstenia dictyospora was recorded from spongy bark on the north side of a veteran Oak at the bottom of Willoughby Cleeve. In Somerset this species has only previously been found growing on lignum of a veteran Ash at May Hill in Dunster Park. It is endemic to Britain and generally occurs, as here, in old woodland but occasionally it may also be found on wayside trees. It is characterised by pale, immersed urceolate apothecia which, when mature, have a distinctive torn margin.

Karstenia nigra (CR, S41, NR, IR)

Prior to its discovery at Alfoxton Wood, *Karstenia nigra* had been recorded at two other sites in Somerset – on oak in Horner Wood by Neil Sanderson in 2016, and on Ash at May Hill, Dunster by Nicola Bacciu in 2022. This species is a British endemic and is characterised by dark blue-black urceolate apothecia which are found growing on damp lignum inside hollowing trees, predominantly Ash, Holly and oak. As with *Bellicidia incompta*, the occurrence on four trees is important as it has only been recorded on single trees at the other Somerset sites, making it more vulnerable to local extinction.

***Mycoporum lacteum* (NT, NS)**

This species was first recorded at Alfoxton Wood by Frances Rose in 1975, again in 1981, and during a BLS field meeting in 2013. During the current survey it was found on 10 veteran Hollies. *Mycoporum lacteum* is recognisable in the field as a pale, silvery thallus on the smooth bark of holly trunks and can cover quite large areas. Black locules are scattered across the thallus under which anywhere between two and 15 perithecia (flask-shaped fruiting bodies) are located. Alfoxton Wood is the only site in Somerset where *Mycoporum lacteum* has ever been recorded. It has a highly localised distribution in Britain and is often considered a relict species of formerly cattle-grazed pasture woodlands.

***Graphis betulina*, *Micarea isidioprasina* and *Thelotrema lueckingii* (all NE, NR)**

These species were identified for the first time in Somerset during the current survey. All are recently recognised taxa and are likely to be recorded more frequently in the future.

4.4.2 Lichenicolous fungi

Lichenicolous fungi are parasites found on all growth forms of lichens and are frequently specific to individual host genera, or species. One species was newly recorded in Somerset.

***Chaenothecopsis retinens* (NE, NR)**

Chaenothecopsis retinens is a parasitic pinhead lichen which is host specific to *Sporodophoron cretaceum*. At Alfoxton Wood it was recorded in a relatively small area of an extensive thallus of *Sporodophoron cretaceum* on one oak (see Photo A1.24). This species is characterised by very short-stalked fruiting bodies capped by a black spore mass, and it is rarely recorded. To date (January 2025), Alfoxton Wood is only the eighth hectad in Britain where it has been found. This is surprising as the host *Sporodophoron cretaceum* is a frequent species in the Ancient Dry Bark Community which develops on the sheltered sides of veteran oaks across southern and south-west England.

4.5 Lichens as designated features of The Quantocks SSSI

The results of this survey should be used to update lichens as a designated feature for The Quantocks SSSI, on the basis summarised in Table 6.

Table 6. Assemblages and species supporting lichens as a designated feature of The Quantocks SSSI.

Taxon or assemblage	Threat status	Rationale
Southern oceanic woodland assemblage	–	The index score of 23 is the highest in the Quantocks NCA.
Pinhead lichen assemblage	–	The index score of 11 is equal to the national SSSI threshold and is the highest in the Quantocks NCA.
Arthonia invadens	NT	This is the only site for the species in the Quantocks NCA.
Bellicidia incompta	VU	This is the only site for the species in the Quantocks NCA, and the only site in Somerset where it occurs on more than one tree, and where there are multiple host trees.
Karstenia chrysophaea	NT	This is the only site for the species in the Quantocks NCA.
Karstenia dictyospora	NT	This is the only site for the species in the Quantocks NCA.
Karstenia nigra	CR	This is the only site for the species in the Quantocks NCA, and the only site in Somerset where it occurs on more than one tree, and where there are multiple host trees.
Mycoporum lacteum	NT	This is the only site for the species in the Quantocks NCA.

