LICHEN SURVEY OF THORNEYTHWAITE FARM WOODLANDS FOR THE NATIONAL TRUST

Ivan Day March 2017

CONTENTS

Summary ........................................................................................................... 2
Introduction ................................................................................................. 2
Methodology ............................................................................................... 4
Results .......................................................................................................... 5
Lichen Communities of Thorneythwaite Farm Woodlands ....................... 6
Conclusions ................................................................................................ 9
Recommendations ....................................................................................... 9
Acknowledgements .................................................................................... 10
References .................................................................................................. 11
Appendices .................................................................................................. 12
Illustrations .................................................................................................. 18
SUMMARY

A three-day survey of Thorneythwaite Woods, Borrowdale, Cumbria revealed a corticolous lichen flora of slightly over 100 species (Appendix 1). Dominant communities present are the Parmelion laevigatae, Parmeliatum revolutae and Xanthorian parietinae. Although some elements of the ancient forest community the Lobarion pulmonariae, such as Peltigera horizontalis and Thelotrema lepadinum are frequent, this community is only present as a depauperate relic with few of the really sensitive cyanolichens that are found in the internationally important Seatoller woodlands on the other side of the valley. The conservation value of the site is discussed and a few recommendations are made regarding management.

INTRODUCTION

History
The complex of woods and woodland pasture on the slopes of Thorneythwaite Fell east of Thorneythwaite Farm is one of the last woodland sites in the Borrowdale valley to be formally surveyed for its lichen communities. Borrowdale as a whole has a long history of lichen recording. Even in pre-Victorian times it was noted for the luxuriance of the Lobarion pulmonariae, the climax community of the Atlantic summer forests. Winch (1833) describes a rich woodland epiphytic flora flourishing in the valley in the early nineteenth century, with records of Lobaria scrobiculata and Pannaria rubiginosa, both now extinct in Lakeland. Degelia plumbea and Sticta sylvatica, now rare, he describes as occurring ‘in every wood near Keswick’ (Appendix 2). Ratcliffe (2002) visited Great Wood in 1956, where he found large trees bearing sheets of L. pulmonaria, a lichen he described as ‘poor and unhealthy’ and surprisingly rare in other Borrowdale Woods. He reports that fine stands of the more sensitive L. amplissima, which he observed at Barrow House and at another site near Keswick in 1956, had completely disappeared by 2002. A more detailed account of the lichen communities of Great Wood was given by Rose et al (1970), where in 1969 the authors observed ‘the best Lobarion communities in the British Isles’ flourishing on old oaks and wych elms.

However, when Rose and his companions examined the woodlands at the southern end of the Borrowdale Valley – Longthwaite and Johnny Woods, they found that despite their rich communities of Atlantic bryophytes they were rather species-poor in lichens. They described the nearby Seatoller Woodlands as similar, but even poorer in species
numbers. On their 1969 excursion they never visited the Thorneythwaite woodlands on the eastern side of the Seathwaite, the subject of this report.

Throughout the late seventies and eighties, Day (1989) conducted a number of surveys of the Seatoller Woods, including the pollard ash trees at Seathwaite, which Rose et al had not seen in 1969. He discovered that the Seatoller woodlands were in fact much richer than first realised, with national rarities such as *Leptogium burgesii*, *Pseudocyphelaria intricata*, *Wadeana dendrographa* and *Ramonia nigra* (type locality) occurring mainly on ash pollards. Low Stile Wood at Seatoller is now known to be the most diverse woodland habitat for lichens in Lakeland, with well over 200 epiphytic species. The richest area is in the vicinity of the group of ancient pollard ashes close to the celebrated Borrowdale Yews.

In 1982 Day briefly visited Thorneythwaite Woods on the other side of the valley, specifically to examine some of the pollard ash trees (Appendix 2). He found two pollards with small thalli of *Lobaria virens* and five all together bearing healthy thalli of the cyanolichen *Pannaria conoplea* (at grid references NY246130 and NY243126). A healthy *Ulmus glabra* high up the slope under Thorneythwaite Fell supported a colony of *L. virens* and good stands of the cyanolichens *Sticta sylvatica*, *Leptogium lichenoides* and *Collema subflaccidum* (grid reference NY243125). However, on the whole, he found the wood to be quite species poor, supporting in the main, assemblages of fairly ubiquitous taxa. In 2013, Allan Pentecost (personal communication) briefly examined Thorneythwaite Wood for lichens and recorded nine epiphytes, including *Sticta sylvatica* and *Pannaria conoplea* on an ash at NY24651306 (See Appendix 4). These brief visits by Day and Pentecost are the only known forays into the Thorneythwaite woodlands before the current survey.

