ATHLONE HOUSE, HAMPSTEAD LANE

MANAGEMENT OF NORTHERN COPSE



September 2020

Issue 1

Tom La Dell

Landscape Architecture Ecology & Environment Masterplanning

> Stocks Studio Grafty Green Maidstone Kent ME17 2AP Tel: 01622 850245 Email: tom@tomladell.co.uk

ISSUE NO.	AUTHOR	CHECKED BY	DATE
One	Tom La Dell	Tom La Dell	03.09.2020

Tom La Dell Landscape Architecture Ecology & Environment Masterplanning

A practice registered with the Landscape Institute Member of the Chartered Institute of Ecology and Environmental Management

Tom La Dell MA(Oxon)Botany DipLD CMLI CEnv MCIEEM FLS

COPYRIGHT:

The concepts and information contained in this document are the property of Tom LaDell Landscape Architects. Use or copying of this document in whole or in part without the written permission of Tom LaDell constitutes an infringement of copyright.

ATHLONE HOUSE, HAMPSTEAD LANE MANAGEMENT OF NORTHERN COPSE

Contents

- 1.0 Introduction
- 2.0 The Site and Setting
- 3.0 Tree Survey Methodology and Tree Evaluation
- 4.0 The Objectives of the Proposals

Drawings

Location Plan

- 0918/2020/B/1 Northern copse Management Plan
- 0918/2020/B/2 Northern copse Planting plan
- 0918/2020/B/3 Northern copse Location of photographs

Annex

Annex 1 – Forestry Recommissioned, Plantlife 2011

1.0 Introduction

- 1.1 This report accompanies an application to do works to trees in the Highgate Village Conservation Area which are in the grounds of Athlone House.
- 1.2 There has been extensive work to the house and grounds under planning permission 2016/3587/P and the discharge of Planning Conditions with the permission. Two of these were for works to trees in the Conservation area, 2017/5043/T and 2018/5784/T. Both of these were for limited works and did not addresses the long term management of the northern copse.
- 1.3 This application assesses the current condition of the northern copse and proposes a management plan which will very significantly enhance the nature conservation value of the copse for the long term and restore its integration in to the grounds of Athlone House. It will also contribute to the overall conservation status on the surrounding areas of Hampstead Heath.
- 1.4 The history of the house and grounds was part of the original planning application as a report Historic Landscape Appraisal for Athlone House, Catherine Bickmore Associates, June 2016. There is a long history of houses and mansions on the northern boundary of Hampstead Heath. The current Athlone House was built in the 1870s and the grounds were laid out then and in the 1920s. The northern copse was probably established in the 1870s and added to later.
- 1.5 The author of this report was the landscape architect and arboriculturalist for the landscape design and arboricultural management and planting of the adjacent site, Caenwood Court, during planning and construction. During these five years the management plan for the existing trees on the site and new planting was agreed with LB Camden officers.
- 1.6 This application is submitted for Conservation Area consent to undertake the works. For any discussions about the proposed works or a meeting on site the author should be contacted by email as on the cover of this report. The details of the proposals can be amended by negotiation if required.

2.0 The Site and Setting

2.1 Athlone House is on the northern edge of Hampstead Heath, with access off Hampstead Lane which is on the northern boundary of part of the site.

- 2.2 The site is surrounded by woodland and copses on the western, southern and eastern boundaries. These link to Hampstead Heath Woods (Ken Wood) to the south west which are ancient woodland and a 16.6ha Site of Special Scientific Interest (SSSI). To the north of the northern copse on the site is a larger copse of currently unmanaged woodland through which there is public pedestrian access to Hampstead Heath from Hampstead Lane. The northern copse defines the northern boundary of the site and partially screens Athlone House for the public land to the north. Views of the copse from the west, south and east and views of the internal structure of the copse are shown on 0918/2020/B/3. A new hedge of mixed native shrubs has been planted along the metal railings fence on the northern boundary.
- 2.3 The locations of the trees on the drawings follows the land survey provided for this tree survey. A small number of additional trees have be added from observation on site.

