Lichen Rich Woodland

(Section 41 species covered: *Arthonia anglica, Arthonia invadens, Bacidia circumspecta, Bacidia incompta, Bacidia subturgidula, Blarneya hibernica (= Tylophoron hibernicum), Bryoria smithii, Buellia hyperbolica, Caloplaca herbidella sensu lato, Caloplaca lucifuga, Catillaria alba (= Biatora veteranorum), Collema fragrans, Cryptolechia carneolutea, Enterographa elaborata, Enterographa sorediata, Fuscopannaria sampaiana, Graphina pauciloculata, Lecania chlorotiza, Lecanographa amylacea, Lecanora quercicola, Lecanora sublivescens, Lecidea erythrophaea, Megalaria laureri, Megalospora tuberculosa, Melaspilea lentiginosa, Opegrapha prosodea, Parmeliella testacea, Pertusaria velata, Porina hibernica, Pseudocyphellaria intricata, Pyrenula nitida, Ramonia chrysophaea, Ramonia dictyospora, Ramonia nigra, Schismatomma graphidioides, Sclerophora pallida, Strigula taganana e, Usnea articulata, Usnea florida, Wadeana dendrographa* & *Wadeana minuta*), also over 100 other Red Data Book and Notable species

Usnea articulata (String of Sausages lichen) ©John Walters

Areas and status: Limited by land use history and pollution pressures, requires old growth or developing old growth woodland with a long continuity.
In England core areas along the south coast from Sussex to Cornwall and in the Lake District and northern Pennines. Other areas can have sites of regional significance, but are often degraded by air pollution. The richest sites are of international importance and Britain has an international responsibility due to having a high proportion of many European populations of declining lichen species.

Woodland type: Upland Broadleaved Woodland, Lowland Broadleaved High Woodland, Wet Woodland, Pasture Woodland, Wood-pasture and Parkland

Graphina pauciloculata ©John Walters

Preferred habitat niches: Unevenly stocked woodland, with frequent glades, including both areas with well lit and more shaded trees, with veteran trees forming a high proportion of the canopy. The very best habitat is typically grazed old growth stands that are failing to regenerate adequately by forestry standards. In such habitat, stand replacement is best initiated in adjacent land and only encouraged with in the stand at the latter stages of stand breakup. In general terms glades ideally should occupy about 30% of the old growth stands and should have a lifespan of at least 30 years. Unthinned open woods with leaning and suppressed trees are especially valuable. The maintenance of suitably open woodlands is not easily achieved without high levels of grazing that contains regeneration to long spaced intervals, or as a very patch occurrence. The structural features can develop in all major types
of British woodlands; the assemblages vary between woodland types but the basic factors driving lichen richness are similar.

Potential habitat management issues associated with decline:

- Decline of grazing as a major use of woodland is leading to dense, dark and shaded condition which are unsuitable for rich lichen assemblages
- Long term high levels of grazing that allowed no regeneration were a widespread threat in grazed woods due to intensification of grazing from lower more sustainable past levels. Still an issue locally, but the withdrawal of grazing as an inappropriate response to long term high grazing pressures is now a more widespread threat than hard grazing.
- Declines linked to past extensive acidifying air pollution and the slow recovery from this, with local acidification and ammonia pollution still issues.
- Declines linked to past destruction of old growth woodland, including 18th and 19th century industrial Oak coppicing displacing traditional old

growth pasture woodlands in the uplands. The resulting even aged 19th century upland Oak plantations are a negative legacy from this past destruction.

- Inappropriate woodland management including intensive coppicing in old Hazel stands and wet woodland that may appear to look like former coppices but often are not.
- Impact of fragmentation of old growth stands within the last few hundred years; the richest stands are extensive areas of old growth extending over 100ha but recently fragmented large stands are usually much richer than long fragmented stands.