**Woodland Structure**

The Thorneythwaite Woods clothe the lower flanks of Thorneythwaite Fell and Glaramara, ‘hanging’ on steep and rocky slopes. The parent rock of these mountains belongs to the Borrowdale Volcanic Series. This extremely hard acidic siliceous rock tends to generate nutrient-poor soils. At Thorneythwaite the soils are mainly base-deficient brown earths covered with acid humus, which is often very sour in the poorly drained areas. Below gullies where softer rocks have eroded to produce scree and dramatic rock falls, some marginally more basic soils have been created, but these are not as widespread as on the other side of the valley. An oak/birch association dominates the acid soils, while those of a
slightly more basic profile support stands of ash trees (*Fraxinus excelsior*). In the past a few wych elms (*Ulmus glabra*) also grew in these vertically orientated ash bands, but were decimated by Dutch elm disease in the late eighties, though a small number of regenerating stools still produce a few living branches. Most of this semi-natural woodland is open in character, without much of a shrub layer, a result of a management regime of open grazing by sheep. There is little evidence of regeneration of trees. However a large number of veteran hazels (*Corylus avellana*), most without evidence of recent coppicing, testify to the nature of the original understorey. Ancient hollies (*Ilex aquifolium*), many of them pollarded, are also frequent. At the northern end of the woodland, crab apples trees (*Malus sylvestris*) are locally abundant and hawthorn (*Craetagus monogyna*) occurs on the open fringes. On the lower slopes, a number of ash trees have been pollarded to produce the ‘cropping ashes’ so typical of the field margins surrounding the steadings of the central Lake District valleys. A number of these have recently been re-pollarded by the last tenant before the National Trust took over the management of the property. One distinctive characteristic of the steeper ground are the number of large boulders and rough scree slopes below some of the gullies on the fell. In some areas there is clear evidence of recent rock falls. A number of veteran trees appear to have been damaged by historic collisions with falling rocks, but have survived to develop eccentric and distorted forms.

The open nature of the woodland, much of which could broadly be described as pasture woodland, means that most trees are well illuminated, a condition that is usually encouraging to the development of epiphytic lichen communities. However, the north-west aspect of the site and its position on the steep flanks of Glaramara means that in the winter months the woodlands do not receive much direct sunlight, particularly in the morning. This is in sharp contrast to the sunny Seatoller woodland complex on the other side of the valley, which faces south-west. On a preliminary visit to the property on a very cold morning in December, it was noted that Thornythewaite woods remained deeply shaded and heavily frosted, while those on the other side of the valley were in full sunlight and free of frost. The woods are also in the highest rainfall area in England with 3552mm recorded as the mean annual average at the rain gauge on nearby Seathwaite Fell.

**METHODOLOGY**

The purpose of the survey was to determine the nature of the lichen communities of Thornythewaite Farm woodlands. Three days were
allowed to survey the site. One day was spent assessing the general nature of the lichen communities before concentrating on examining assemblages specific to particular tree species and bare wood surfaces. Considering the large scale of the site and its steep profile, it was not considered possible in the timeframe to thoroughly survey habitats such as rocks, walls, soil etc., though an ongoing list of taxa present on these substrates was kept and is presented here in Appendix 5.

The position of trees with interesting assemblages was recorded with a ten-figure grid reference using a GPS device. As a result, no tree labeling was undertaken. In cases where field determination of species was difficult, small vouchers were collected and examined microscopically to enable accurate identification. This material has been retained and preserved in labeled herbarium packets by the author. With the National Trust’s permission these specimens, together with the rest of Ivan Day’s Cumbria lichen herbarium, will eventually be deposited in Tullie House Museum, Carlisle. Any critical material, which the author could not identify, or was considered to be nationally important, was to have been forwarded to Dr. B. J. Coppins for determination, but this proved unnecessary, as very little difficult material was encountered. Dr. Allan Pentecost, who was familiar with the habitat from his 2013 visit, spent a day on site with the author, adding some more records and confirming the identity of many species.

The methods for identifying epiphytic communities in James et al (1977) were broadly followed. Ellis et al (2015) also proved useful in this respect.

RESULTS

Slightly over 100 lichen taxa were recorded on bark and bare wood and are listed in Appendix 1. Most of these are ubiquitous and commonly occurring species found in most Lake District woodlands. No lichens new to the vice county of Cumberland were found. None of the species in the list are identified as threatened according to IUCN criteria.