3.0 Tree Survey Methodology and Tree Evaluation

- 3.1 The tree species and sizes were recorded on site on 19 and 24 August 2020 on a bright day with sunshine and few clouds. The ages of the trees are described in the categories in BS5837:22012, Trees in relation to design, demolition and construction. The notes record any special features. They are detailed on 0918/2020/B/1.
- 3.2 The copse is typical of a much neglected boundary planting of ornamental grounds from the late 19th century. There are a few oaks which are old enough to have been part of the older parkland landscapes and there are many hollies and yew. There are many sycamore trees of varying ages which cause dense shade, extensively self sow and have a low wildlife value compared to most native trees and shrubs. Some shrubs such as spotted laurel have been removed but the copse still has a very dark interior as seen on 0918/2020/B/3. There is a restored paved path through the copse indication that this was part of the ornamental grounds of Athlone House. This is shown on plans from 1881.
- 3.3 If the copse is not managed it will develop even denser tree and shrub canopies and have a steadily declining wildlife value.

4.0 The Objectives of the Proposals

4.1 Woodland in South East England and much of Britain was managed for millennia for timber, firewood and charcoal. This management largely ceased in the first half of the 20th century and the developing, dense canopy of trees and shrubs has led to a dramatic decline in the wildlife value and biodiversity compared to when the woodlands were managed. The lack of light to the shrub and ground layers of the woodland are the prime cause of this decline. The most concise assessment of this is in the Plantlife report Forestry Recommissioned, 2011, which is in Annex 1 of this report. This problem is addressed in the Citation for the Hampstead Woods SSSI as "This frequently dens understorey coupled with the acidic soils produces a typically limited ground flora dominated by bramble *Rubus fruticosus* and bracken *Pteridium aquilinum*. Other species include bluebell *Hyacinthoides non-scripta* and species indicating long established woodland such as wood anemone *Anemone nemorosa*". In the northern copse the light levels are too low over most of the area even for brambles and bracken. The ground flora is essential for a habitat rich and biodiverse woodland.

- 4.2 The proposals are shown on 0918/2020/B/1 and are to retain most of the trees and shrubs on the northern boundary with the public land. This is on the north side of the copse and the dense canopies to screen the public land will not significantly overshadow the southern area of the copse. Many of the other sycamores away from this boundary are proposed to be removed and this will open up the tree canopy and allow more light to the woodland floor. The sycamores which are in competition with the fine mature oaks will be removed to save the oaks from premature decline. Oaks are the habitat for the greatest number of insect species, with almost 300, and support a wide range of birds and other insect eating species. Sycamores have only around 15 insect species and the horse chestnuts proposed for removal have only around 5 insect species. These trees are also in poor condition. Holly and yew are native but only support 5 or so insect species.
- 4.3 The dense hollies and yew are evergreen and allow very little light to the woodland floor at any time of the year. This prevents the establishment of a characteristic ground flora of, for example, bluebells and wood anemone. They support few insect species, with some eight and five respectively. Coppiced holly rapidly develops good, safe habitat for nesting birds as the young growth leaves are the most prickly. The hollies are selectively proposed for coppicing, with the retention of the most treelike specimens.
- 4.4 The overall objective is to create the habitats for a typical bluebell wood. This requires management as proposed in the application to open up the tree and shrub canopies, which will be the basis for the development of biodiverse woodland habitats. The trees and shrubs to be retained and coppiced are shown on 0918/2020/B/2. This drawing shows new tree planting of large specimens on oak, beech and hornbeam. The young oaks in the copse are retained and these, together with the new tree planting will

provide the next generation of these forest tree species. Bluebells of known native provenance will be planted, together with wood anemone, to speed up these processes. Brambles and bracken will be selectively cleared as part of the regular management and maintenance of the copse. The trees identified trees will be felled from November to February and the hollies will be coppiced in early March, in accordance with good practice. The copse is part of the gardens and ornamental grounds of Athlone House and these proposals will provide a very significant enhancement of the wildlife habitats and be an attractive feature in combination with the designed gardens and landscape on the other areas of the site.