4.6 Management advice

The importance of the hollies in Alfoxton Wood as a population of veteran trees has not previously been recognised. The maiden tree with the largest diameter measured in the current survey (58 cm) would be among the larger hollies at Staverton Park in Suffolk (Peterken, 1969). The veteran hollies are difficult to count but there may be more than 80 trees. There is no comparable feature elsewhere in Somerset and these trees should be left unmanaged. While the lichen assemblage lacks most of the rarities that might be found in more humid and well-lit locations, the occurrence of *Bellicidia incompta* on six trees and *Karstenia nigra* on four trees is regionally significant. Alfoxton Wood is also the only site

for *Mycoporum lacteum* in Somerset, and the hollies and veteran oaks here support a well-developed Ancient Dry Bark Community.

The main management issue at Alfoxton Wood and Willoughby Cleeve is the age structure of the oak populations. Younger trees to replace the current generation of old trees are scarce, and the most recent Natural England Common Standards Monitoring assessments found these SSSI units (38 and 49) to be in unfavourable condition, partly because of a lack of tree regeneration. **This is not an issue that can be addressed within these units**, which are too small to allow space for the missing generation of trees and at the same time retain current levels of openness.

Alfoxton Wood is notable for its large veteran oaks which are well spaced (at least 20 m apart) and partly open-grown. Lateral branches on open-grown trees increase the niches that are available for lichens. The ultimate failure of these branches gives rise to wounds and cavities which are of further importance to saproxylic invertebrates (Alexander, 2024). Unfortunately the open space in Alfoxton Wood has been planted with young trees (at 7 m spacing) that will damage the open structure of this important feature (see Photos A1.25 to A1.28). The tree planting must be thinned, with selected planted trees potentially cut as pollards, to reduce the shading effects on the existing oaks. In Willoughby Cleeve there is also no space in the main pollard area for a new generation of oaks.

Efforts should instead be made to create large-scale landscapes in which old trees can develop (Kirby, 2015). Younger oaks can be found in surrounding areas although not commonly. Oak is a light-demanding tree and the high level of deer browsing on the Quantocks at present is limiting regeneration. This is mostly confined to the higher slopes outside currently wooded areas, where the development of large trees will be suppressed by wind exposure. There are a few exceptions to this, as on Lower Hare Knap (see Photo A1.29), although many areas are bracken-dominated and small numbers of oaks could easily be established to develop into future veteran trees. These will need protection from grazing, although it is possible that acorns could be planted amongst browsed low holly.

Young Holly is much more widespread in the north Quantocks, including in Withing Wood, Oyles Wood, Holford Kelting, Holford Combe, Hodder's Combe, and Lower Hare Knap (see Photos A1.30 and A1.31). In woodland this is causing shading, and a cutting program should encourage the development of well-lit lichen assemblages on oak, and the creation of free-standing old pollards will support future colonisation by the species dependant on holly lignum. Some Holly is already coppiced or ring-barked on the open combe sides to achieve scrub reduction targets, but it would be preferable to pollard some instead, particularly if already well-grown.

A programme of Holly cutting and oak planting is therefore suggested, aiming to cut 1 hectare of Holly per year mostly within woodland, and planting 10 oaks per year in bracken-dominated areas outside this. It is acknowledged that Lower Hare Knap is currently targeted for heathland restoration by Natural England, though it is questionable

whether this achievable in dense bracken on the north side of the hill (see Photo A1.32). The SSSI unitisation here is unhelpful by including a complex mosaic of habitats, and the combe sides may not have been entirely dwarf shrub heath in recent times, particularly as the open-grown hollies are noted as a locally distinctive feature on the SSSI citation.

A Holly cutting protocol is provided in sub-section 4.6.1. Oaks should be planted at no closer than 20 m spacing and not where these will shade existing trees. At the end of a 40-year pollarding cycle this should mean numerous hollies have been pollarded to benefit lignum-associated lichens, and 400 young oaks established, helping to address the continuity problem identified on the north Quantocks. In the longer term as stands at Alfoxton Wood and Willoughby Cleeve start to break open, then regeneration can be considered there. This should all be evaluated in the context of the surrounding landscape, which includes intermediate-aged tree stands in various locations, such as the mature oaks on the east side of Alfoxton Park.