Most woodland lichens occur in fairly well defined epiphytic communities, though it must be understood that these assemblages are not mutually exclusive. Because of the complexity of succession dynamics and variations in microclimate and woodland microhabitats, some species will co-occur across one community to another. Only the most distinctive and easily defined communities at Thorneythwaite are listed here.
LICHEN COMMUNITIES IN THORNEYTHWAITE FARM WOODLANDS


This is more or less equivalent to the Lecanoretum subfuscae Hil. (Alliance 4) described at length in James et al (1977 p. 318). It is a pioneer mosaic-forming community of smooth bark, particularly on young trees in mesotrophic settings, but can also occur on younger limbs and smooth bark profiles of older ash trees. Other species at Thorneythwaite found in this community are Buellia griseovirens, Lecania cyrtella, Lecanora carpinea, L. expallens and Rinodina Sophodes. It is frequent on the young twigs of ash, hawthorn and hazel, though in more shaded areas frequently blends into Community Type 2 - the Graphidietum scriptae - particularly on hazel and holly. It is so frequent and ubiquitous on smooth bark throughout the site that no attempt has been made to map its distribution. On more eutrophicated twigs and smooth bark it is succeeded by and often blends into Community Type 5, the Xanthorian parietinae.

Community Type 2 (Ellis et al type B). This is synonymous with the Graphidietum scriptae Hil. described by James et al (1977) p.316.

Indicator species in Thorneythwaite are Graphis scripta, G. elegans, G. ruiziana, Thelotrema lepadinum and Arthonia elegans (Fig. 1). This alliance of crustose species is primarily a pioneer community, but can also persist on smooth bark horizons on mature trees, particularly in deep shade and is even found on the smooth buttress roots of ancient oaks. However, at Thorneythwaite it reaches its optimum development on the smooth bark of hazel and holly. On younger twigs and boughs of these trees, an association of initial bark pioneers, some of which are non-lichenised, tends to precede the Graphidietum scriptae. At Thorneythwaite this includes Arthonia radiata, Arthopyrenia cerasi, A. fraxini, A. punctiformis and Tomasellia gelatinosa on hazel. On holly throughout the wood, small pinhead fruiting bodies of Stenocybe septata often grow up through the thalli of Graphis scripta and Thelotrema lepadinum. The latter, an old forest lichen, occurs on most tree species in Thorneythwaite, even on birch and alder as well as mature oaks and ashes. In these situations it is frequently associated with Normandina pulchella and almost certainly represents a surviving relic of a former
Lobarion, a mature succession community that was much more widespread in Lakeland woodlands in the pre-industrial past.

Community Type 3. (Ellis et al Type M). Parmelion laevigatae Hil.

Many of the large oaks and birches growing on thin acid soils on steep slopes have dramatically acidified bark and support a typical facies of the Hypotrachyna laevigata community, an oligotrophic assemblage described by James et al (1970) as the Parmelion laevigatae (Figs. 2-8). This is frequently encountered on trees in high rainfall areas in Britain that have at least 180 wet days a year. It is usually found on phorophytes with a bark pH range of between 3.75-4.60 (James et al., p.330). It also has a preference for a degree of shade and thrives on trees which are less sun-exposed and not subject to frequent drying (Ellis et al. p. 85). The community is well known in Lakeland and should be considered an important late successional climax community in the wetter woodlands of the region. It is particularly well developed in Johnny Wood and at the northern end of the Seatoller woodlands. Further afield, it is common in the woods around Surprise View and in Scales Wood near Buttermere. At Thornythwaite, the best-developed stands of it are in the section of the wood directly opposite and slightly to the north-west of the farm on the middle and upper slopes.

The community is at its optimum development on a large Quercus petraea at NY25021 13432, which supports good stands of Cladonia coniocraea, Hypotrachyna laevigata, Micarea prasina, Mycoblastus sanguianarius, Ochrolechia androgyna, O. tartarea, Pertusaria amara and Sphaerophorus globosus. Many of the oaks and birches growing on the middle and upper slopes on acid soils bear similar, though species-poor variants of the community. It is frequent on birches in the sheltered ravine above the waterfall at NY25192 131154, where a small thallus of Parmeliopsis hyperopta was seen growing among the Hypotrachyna laevigata. A very small thallus of Micarea stipitata overgrowing bryophytes was also found in this area. This distinctive crustose lichen is frequent on Betula and acid Quercus at the northern end of the Seatoller Woods on the opposite side of the valley.

The old forest lichen Cetrelia olivetorum (Fig. 8), often considered to be part of this community, grows on a number of oaks in this area, as at NY25108 13287, NY25084 132224 and on a fallen limb at NY24937 13208. The sorediate crustose lichen Megalaria pulverea is also frequent in this community. This lichen rarely develops apothecia, but is abundantly fertile on a sessile oak close to the weir area at NY25167.
One important member of this alliance, which is frequent in the Seatoller woods on the other side of the valley and in Johnny Wood, is *Hypotrachyna taylorensis*. This taxon appears to be completely absent in the Thorneythwaite Woods, where the community is never as well developed as it is in these neighbouring woodlands.