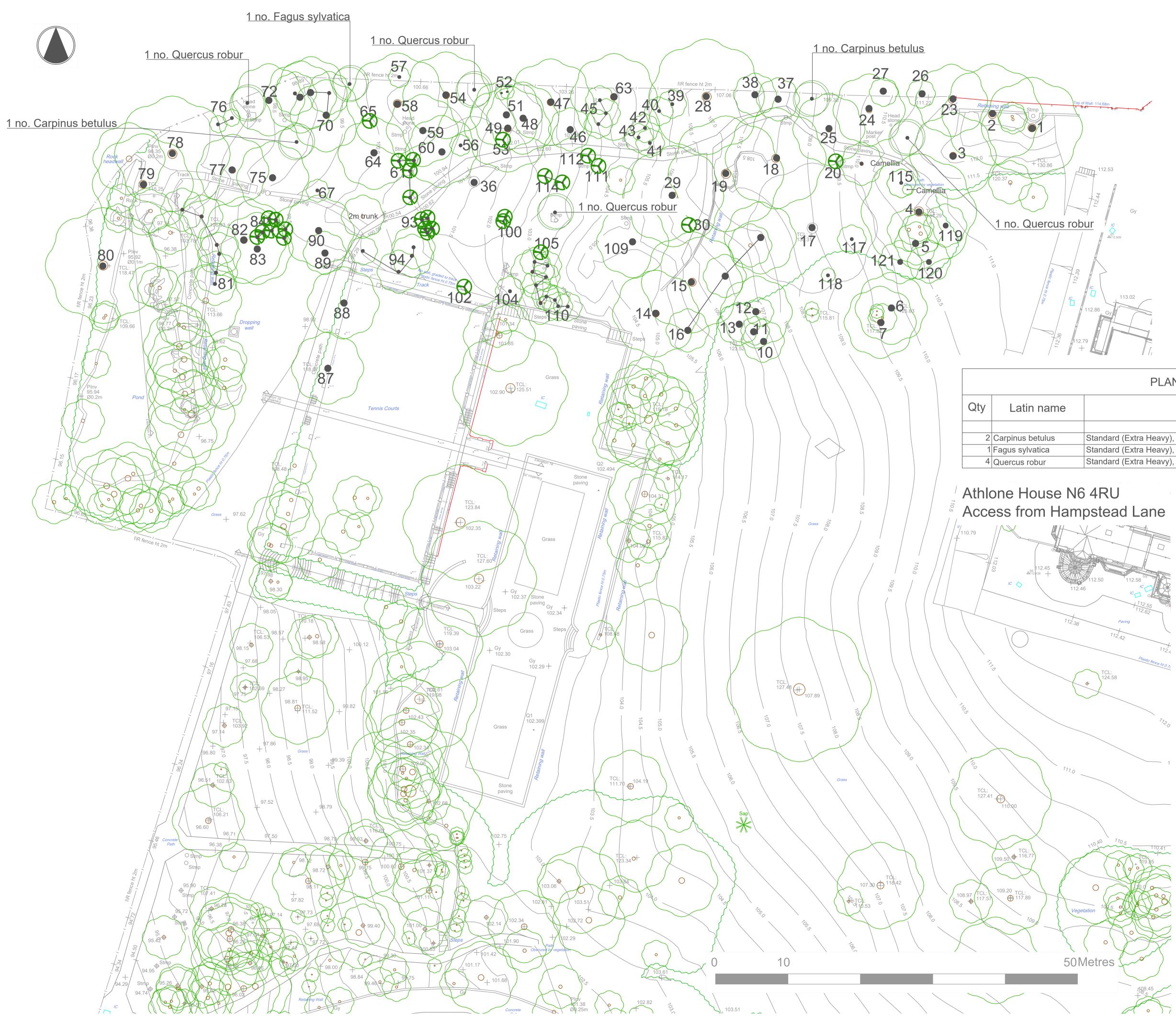


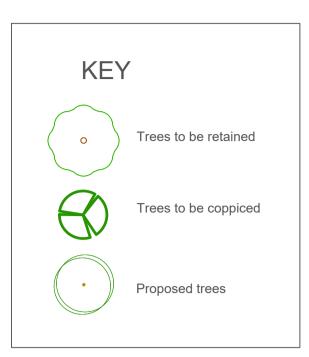
	-					
	-					
	-					
	-					
Rev Description	Date					
	PLANNING					
LaDellWood	t: 01622 850245 e: info@ladellwood.co.uk w: www.ladellwood.co.uk					
Y	Stocks Studio, Grafty Green, Maidstone, Kent ME17 2AP					
Landscape Architecture Ecology & Environm	nent Masterplanning Arboriculture Historic Landscapes					
ATHLONE HOUSE, HAMPSTEAD LANE N6 4RU						
Drawing title Location of Northern Copse						
Scale Date	Drawing number Rev					
1:1,000@A3 Sept 20	1:1,000@A3 Sept 2020					