In Willoughby Cleeve there has been a very large-scale programme of Holly felling in recent years, following concerns about recent mortality of oak pollards and the level of shade cast by dense Holly thickets (Alexander, 2017). This has achieved a short-term improvement in the amount of light available, although very soon the dead Holly branches will cause the development of bramble thickets as many areas have become completely inaccessible to grazing, such is the volume of brash (see Photo A1.33 to A3.36). It is also possible that Beech will colonise under these circumstances as it is a more shade-tolerant tree than oak. The pressing issue here now is to **clear dead holly from within the canopy radius of any oak trees** where it has been left after felling and ensure that the woodland can be easily accessed by grazing animals. It is also regrettable that some veteran hollies were felled during the clearances (see Photo A1.37) as these are likely to be of similar age to the oak pollards.

Management actions for selected trees in Alfoxton Wood, and Willoughby Cleeve in general, are listed in Appendix 3. This is not a comprehensive list of management advice as there was not enough time during the survey to compile this. The specific actions are limited to the area along Alfoxton Drive nearest the entrance, and some of the nearby tree planting. In addition no attempt has been made to suggest individual hollies to pollard, this would best be done in a walkover survey to mark up these trees.

4.6.1 Holly cutting protocol

Historically some Holly was managed within oak woodlands for fodder, particularly in northern and western Britain (Spray, 1981). Holly leaves have a high calorific value and were fed to sheep, cattle, and in some cases to deer, when feed was in short supply in the winter. Pollarding of Holly was undertaken to supply the fodder by removing upper branches with more palatable blind (thornless) leaves. The following protocol is entirely

based on work in the New Forest, Hampshire to document holly cutting as a method to benefit epiphytic lichen conservation (Sanderson, 2019b).

1. Cut Holly in management blocks of between 30 m and 100 m in length. This is best undertaken where pre-existing paths encourage grazing animals to control regrowth. It is important to maintain humidity within stands of woodland so the size of the cut blocks should reflect local site conditions and never exceed 100 m.
2. Most hollies chosen for pollarding should measure between 10 cm and 20 cm in diameter. Hollies larger than 20 cm diameter may be pollarded if these are shading a veteran oak, or individual stems on multi-stemmed trees can be cut.
3. Pollarding should occur at a minimum height of 1.5 m but ideally at 1.8 m as the higher the cut, the less chance there is of the pollard failing.
4. Old hollies or lapsed pollards, and old coppice, should not be re-cut.
5. All Holly in a management block that is under 10 cm in diameter should be coppiced. Young Holly regrowth is highly palatable during the summer months and will be favoured over older holly.
6. Pollard rotation is recommended on a 30-to-40-year cycle depending on the time taken for the Holly to generate dominant blind leaves.
7. After Holly is cut the brash should be reduced in volume to make it more palatable to grazing animals. This will help to maintain open conditions, free of bramble, around any upcoming or veteran trees.
8. Cutting should be undertaken between November and at the latest early March. Blind Holly leaves are readily eaten whereas thorny Holly leaves are mostly eaten during colder weather.
9. Several factors should be considered when choosing sites to be cut: Holly stands that are more sheltered as opposed to exposed; low lying sites or those near streams that have a humid microclimate; prioritising Holly cutting in stands with veteran trees shaded by Holly of 20 cm or less in diameter; and where young Holly is invading stands of lichen or bryophyte-rich veteran trees.
10. Cuts should not be on exposed woodland edges to maintain sheltered conditions, and for the same reason it is preferable to scatter sites across woods rather than extending recent cuts.

5 Recommendations

There are three recommendations following this survey:

1. List lichens as a designated feature of The Quantocks SSSI, based on the assemblages and species reported in this survey.
2. Complete an additional day of survey in Alfoxton Wood to systematically search for *Bellicidia incompta* on Holly and Sycamore. Two additional trees with this species

were found during a visit in January 2025 and given the large number of hollies in the wood, more time is needed to survey these.