**Community type 4. Lobarion pulmonariae Ochsn. (James et al p.325).**

This late succession mesotrophic community is only marginally present at Thorneythwaite, though some components, such as the old forest lichen *Thelotrema lepadinum* (fig 9) and its frequent associate, the glaucous, squamulose lichen *Normandina pulchella* (fig. 10), are widespread and found on most tree species. The only large foliose member of the alliance commonly encountered, usually on the bases of trunks of ash trees, is the old forest taxon *Peltigera horizontalis* (fig. 11). The similar *P. praetextata* (fig. 12), easily determined by its coralloid isidia, is not usually considered to be faithful to ancient forest, but is also common in humid and slightly shaded areas at the base of trees. As mentioned in the introduction, *Lobaria virens* was present in Thorneytwaite Wood on three trees in 1982, but has since vanished. *Sticta sylvatica* (fig. 14) still lingers at NY24399 12577, where it once flourished on an old elm (fig. 13) This tree has been badly infected by Dutch elm disease, but a few thalli of *Sticta* survive on the rocks below with *Leptogium lichenoides*, *Peltigera horizontalis*, *P. praetextata* and *Collema subflaccidum*. The cyanolichen *Pannaria conoplea* (fig. 15) was also more widespread on pollard ashes, but is now confined to just three trees.

**Community Type 5 Parmeliatum revolutae Klem. (James et al p. 331).**

This community is often well developed on the upper limbs and better illuminated parts of ash, hawthorn, crab apple and to a lesser extent oaks at Thorneythwaite. On more nutrient-enriched bark it merges with, or becomes dominated and replaced by, nitrogen greedy members of Community Type 6. Typical components are *Evernia prunastri*, *Hypogymnia physodes*, *H. tubulosa*, *Hypotrachyna revoluta*, *H. afrorevoluta*, *Flavoparmelia caperata*, *Platismatia glauca*, *Melanelixia subaurifera*, *Melanohalea elegantula*, *M. exasperata*, *Punctelia subaurifera*, *P. jeckeri* (Fig. 16), *Hypogymnia physodes*, *Ramalina farinacea*, *R. fastigiata*, *Parmelia saxatilis*, *P. sulcata*, *Pertusaria albecens*, *P. amara*, *Phlyctis argena*. *Parmotrema perlatum*, which often occurs in this community in Lakeland, is surprisingly rare at Thorneythwaite. *Flavoparmelia caperata*, so frequent in many other Borrowdale woods, is never very well developed and often looks
unhealthy at Thorneythwaite. Upper limbs of ash trees, crab apple and some hazels throughout the site bear this community, but it is better developed in the lower parts of the pasture woodland on well illuminated trees.

**Community Type 6. Xanthorion parietinae. (James et al p.342).**

This community is typical of hypertrophicated bark, particularly twigs on hawthorn and smaller ash limbs. It is particularly noticeable on trees on the woodland margins directly downwind of the farmyard. It is well developed and luxuriant on a maiden ash on the open lower slopes at NY25073 13505, but occurs on many other trees in this area (fig.17). In woodlands away from the coast and remote from agricultural activities, it is usual only to find lichens that have a preference for nitrogen-rich substrates on bird perching twigs. Away from the coast these ornithocoprophilous communities have developed as a result of human activity and are frequent where there are grazing animals and nearby farmyards. Late succession lichen communities, such as the *Lobarion*, particularly those rich in sensitive cyanolichens, are adversely effected by high nitrogen input. At Thorneythwaite the *Xanthorian* community is not spectacularly developed as in more intensively farmed areas of Cumbria, but it is thriving on some trees. Typical nitrogen-loving species here are *Physcia adscendens*, *P. aipolia*, *P. tenella*, *Physconia enteroxantha*, *P. grisea* and *P. perisidiosa*, *Xanthoria parietina* and *X. polycarpa*. *Parmelina* pastillifera is frequently present and often abundant in this community, as are *Punctelia subredecta* and to a lesser extent *P. jeckeri*.

**CONCLUSIONS**

Despite being only a few hundred metres from the internationally important Seatoller Woodlands, unlike its close neighbour, Thorneythwaite is not such an impressive habitat for lichens. A woodland of heterogeneous structure such as this in a high rainfall area, with a diverse mosaic of tree species and varying stand ages, would be expected to support a diverse lichen flora. This is the case, as over 100 corticolous species were recorded in the course of the survey. However, the conservation status of the majority of the lichens present in the habitat raises little concern, as many are ubiquitous and flourish in other Lakeland woodlands of similar character. No regional or national rarities are present.
However, the woodland continues to harbour a few taxa belonging to the *Lobarion* community, which is under threat both in the region and nationally. It is possible, but difficult to prove, that the declining status of the *Lobarion* in this wood could be a result of episodes of historic nitrate input from the fertilized fields around the farm, which are directly upwind of the woodland. The presence of a *Xanthorian* on many trees on the woodland margins and the absence of fruticose lichens such as *Bryoria* and *Usnea* spp. supports this argument.