Potential habitat management solutions:	
Prescription	*Comment*
Grazing	Maintain or restore grazing at levels that vary over time but have significant long term impacts on the structure of the woodlands. Lichens would usually set the lower limits of grazing, i.e. levels that prevents excessive tree density and unfavourable levels of shade. The upper limits of grazing need to be set by the sensitivity of other groups, but sufficient regeneration must occur in relation to the life span of the tree species involved to maintain the woods. Long term maintenance grazing should ideally allow suppressed browsed regeneration to build up, not prevent all regeneration, with short periods of lower grazing levels allowing this suppressed regeneration to escape.
Minimal intervention pasture woodland	The ideal management for the richest sites is likely to be minimal intervention pasture woodland, where grazing levels have a significant impact on the long term woodland structure, but otherwise the intervention is only carried out to maintain the conservation status. This can be applied to the most favourable areas of large meta-sites, with more intensive management in other areas that are not of lichen interest.
Thinning/selective felling: Heavy	Over stocked woods, especially former pasture woodlands, including former upland pasture woodlands converted to Oak plantations in the 19th century, can be actively restructured by thinning and cropping. This would involve glade creation and very uneven thinning to introduced structural variation. Straighter trees with timber value can be removed preferentially. The aim in most large upland Oak plantations should be to convert a significant proportion back to minimal intervention pasture woodland; potentially at least about a third of the resource.
Small group felling	Can be used to 'rescue' veteran trees in dense re-growth or conifer plantations. Threatened lichen rich veteran trees should only be treated in this way, if shading from additional vigorous re-growth and Ivy can be restrained.
Maintain shelter	Do not coppice or clear-fell close to lichen rich stands.
Deer management	Where increasing deer populations are being controlled and reduced, the need to replace the positive browsing impact with restored stock grazing in abandoned pasture woodlands should be evaluated.
Glades	Glades should ideally form around 30% of the lichen rich areas and have a lifespan of at least 30 years, glades should be an integral part of the woodland structure and vary greatly in size. Grazing is the only practical way of maintaining the complex glade mosaics required for the time span required.
Deadwood	Large diameter naturally generated deadwood is an important niche, see 'Lichen Rich Deadwood' factsheet.
Connectivity	Woods fragmented in the last few hundred years should be reconnected. Where they exist, this is most simply archived by converting existing 19th century Oak woods to low intervention pasture woodlands.

Pollution	Air pollution needs to be reduced to as low a level as possible. This includes both acidifying pollution, which is still a serious legacy issue, and eutrophication by ammonia. Total nitrogen deposition does not appear to clearly correlate to impacts on epiphytic lichens. Ammonia pollution has a short range and can be reduced by local reduction in intensive agriculture and buffer zones. Acidification is a regional to international issue.
Control of invasive vegetation	Eliminate shade casting evergreen exotic species, especially Rhododendron. The approach to locally non-native European native trees such as Beech and Sycamore will need wood by wood evaluation. Sycamore is rarely a problem in grazed pasture woodland and can be a rich substrate for epiphytic lichens. The dense shade of Beech is potentially very problematic, even where Beech is native, and Beech pasture woodland requires intensive grazing to remain open, but can be very rich in lichens when stand ages reach over 250 – 300 years. The native Holly was probably a major component of acid western Oak woods until it was nearly eliminated by intensive Oak cultivation followed by heavy sheep grazing. Like Beech the shade of uncontrolled Holly can be very damaging and it will require management as it returns to its native habitats. Regeneration and regrowth can be controlled by winter and spring grazing and cutting, including for winter fodder. Old well and lit Hollies are one of the most important lichen habitats in oceanic woods.
Woodland edges	On fenced woodland edges, avoid destroying rich lichen assemblages on wood edge veteran trees by increasing shade on these trees, for instance by moving fences into fields.
Rides – veteran trees	In woods that can not be grazed, rides can provide a refuge for light and shelter demanding declining lichens. These trees need to be set in ride grassland zone, not in the shrub zones to avoid over shading and Ivy growth.
Veteran trees	Lichen rich woodlands mainly require management at the stand not tree level, ensuring openness and tree succession. Individual tree management is rarely practical.
PAWS	In restoring pasture woodlands planted with conifers but retaining lichen interest, it is important both to restore grazing early in the process and, especially in oceanic areas, to open up much more than is generally recommended. In oceanic woods there is a premium on light not humidity for most lichens and the shade of the conifers is usually causing most of the damage. The shade of conifers needs to be totally removed from surviving trees so that winter light can get in fully. Grazing helps prevent rapid overgrowth by native shade casting species.