3. Plan and implement a long-term programme of small-scale Holly cutting and oak planting in the north Quantocks, based on a 40-year pollard rotation cycle for the Holly.

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Appendix 1 Photos

Photo A1.1. *Bellicidia incompta* seen as a green-grey granular verrucose thallus with black apothecia, in bark fissures below a wound on Sycamore in Alfoxton Wood.

Photo A1.2. *Karstenia nigra* characterised by blue-black urceolate apothecia immersed in damp lignum of a hollowing veteran Holly at Alfoxton Wood.

Photo A1.3. *Karstenia chrysophaea* characterised by pale urceolate apothecia immersed in damp lignum of a hollowing veteran Holly at Alfoxton Wood.

Photo A1.4. Veteran Holly at ST15263.41303 with *Bellicidia incompta* growing on lignum in a low wound.

Photo A1.5. Veteran Holly at ST15263.41303 with location of *Bellicidia incompta* marked by blue pin (sterile thallus and pycnidia).

Photo A1.6. Veteran Holly at ST15726.41294 with *Bellicidia incompta* growing on lignum in hollowing trunk.

Photo A1.7. Veteran Holly at ST15726.41294 with the extent of *Bellicidia incompta* marked by blue pins.

Photo A1.8. Veteran Holly at ST15284.41207 with *Bellicidia incompta* growing on lignum in wound.

Photo A1.9. Veteran Holly at ST15284.41207 with the location of *Bellicidia incompta* marked by a blue pin.

Photo A1.10. Veteran Holly at ST15269.41223 with *Bellicidia incompta* growing on lignum in wound.

Photo A1.11. Veteran Holly at ST15269.41223 with the extent of *Bellicidia incompta* marked by blue pins.

Photo A1.12. Sycamore at ST15222.41338 with *Bellicidia incompta* growing in a wound track.

Photo A1.13. Sycamore at ST15222.41338 with the location of *Bellicidia incompta* marked by blue pins, the thallus is in the narrow bark fissures.

Photo A1.14. Sycamore at ST15362.41827 with *Bellicidia incompta* growing in a wound track.

Photo A1.15. Sycamore at ST15362.41827 with the location of *Bellicidia incompta* marked by blue pins, the thallus is in the bark fissures.

Photo A1.16. Veteran Holly at ST15178.41409 supporting *Karstenia nigra* and *Karstenia chrysophaea*. View north-east (60º).

Photo A1.17. Pins indicating *Karstenia nigra* (yellow) and *Karstenia chrysophaea* (red) on veteran Holly at ST15178.41409.

Photo A1.18. Veteran Holly at ST15167.41400 supporting *Karstenia nigra*. View north (20º).

Photo A1.19. Pin indicating *Karstenia nigra* (yellow) on veteran Holly at ST15167.41400.

Photo A1.20. Veteran Holly at ST15182.41404 supporting *Karstenia nigra* and *Karstenia chrysophaea*. View north-east (25º).

Photo A1.21. Pins indicating *Karstenia nigra* (yellow) and *Karstenia chrysophaea* (red) on veteran Holly at ST15182.41404.

Photo A1.22. Veteran Holly at ST15298.41313 supporting *Karstenia nigra* and *Karstenia chrysophaea*.

Photo A1.23. Pins indicating *Karstenia nigra* (yellow) and *Karstenia chrysophaea* (red) on veteran Holly at ST15182.41404.

Photo A1.24. *Chaenothecopsis retinens* parasitising *Sporodophoron cretaceum* on a veteran Oak in Alfoxton Wood. This rarely recorded pinhead lichen has very short-stalked apothecia capped by a black spore mass.

Photo A1.25. Target Note 1 at ST 1511.4133. Planted oaks which will shade the mature oak downslope to the north. Thinning and pollarding are recommended for the planted trees.