Little evidence was found of lichens belonging to the late succession dry bark community of mature trees, which often features members of the *Caliciales* – the iconic pinhead lichens of dry, shady bark profiles. A few common species of this alliance, such as *Lepraria membranacea* and *Opegrapha vermicellifera* are common on acid barked trees in the wood, but surprisingly no members of the *Caliciales* were detected.

**Assessment of Ecological Continuity**

A number of indices to assess the ecological continuity of woodlands through indicator lichen species, have been in use by lichenologists since the 1970s - Coppins, A.M. and Coppins, B.J. (2002). These have proved very useful in helping to assess the ecological history and conservation status of woodlands. Three of these are applicable to Thorneythwaite Woods – the RIEC (Revised Index of Ecological Continuity), the NIEC (New Index of Ecological Continuity) and the EUOCIEC – (Eu-Oceanic Calcifuge Index of Ecological Continuity).

**RIEC score for Thorneythwaite**

This is a score given for the number of ‘old growth’ or ‘old forest’ species present in a woodland habitat. 30 key species are recognised and the RIEC is calculated by the number of those species present - \( \frac{n}{20} \times 100 \). Seven RIEC species were found at Thorneythwaite during the course of the survey – *Arthonia vinosa*, *Loxospora elatina*, *Pannaria conoplea*, *Peltigera horizontalis*, *Stenocybe septata*, *Sticta sylvatica* and *Thelotrema lepadinum*. This gives an RIEC score of 35. An RIEC score of between 30–45 is considered to provide evidence of some degree of ecological continuity. If the recently lost *Lobaria virens* was added to the list, the RIEC score would be slightly higher at 40. However, with the exception of *Peltigera horizontalis*, *Thelotrema lepadinum* and *Stenocybe septata*, which are all very common at Thorneythwaite, it is likely that nearly all these lichens will disappear from the wood over the next decade or so.
NIEC score for Thorneythwaite

The RIEC has proved useful to assess the presence particularly of elements of the *Lobarion*, but it has been succeeded in more recent years by the RIEC. In this index 70 species are recognised as being indicators of ecological continuity, but there are also 40 rare ‘bonus’ species that can be used to augment the final score. At Thorneythwaite there are 12 NIEC lichens present – *Arthonia vinosa*, *Cetrelia olivetorum* s. lat., *Collema subflaccidum*, *Lecanora jamesii*, *Leptogium lichenoides*, *L. teretiusculum*, *Loxospora elatina*, *Pannaria conoplea*, *Peltigera horizontalis*, *Stenocybe septata*, *Sticta sylvatica* and *Thelotrema lepadinum*. No bonus species were found. The NIEC score is therefore 12. Woodlands with a $T$ score in excess of 30 are considered to be of high conservation value. A score of below 20 indicates a site of less importance.

EUOCIEC score for Thorneythwaite

This index is used to assess the conservation value of western woodlands, which support calcifuge lichen assemblages in eu-oceanic areas of high rainfall. It is the most appropriate index for this region. Thorneythwaite Wood features elements of both sheltered valley bottom broadleaf woodland and more elevated exposed trees subject to leached bark, so in order to assess the continuity of this site in Lakeland, the most realistic approach is to combine the scores of the EUOIC with that of the NIEC. Out of a possible total count of 30 main indicator EUCIEC species, Thorneythwaite has the following ten calcifuge taxa -

*Buellia griseovirens*, *Cetrelia olivetorum* s. lat., *Graphis ruiziana*, *Hypotrachyna laevigata*, *Loxospora elatina*, *Megalaria pulverea*, *Micarea stipitata*, *Mycoblastus sanguinarius*, *Ochrolechia tartarea* and *Sphaerophorus globosus*.

Sites with a score of ten EUCIEC species are considered to be of high conservation value, so Thorneythwaite comes out well. However, species used to assess the NIEC can be added to this score to give a more meaningful assessment for old growth woodland of this diverse nature in a western high rainfall habitat. The final combined RIEC and EUCIEC scores at Thorneythwaite is 22. This is the most relevant score for this site and indicates that Thorneythwaite is of high conservation value. The eu-oceanic *Parmelion laevigatae* community is in much better shape than the declining *Lobarian pulmonareae* at Thorneythwaite, but the continued presence of these two communities makes this interesting habitat a regionally important site.
RECOMMENDATIONS

Felled limbs, making the trees difficult to approach, surround most of the recently pollarded ash trees. These urgently need to be tidied up. In terms of specific lichen conservation measures, the only positive suggestion I can make is to keep an eye on the *Sticta sylvatica* on the rocks below the *Ulmus* at NY24399 12577. One of the thalli is becoming detached from the substrate and could be used as a source of material for translocation to some of the ash pollards lower down in this area. Those trees with *Pannaria conoplea* present are likely to have sympathetic bark chemistry and would be good subjects for translocation experiments. The author would be very happy to carry this work out. Excluding sheep by erecting fencing is a good way of encouraging the regeneration of tree species, but can sometimes result in a dense flush of saplings. In prime lichen woodlands this can often result in communities on tree boles being shaded out. I do not think that it is a major issue here. Though I would leave the ash pollards as they are in open ground, as the main lichen interest is low down on the boles and they would very quickly get shaded out if there was a flush of saplings and herbaceous plants as a result of excluding grazing sheep. In the oak and birch woodlands at the north end of the site, I think it would be preferable to plant young trees in robust guards, rather than fencing this area off completely. A National Trust tree nursery based in Borrowdale would be a valuable resource for raising trees grown from locally sourced seed.