Latin name	Age	Notes	Management
binia pseudoacacia	Mature	Trunk lean to south east	Retain
er pseudoplatanus	Mature		Retain
axus baccata	Young		Retain
edrus atlantica	Mature		Retain
x aquifolium tula pendula	Middle aged		Retain
uercus robur ataegus monogyna	Young Over mature	Fallen over	Retain
cer pseudoplatanus	Young		Remove
uercus robur	Young		Retain
tula pendula	Young		Retain
uercus robur	Young		Retain
uercus robur	Mature		Retain
ixus baccata	Mature		Retain
axus baccata		2 trunks from base	Retain
amore and holly with Rh		onticum	Remove sycamores
uercus robur	Over mature		Retain
astanea sativa	Mature		Retain
astanea sativa	Mature	4 trunks from base	Retain
x aquifolium	Mature		Coppice
axinus excelsior	Mature		Remove
er pseudoplatanus	Mature Middle aged		Remove Retain
er pseudoplatanus ex aquifolium	Middle aged Mature		Retain
er pseudoplatanus	Mature	On adjacent site	Retain
er pseudoplatanus	Mature	On adjacent site	Retain
er pseudoplatanus	Mature		Retain
iercus robur	Mature		Retain
x aquifolium	Young	3 trunks from base	Coppice
er pseudoplatanus	Young		Remove
er pseudoplatanus	Young	3 trunks from base	Remove
er pseudoplatanus	Middle aged		Remove
er pseudoplatanus er pseudoplatanus uercus robur	Middle aged Middle aged Mature		Remove Remove
iercus robur	Mature	4 trunks from base	Retain
er pseudoplatanus	Young		Retain
ex aquifolium	Young		Retain
xus baccata ex aquifolium	Young		Retain Retain
ex aquifolium xus baccata	Young		Retain
xus baccata	Young		Retain
er pseudoplatanus	Young		Remove
xus baccata	Young	Group of 3	Retain
xus baccata	Young		Retain
er pseudoplatanus	Mature		Retain
tula pendula	Mature		Retain
tula pendula	Mature	Growing from base of 49 & severe trunk wound at base	Retain
axinus excelsior	Middle aged		Remove
ex aquifolium	Young	2 trunks from base	Retain
ex aquifolium	Young	Group of 2	Retain
ex aquifolium ex aquifolium	Young Mature	4 trunks from base	Coppice
er pseudoplatanus	Middle aged		Remove
xus baccata	Young		Retain
er pseudoplatanus	Middle aged	On adjacent site	Retain
er pseudoplatanus	Mature		Retain
tula pendula	Mature		Retain
tula pendula	Mature		Retain
ex aquifolium er pseudoplatanus	Young Mature	Group of 4 Damaging canopy of fine mature oak, Tree 36	Coppice Remove
er pseudoplatanus	Mature		Retain
ex aquifolium	Middle aged		Retain
ex aquifolium er pseudoplatanus	Young		Coppice
gus sylvatica	Young	Remove to benefit beech,	Retain
er pseudoplatanus	Young		Remove
er pseudoplatanus	Young	Tree 67 Remove to benefit beech, Tree 67	Remove
ex aquifolium	Young	Group of 5	Retain
er pseudoplatanus	Middle-aged		Remove
er pseudoplatanus	Middle aged Young		Retain Remove
er pseudoplatanus	Young		Remove
xus baccata	Middle aged		Retain
ex aquifolium	Young	Group of 2	Retain
ex aquifolium	Middle aged	2 trunks from base	Retain
iercus robur	Mature		Retain
iercus robur	Mature		Retain
ododendron cvs.	Mature Mature		Retain Retain
binia pseudoacacia	Mature	Group of 7	Retain
ododendron cvs.	Mature		Retain
ex aquifolium	Young	Group of 7	Coppice
axinus excelsior	Young		Remove
binia pseudoacacia	Mature		Remove
tula pendula iercus robur	Middle aged	3 trunks from base & scrubby	Remove Retain Retain
xus baccata	Young	Strong canopy lean to south	Retain & shorten branches to 1m
ex aquifolium	Mature	Thin canopy with dieback & leaf miner	Retain
sculus hippocastanum	Over mature		Remove
sculus hippocastanum	Over mature	Thin canopy with dieback & leaf miner	Remove
ex aquifolium	Young	Group of 5	Coppice
ododendron cvs.	Mature		Retain
xus baccata	Young		Remove
binia pseudoacacia	Mature		Remove
xus baccata	Young		Remove
ex aquifolium	Young		Remove
xus baccata ex aquifolium er pseudoplatanus	Young Mature	3 trunks from base	Remove Coppice
er pseudoplatanus x aquifolium er pseudoplatanus	Young Young Young	Group of 6 Group of 3	Remove Coppice
er pseudopiatanus ododendron cvs. ex aquifolium	Mature	3 trunks from base	Remove Retain Coppice
er pseudoplatanus er pseudoplatanus	Middle aged Middle aged		Remove Remove
er pseudoplatanus er pseudoplatanus x aquifolium	Young Middle aged	Group of 12	Remove Retain
ododendron cvs.	Mature	5 trunks from base	Retain
ex aquifolium	Young		Coppice
er pseudoplatanus	Young Young		Coppice Remove
ex aquifolium	Young	Group of 2	Coppice
xux baccata	Young		Retain
er pseudoplatanus	Young		Remove
xux baccata	Young		Retain
xux baccata	Young		Retain
ex aquifolium	Young		Retain
ex aquifolium	Young		Retain
ex aquifolium	Young		Retain