Photo A1.26. Target Note 2 at ST 1516.4134. These oaks have been planted too closely to develop as open-grown trees and should now be thinned, with particular attention to retaining light reaching the mature oaks to the north.

Photo A1.27. Target Note 3 at ST1546.4128. The planted oaks to the south of the existing mature oaks should be thinned and/or pollarded to maintain the open pasture woodland.

Photo A1.28. Target Note 4 at ST1539.4130. The planted oaks to the south of the existing mature oaks should be thinned and/or pollarded to maintain the open pasture woodland.

Photo A1.29. ST1468.4051. Open-grown oak amongst Bracken on Lower Hare Knap. These are potential future veterans and successor trees to the pollards on the opposite side of the combe in Willoughby Cleeve.

Photo A1.30. ST1538.4096. Young holly surrounding mature oak at the north end of Holford Combe. Heavily shaded veteran trees should be prioritised for Holly cutting.

Photo A1.31. ST1460.4044. Open-grown Holly amongst dense Bracken on Lower Hare Knap. Some of these trees could be pollarded to create a new generation of veteran Hollies.

Photo A1.32. ST1449.4056. Holly amongst dense Bracken on Lower Hare Knap. The slopes opposite Willoughby Cleeve are an excellent place to establish more open-grown oaks.

Photo A1.33. ST1478.4074. View upslope in Willoughby Cleeve of an oak trunk surrounded by cut holly brash. This needs to be cleared to maintain access for grazing animals.

Photo A1.34. ST1447.4055. An impenetrable mass of felled Holly surrounding a lapsed Oak pollard. Bramble can be seen establishing at base of the tree as it is now inaccessible to grazing animals.

Photo A1.35. ST1436.4037. An impenetrable mass of felled holly surrounding a lapsed oak pollard. This must be removed.

Photo A1.36. ST1436.4036. An impenetrable mass of felled holly surrounding mature Oaks. This must be cut up and spread to restore access for grazing animals.

Photo A1.37. Felled veteran holly at ST1442.4063. This was one of the largest hollies in Willoughby Cleeve which was unfortunately felled at the same time as the younger growth.

Photo A1.38. Target Note 5 at ST1532.4114. Hollies south of oak trunk. The canopy aloft is drying out the trunk of this oak which limits the range of lichens that can colonise the bark.

Photo A1.39. Target Note 5 at ST1532.4114. Beech and young holly shading the oak on the south side of Alfoxton Drivein Photo A1.37.

Photo A1.40. Target Note 6 at ST1534.4116. The Holly shading this oak trunk should be coppiced, and the twin-stemmed Holly to the east pollarded.

Photo A1.41. Target Note 7 at ST1535.4116. The Holly by this oak trunk should be coppiced, and the surrounding young hollies coppiced or pollarded.

Photo A1.42. Target Note 7 at ST1535.4116. The younger Beech has overtopped the oak which is likely to undergo canopy retrenchment and ultimately die for lack of light.

Photo A1.43. Target Note 8 at ST1537.4119. Pollard the Holly to the south of the oak to improve light levels.

Photo A1.44. Target Note 8 at ST1537.4118. The Holly by the oak trunk should be coppiced, and the hung-up Holly removed from the oak.

Photo A1.45. Target Note 9 at ST1539.4117. Coppice Holly surrounding the oak and pollard the Holly to the north of this tree.

Photo A1.46. Target Note 9 at ST1539.4117. Fell the beech on the opposite side of Alfoxton Drive to reduce shading on the oak.

Photo A1.47. Target Note 10 at ST1540.4119. Coppice hollies around this oak to reduce shading on the trunk.

Photo A1.48. Target Note 11 at ST1540.4120. Coppice Holly shading the oak trunk.

Photo A1.49. Target Note 12 at ST1543.4121. The hollies to the south of the oak should be felled and the healthy stems on the Holly to the north should be pollarded.

Photo A1.50. Target Note 12 at ST1543.4121. This twisted Beech is blocking light reaching the oak in the sub-canopy and should be removed.

Photo A1.51. Target Note 13 at ST1544.4122. Fell Beech and coppice Holly to improve light levels reaching the oak trunk.