ACKNOWLEDGEMENTS

My thanks particularly to Dr. Allan Pentecost for his list of his 2013 visit to the site.

REFERENCES


APPENDICES

Appendix 1.

Thorneythwaite Farm Woodlands - Epiphytic Lichen Checklist


The abbreviations following the binomial synonyms refer to the current conservation evaluation of each taxon according to Woods and Coppins (2012).

Key to abbreviations
LC – least concern
NS – nationally scarce
IR – international responsibility – British populations of these taxa are considered to be of international significance, with the possibility of Britain supporting more than 10% of the world’s populations.

Arthonia didyma Körb - LC
Ar. elegans auct. brit., non (Ach.) Almq. (1880) - LC
Ar. punctiformis Ach. (1808) - LC
Ar. radiata (Pers.) Ach. (1808) - LC
Ar. vinosa Leight. (1856) - LC
Arthopyrenia cerasi (Schrad.) A. Massal. (1852) – LC – NS
Ar. fraxini A. Massal. (1852) – LC - NS
Ar. punctiformis A. Massal. (1852) - LC
Brianaria bauschiana (syn. Micarea bauschiana (Körb.) V. Wirth & Vězda (1976) - LC
Buellia griseovirens (Turner & Borrer ex Sm.) Almb. (1952) - LC
Candelariella reflexa Nyl.) Lettau (1912) - LC
Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb. (1968) s. lat. - LC
Cladonia coniocraea (Flörke) Spreng. (1827) - LC
C. digitata (L.) Hoffm. (1796) - LC
C. macilenta Hoffm. (1796) - LC
Collema flaccidum (Ach.) Ach. (1810) - LC
C. subflaccidum Degel. (1974) - - LC
Dimerella pineti Ach.) Vězda (1975) - LC
Evernia prunastri (L.) Ach. (1810) - LC
Flavoparmelia caperata (L.) Hale (1986) - LC
Fuscidea lightfootii (Sm.) Coppins & P. James (1978) - LC
Graphis elegans Borrer ex Sm.) Ach. (1814) - LC
G. ruiziana (Fée) A. Massal. (1853) – LC - NS
G. scripta (L.) Ach. (1809) – LC
Hypocenomyce scalaris (Ach. ex Lilj.) M. Choisy (1951) – LC
Hypogymnia physodes (L.) Nyl. (1896) – LC
H. tubulosa (Schaeer.) Hav. (1918) [1917-1918] – LC
Hypotrichyna afrorevoluta (Krog & Swinscow) Krog & Swinscow (1987) – LC
H. laevigata (Sm.) Hale (1975) – LC
H. revoluta s. lat. – LC
Lecania cyrtella (Ach.) Th. Fr. (1871) – LC
Lecanora carpinea (L.) Vain. (1888) – LC
L. chlorotera Nyl. (1872) – LC
L. expallens Ach. (1810) – LC
L. jamesii J.R. Laundon (1963) – LC
Lepraria incana s. lat – LC
L. membranacea (Dicks.) Vain. (1921) – LC
Leptogium lichenoides (L.) Zahlbr. (1924) – LC
L. teretiusculum (Wallr.) Arnold (1892) – LC
Leptorrhaphis epidermidis (Ach.) Th. Fr. (1860) – LC
Lobaria virens (not seen since 1982)
Loxospora elatina (Ach.) A. Massal. (1852) – LC
Megalaria pulvrea Borrer) Hafellner & E. Schreiner (1992) – LC
M. subaurifera (Nyl.) O. Blanco et al. (2004) – LC