 Rev Description		- - D	ate
	PL	ANNING	
LaDellW	ood	t: 01622 850245 e: info@ladellwood.co.uk w: www.ladellwood.co.uk Stocks Studio, Grafty Green, Maidstone, Kent ME	17 2AF
Landscape Architecture	Ecology & Environment	Masterplanning Arboriculture Historic Landscapes	
	LONE HOUS	E, HAMPSTEAD LANE	
Drawing title Nc	orthern Cops	e - Management Plan	
Scale	Date	Drawing number R	ev
1:250@A1	Aug 2020	0918/2020/B	/1





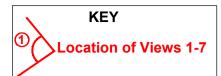
PLANTING SCHEDULE	
Specification	Root
rd (Extra Heavy), 18-20cm girth, min.450cm ht, min.200cm clearstem	CG
rd (Extra Heavy), 18-20cm girth, min.450cm ht, min.200cm clearstem	CG
rd (Extra Heavy), 18-20cm girth, min.450cm ht, min.200cm clearstem	CG

			-
			-
			-
			-
Rev Description			Date
	PL	ANNING	
LaDellWe	bd	t: 01622 850245 e: info@ladellwood.co.uk w: www.ladellwood.co.uk Stocks Studio. Grafty Green. Maidstone.	Kent ME17 2∆P
andscape Architecture	Ecology & Environment	Masterplanning Arboriculture Historic Lar	
Project ATH	LONE HOUS	SE, HAMPSTEAD LANE	
Drawing title	Northern Co	pse - Planting Plan	
Scale	Date	Drawing number	Rev
1:250@A1	Aug 2020	0918/2020	/B/2