Photo A1.52. Target Note 14 at ST1546.4120. This Beech has overtopped the oak to the south and should be felled or reduced to maximise the lifespan of the oak.

Photo A1.53. Target Note 14 at ST1546.4120. The Beech has overtopped the oak which is starting to be excluded from the canopy.

Photo A1.54. Target Note 15 at ST1549.4126. The Holly to the south of the oak should be coppiced to increase light levels reaching the oak trunk.

Photo A1.55. Target Note 16 at ST1433.4056. Some of the oak pollards in Willoughby Cleeve would benefit from further clearance of Holly. The brash should be cut up and made accessible to grazing animals, and shelter maintained on the edge of the woodland.

Appendix 2 Index calculations

Table A2.1. Southern Oceanic Woodland Index for Alfoxton Park, Alfoxton Wood and Willoughby Cleeve.

Taxon	Year of last record	Alfoxton Wood	Willoughby Cleeve	Alfoxton Park
Arthonia vinosa	2024	–	✓	–
Catinaria atropurpurea	2024	–	✓	–
Chaenotheca brunneola	2024	–	✓	–
Chaenotheca hispidula	2024	–	✓	✓
Chaenotheca stemonea	2022	–	–	✓
Chaenotheca trichialis	2024	✓	✓	✓
Cladonia parasitica	2024	✓	–	✓
Cresponea premnea	2024	✓	✓	✓
Inoderma subabietinum	2024	✓	–	✓
Lecanographa lyncea	2024	✓	–	✓
Lepra multipuncta	2013	✓	–	–
Myoporum antecellans	2024	✓	–	✓
Mycobilimbia sphaeroides	2013	✓	–	–
Pachyphiale carneola	2024	✓	–	–
Porina coralloidea	2024	✓	–	–
Schizotrema quercicola	2024	✓	–	–
Snippocia nivea	2024	✓	✓	✓
Sporodophoron cretaceum	2024	✓	–	–
Stenocybe septata	2024	✓	✓	–

Taxon	Year of last record	Alfoxton Wood	Willoughby Cleeve	Alfoxton Park
Thelopsis corticola	2024	✓	✓	✓
Thelotrema lueckingii [1]	2024	✓	✓	✓
Usnea florida	2022	–	–	✓
Zwackhia prosodea	2024	✓	–	✓

[1] *Thelotrema lepadinum* appears on the list of SOWI taxa although this is now known to have been confused with *Thelotrema lueckingii*. These are taken to be equivalent in the calculation of the index.

Table A2.2 Pinhead Index Calculation for Alfoxton Park, Alfoxton Wood and Willoughby Cleeve.

Taxon	Year of last record	Alfoxton Wood	Willoughby Cleeve	Alfoxton Park
Calicium glaucellum	2022	–	–	✓
Chaenotheca brunneola	2024	–	✓	–
Chaenotheca ferruginea	2022	–	–	✓
Chaenotheca furfuracea	2010	✓	–	–
Chaenotheca hispidula	2024	–	✓	✓
Chaenotheca stemonea	2022	–	–	✓
Chaenotheca trichialis	2024	✓	✓	✓
Chaenothecopsis nigra	2024	✓	✓	–
Chaenothecopsis pusilla	2024	–	✓	–
Chaenothecopsis retinens	2024	✓	–	–
Microcalicium ahlneri	2024	✓	✓	–

Appendix 3 Management target notes

Table A3.1. Management target notes for Alfoxton Wood (1-15) and Willoughby Cleeve (17-18).