Melanohalea elegantula (Zahlbr.) O. Blanco et al. (2004) – LC
M. exasperata (De Not.) O. Blanco et al. (2004) – LC
M. exasperatula (Nyl.) O. Blanco et al. (2004) – LC
Micarea prasina s. lat. – LC
M. stipitata Coppins & P. James (1979) – LC
Mycoblastus sanguinarius (L.) Norman (1853) f. sanguinarius – LC
Normandinia pulchella (Borrer) Nyl. (1861) – LC
Ochrolechia androgyna (Hoffm.) Arnold (1885) – LC
O. tartarea (L.) A. Massal. (1928) – LC
O. subviridis (Høeg) Erichsen (1930) – LC
Opegrapha herbarum Mont. (1833) – LC
O. niveoatra (Borrer) Laundon (1963) – LC
O. ochrocheila Nyl. (1865) – LC
O. rufescens Pers. (1794) – LC
O. sorediifera P. James (1962) – LC
O. vulgata (Ach.) (Ach.) 1803 – LC
O. vermicellifera (Kunze) J.R. Laundon (1963) – LC
Pannaria conoplea (Ach.) Bory (1828) – LC
Parmelia saxatilis s. lat. – LC
P. sulcata Taylor (1836) – LC
Parmelinopsis hyperopta (Ach.) Arnold (1880) – LC
Parmotrema perlatum (Huds.) M. Choisy (1952) – LC
Peltigera horizontalis (Huds.) Baumg. (1790) – LC
P. hymenina (Ach.) Delise (1830) – LC
P. membranacea (Ach.) Nyl. (1887) – LC
P. praetextata Flörke ex Sommerf.) Zopf (1909) – LC
Pertusaria albescens (Huds.) M. Choisy & Werner (1932) v. albescens – LC
P. amara (Ach.) Nyl. (1873) f. amara – LC
P. flavida (DC.) J.R. Laundon (1963) – LC
P. hymenea (Ach.) Schaer. (1836) – LC
P. leioplaca DC. (1815) – LC
P. pertusa (Weigel) Tuck. (1845) – LC
Phlyctis argena (Spreng.) Flot. (1850) – LC
Physcia adscendens H. Olivier (1882), nom. cons. – LC
P. aipolia (Ehrh. ex Humb.) Führnr. (1839) – LC
P. tenella (Scop.) DC. (1805) – LC
Physconia enteroxantha (Nyl.) Poelt (1966) – LC
P. grisea (Lam.) Poelt (1965) – LC
P. perisidiosa (Erichsen) Moberg (1977) – LC
Platismatia glauca (L.) W.L. Culb. & C.F. Culb. (1968) – LC
Pseudevernia furfuracea s. lat. (L.) Zopf s. lat. (1903) – LC
Punctelia jeckeri (Roum.) Kalb (2007) – LC
P. subredecta s. lat. – LC
Pyrenula laevigata (Pers.) Arnold (1885) – LC - NS
Pyrrhosphora quernea (Dicks.) Körb. (1855) – LC
Ramalina farinacea L. Ach. (1810) – LC
R. fastigiata (Pers.) Ach. (1810) – LC
Rinodina sophodes (Ach.) A. Massal. (1852) – LC
Scoliciosporum chlorococcum (Graewe ex Stenh.) Vězda (1978) – LC
S. umbrinum (Ach.) Arnold (1871) – LC
Sphaerophorus globosus (Huds.) Vain. (1903) – LC
Stenocybe pullatula (Ach.) Stein (1879) – LC
S. septata (Leight.) A. Massal. (1860) – LC
Sticta sylvatica (Huds.) Ach. (1803) – LC - IR
Thelotrema lepadinum (Ach.) Ach. (1803) LC –
Tuckermannopsis chlorophylla (Willd.) Hale ) – LC
Usnea subfloridana Stirt. (1882) – LC
Xanthoria parietina (L.) Th. Fr. (1860) ) – LC
X. polycarpa (Hoffm.) Th. Fr. ex Rieber (1891) – LC

APPENDIX 2

Lakeland lichens from Winch (1833)
APPENDIX 3

Entry in Ivan Day’s field notebook for a visit to Thorneythwaite Woods in September 1982.

APPENDIX 4.

Lichen epiphytes recorded in Thorneythwaite Woods by Allan Pentecost in February 2013.

Arthopyrenia fraxini
Cetrelia olivetorum
Collema flaccidum
Dimerella pineti
Pannaria conoplea
Peltigera membranacea
Parmotrema perlata
Pyrenula laevigata
Sticta sylvatica
APPENDIX 5

Thorneythwaite Farm. Saxicolous, Muscicolous and Terricolous Lichen Checklist - Including Mossy Walls, Rock Outcrops, Boulders, Soil etc.

This brief provisional list is of species that were incidentally observed while hunting for corticolous lichens and is in no way exhaustive. A further dedicated search of these habitats would reveal a much richer list than this, particularly on the crags and larger boulders.

*Buellia aethalea* (Ach.) Th. Fr. (1874)
*B. ocellata* (Flot.) Körb. (1855)
*Bunodophoron melanocarpum* (Sw.) Wedin (1995)
*Candelariella vitellina* f. *vitellina*
*Cladonia bellidiflora* (Ach.) Schaer. (1823)
*C. chlorophaea* s. lat.
*C. diversa* Asperges ex S. Stenroos (2012)
*C. fimbriata* (L.) Fr. (1831)
*C. floerkeana* (Fr.) Flörke (1828)
*C. pocillum* (Ach.) Grognot (1863)
*C. polydactyla* (Flörke) Spreng. (1827), nom. cons. var. *polydactyla*
*C. scabriuscula* (Delise) Leight. (1876)
*C. squamosa* (Scop.) Hoffm. (1796) var. *squamosa*
*C. subcervicornis* (Vain.) Kernst. (1900)
*Cystocoleus ebeneus* (Dillwyn) Thwaites (1849)
*Flavoparmelia caperata* (L.) Hale (1986)
*Hypogymnia physodes* (L.) Nyl. (1896)
*Hypotrachyna revoluta* (Flörke) Hale (1975)
*Lecanora gangelioides* Nyl. (1872)
*L. rupicola* (L.) Zahlbr. (1928) var. *rupicola*
*Lecidia fuscoatra* s. lat.
*L. grisella* Flörke
*L. lithophila* (Ach.) Ach. (1814)
*Micarea leprosula* (Th. Fr.) Coppins & A. Fletcher (1975)
*Parmelia saxatilis* s. lat.
*P. omphalodes* (L.) Ach. (1803)
*Peltigera hymenina* (Ach.) Delise (1830)
*P. membranacea* (Ach.) Nyl. (1887)
*Pertusaria corallina* (L.) Arnold (1861)
*Physcia tenella* (Scop.) DC. (1805)
*Physconia grisea* (Lam.) Poelt (1965)
*Placopsis lambii* Hertel & V. Wirth (1987)
Platismatia glauca (L.) W.L. Culb. & C.F. Culb. (1968)
Porpidia macrocarpa f. macrocarpa
Rhizocarpon geographicum (L.) DC (1805)
R. hochstetteri (Körb.) Vain. (1922)
R. oederi (Ach.) Körb. (1861)
Tephromela atra (Huds.) Hafellner (1983) var. atra
Tremolecia atrata (Ach.) Hertel (1977)
Stereocaulon vesuvianum Pers. (1811) var. vesuvianum
Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale (1974)
X. mougetii (Ehrh. ex Ach.) Hale (1974)
Fig. 1. *Graphis scripta* and *Thelotrema lepadinum* on holly.
Fig 2. Parmelion laevigatae lichen community on sessile oak. Hypotrachyna laevigata and Mycoblastus sanguinarius are dominant on this tree.
Fig. 3. *Hypotrachyna laevigata* on *Betula pubescens*.
Fig. 4. *Mycoblastus sanguinarius* on sessile oak, an easily recognised crustose member of the eu-oceanic *Parmelion laevigatae* community with distinctive patches of red pigment where the cortex has been abraded.

Fig. 4a. Closeup to show crimson areas of the medulla of *Mycoblastus sanguinarius* where apothecia have fallen off.
Fig. 5. *Hypotrachyna laevigata* on sessile oak.
Fig. 6. *Sphaerophorus globosus*. A common frutiose species on boulders at Thorneythwaite, but here flourishing on the lower bole of a sessile oak as an important and easily recognised member of the eu-oceanic *Parmelion laevigatae* community.
Fig. 7. *Ochrolechia tartarea*. An easily identified member of the Parmelion laevigatae.
Fig. 8. *Cetrelia olivetorum* – an old forest species that is found in the *Parmelion laevigatae*. Locally frequent on sessile oaks in Thorneythwaite.
Fig. 9. *Thelotrema lepadinum* – an old forest lichen, abundant and widespread on many tree species throughout Thorneythwaite
Fig. 10. *Normandina pulchella*. A small squamulose lichen which is common and widespread throughout Thorneythwaite, usually growing on bryophytes.
Fig. 11. *Peltigera horizontalis*. An old forest species frequent and widespread throughout Thorneythwaite.
Fig. 12. *Peltigera praetextata*. An easily recognisable lichen due to the presence of coralloid outgrowths known as isidia. This is the second most common large cyanolichen in the woodland.
Figure 13. An *Ulmus glabra* infected with Dutch Elm Disease. This tree formerly supported a rich *Lobarion* community, including *Lobaria virens* and *Sticta sylvatica*. The latter is still holding out on the rocks below the tree.
Fig. 14. *Sticta sylvatica*. An important cyanolichen surviving below the elm tree in fig. 13.
Fig. 15. The cyanolichen *Pannaria conoplea* (above right), one of the last vestiges of the *Lobarion* climax community, here growing on the base of a pollard ash with *Thelotrema lepadinum*. 
Fig. 16. Punctelia jeckeri.
Fig. 17. A typical *Xanthorian* community of hypertrophicated ash bark with *Xanthoria parietina*, *Punctelia subrudecta*, *Parmelina pastillifera* and *Physcia tenella*. 