Note	Tree species	Grid reference	Action	Timescale	Rationale
1	Oak (Photo A1.25)	ST 1511.4133	Thin and/or pollard planted oaks which will cause shade to the mature trees to the north of these.	1 year	To preserve light levels on existing veteran oaks and prevent loss of open pasture woodland habitat.
2	Oak (Photo A1.26)	ST 1516.4134	Thin and/or pollard planted oaks which will cause shade to the mature trees to the north of these.	1 year	To preserve light levels on existing veteran oaks and prevent loss of open pasture woodland habitat.
3	Oak (Photo A1.27)	ST 1546.4128	Thin and/or pollard planted oaks which will cause shade to the mature trees to the north of these.	1 year	To preserve light levels on existing veteran oaks and prevent loss of open pasture woodland habitat.
4	Oak (Photos A1.28)	ST 1539.4130	Thin and/or pollard planted oaks which will cause shade to the mature trees to the north of these.	1 year	To preserve light levels on existing veteran oaks and prevent loss of open pasture woodland habitat.
5	Oak (Photo A1.38)	ST 1532.4114	Coppice Holly immediately south of oak trunk.	2 years	To increase moisture reaching the oak trunk and encourage lichens to reestablish.

Note	Tree species	Grid reference	Action	Timescale	Rationale
5	Oak (Photo A1.39)	ST 1532.4114	Coppice and pollard Holly on south side of Alfoxton Drive. Remove Beech saplings.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
6	Oak (Photo A1.40)	ST 1534.4116	Coppice Holly by oak trunk and pollard two young Holly stems to the east of this.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
7	Oak (Photo A1.41)	ST 1535.4116	Coppice Holly next to oak trunk, and coppice or pollard nearest young Holly.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
7	Oak (Photo A1.42)	ST 1535.4116	Fell or reduce Beech to south of the oak	2 years	To maximise the life of the oak and prevent its premature demise by the overtopping Beech.
8	Oak (Photo A1.43)	ST 1537.4119	Pollard Holly to the south of oak.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
8	Oak (Photo A1.44)	ST 1537.4118	Coppice Holly by oak trunk and free hung-up Holly from where it is caught in the oak.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.

Note	Tree species	Grid reference	Action	Timescale	Rationale
9	Oak (Photo A1.45)	ST 1539.4117	Coppice Holly surrounding oak trunk and pollard Holly to north of this.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
9	Oak (Photo A1.46)	ST 1539.4117	Remove young Beech on opposite side of Alfoxton Drive.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.
10	Oak (Photo A1.47)	ST 1540.4119	Coppice holly surrounding oak trunk.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.
11	Oak (Photo A1.48)	ST 1540.4120	Coppice holly shading oak trunk.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.
12	Oak (Photo A1.49)	ST 1543.4121	Coppice hollies to south of oak, pollard healthy stem Holly to north but retain hollowing stem.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish, and to veteranise the Holly.
12	Oak (Photo A1.50)	ST 1543.4121	Remove Beech in sub-canopy.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.

Note	Tree species	Grid reference	Action	Timescale	Rationale
13	Oak (Photo A1.51)	ST 1544.4122	Fell Beech and coppice Holly shading oak.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.
14	Oak (Photos A1.52 and A1.53)	ST 15 46.4120	Fell or reduce Beech to south of the oak.	2 years	To maximise the life of the oak and prevent its premature demise by the overtopping Beech.
15	Oak (Photos A1.54)	ST 1549.4126	Coppice Holly to south of the oak.	2 years	To increase light levels at the oak trunk and encourage lichens to reestablish.
16	Oak	N/A	Assess all planted trees in Alfoxton Wood and decide whether to thin or pollard these based on how much shade the planted trees will cause in future for the existing mature and veteran oaks.	1 year	To preserve light levels on existing veteran oaks and prevent loss of open pasture woodland habitat.

Note	Tree species	Grid reference	Action	Timescale	Rationale
17	Holly (Photos A1.33 to A1.36)	N/A	Cut up Holly brash throughout area of felling in Willoughby Cleeve to allow access for grazing animals and reduce the establishment of bramble and ivy. This issue is widespread throughout the areas of recent Holly felling, particularly towards the bottom of combe.	1 year	To maximise the life of the oaks and encourage lichens to reestablish.
18	Holly (Photo A1.55)	N/A	Continue Holly cutting in Willoughby Cleeve though according to the protocol in subsection 4.5.1.	Ongoing	To maximise the life of the oaks and encourage lichens to reestablish.