TREE SCHEDULE

		EE SCHE		
	Latin name	Age	Notes	Management
	Robinia pseudoacacia	Mature	Trunk lean to south east	Retain
	Acer pseudoplatanus Taxus baccata	Mature Young		Retain
	Cedrus atlantica Ilex aquifolium	Mature		Retain
	Betula pendula	Middle aged Mature		Retain Retain
	Quercus robur Crataegus monogyna	Young Over mature	Fallen over	Retain Remove
	Acer pseudoplatanus Quercus robur	Young Young		Remove Retain
	Betula pendula Quercus robur	Young Young		Retain Retain
	Quercus robur Taxus baccata	Mature Mature		Retain Retain
	Taxus baccata ycamore and holly with Rho	Mature	2 trunks from base	Retain Remove sycamores
2	Quercus robur	Over mature		Retain
	Castanea sativa Castanea sativa	Mature Mature		Retain Retain
	llex aquifolium Fraxinus excelsior	Mature Mature	4 trunks from base	Coppice Remove
	Acer pseudoplatanus Acer pseudoplatanus	Mature Middle aged		Remove Retain
	Acer pseudoplatanus Ilex aquifolium	Middle aged Mature		Retain Retain
	Acer pseudoplatanus Acer pseudoplatanus	Mature Mature	On adjacent site On adjacent site	Retain Retain
	Acer pseudoplatanus	Mature		Retain
	Quercus robur Ilex aquifolium	Mature Young	3 trunks from base	Retain Coppice
	Acer pseudoplatanus Acer pseudoplatanus	Young Young	3 trunks from base	Remove Remove
	Acer pseudoplatanus Acer pseudoplatanus	Middle aged Middle aged		Remove Remove
	Acer pseudoplatanus Quercus robur	Middle aged Mature		Remove Retain
	Acer pseudoplatanus Ilex aquifolium	Young	4 trunks from base	Retain
	Taxus baccata Ilex aquifolium	Young		Retain
	llex aquifolium	Young		Retain Retain
	Taxus baccata Taxus baccata	Young Young		Retain Retain
	Acer pseudoplatanus Taxus baccata	Young Young	Group of 3	Remove Retain
	Taxus baccata Acer pseudoplatanus	Young Mature		Retain Retain
	Betula pendula Betula pendula	Mature		Retain
	Fraxinus excelsior	Middle aged	Growing from base of 49 & severe trunk wound at base	Remove
	Ilex aquifolium Ilex aquifolium	Young Young	2 trunks from base Group of 2	Retain Retain
	llex aquifolium	Young		Coppice
	Ilex aquifolium Acer pseudoplatanus	Mature Middle aged	4 trunks from base	Retain Remove
	Taxus baccata Acer pseudoplatanus	Young Middle aged	On adjacent site	Retain Retain
	Acer pseudoplatanus Betula pendula	Mature Mature		Retain Retain
	Betula pendula Ilex aquifolium	Mature Young	Group of 4	Retain Coppice
	Acer pseudoplatanus	Mature	Damaging canopy of fine mature oak, Tree 36	Remove
	Acer pseudoplatanus Ilex aquifolium	Mature Middle aged		Retain Retain
	Ilex aquifolium Acer pseudoplatanus	Young		Coppice Remove
	Fagus sylvatica	Young	Demonstration of the sector	Retain
	Acer pseudoplatanus	Young	Remove to benefit beech, Tree 67	Remove
	Acer pseudoplatanus Ilex aquifolium	Young Young	Remove to benefit beech, Tree 67 Group of 5	Remove Retain
	Acer pseudoplatanus Ilex aquifolium	Middle-aged		Remove
	Acer pseudoplatanus	Young		Retain Remove
	Acer pseudoplatanus Taxus baccata	Young Middle aged		Remove Retain
	llex aquifolium llex aquifolium	Young Middle aged	Group of 2 2 trunks from base	Retain Retain
	Quercus robur Quercus robur	Mature Mature		Retain Retain
	4	Mature Mature		Retain
	Robinia pseudoacacia	Mature		Retain
<u>}</u>	Rhododendron cvs. Ilex aquifolium	Mature Young	Group of 7	Retain Coppice
	Fraxinus excelsior Robinia pseudoacacia	Young Mature		Remove Remove
	Betula pendula Quercus robur	Middle aged Middle aged	3 trunks from base & scrubby	Retain Retain
	Taxus baccata	Young	Strong canopy lean to south	Retain & shorten branches to 1m
	Ilex aquifolium Aesculus hippocastanum	Mature Over mature	Thin canopy with dieback &	Retain Remove
	Aesculus hippocastanum	Over mature	leaf miner Thin canopy with dieback &	Remove
	llex aquifolium	Young	leaf miner Group of 5	Coppice
5	Rhododendron cvs. Taxus baccata	Mature Young		Retain Remove
	Robinia pseudoacacia Taxus baccata	Mature Young		Remove Remove
	Ilex aquifolium Taxus baccata	Young Young		Remove Remove
	Ilex aquifolium Acer pseudoplatanus	Mature Young	3 trunks from base Group of 6	Coppice Remove
	Ilex aquifolium Acer pseudoplatanus	Young Young	Group of 3	Coppice Remove
5	Rhododendron cvs.	Mature		Retain
	Ilex aquifolium Acer pseudoplatanus	Middle aged	3 trunks from base	Coppice Remove
_	Acer pseudoplatanus Acer pseudoplatanus	Middle aged Young	Group of 12	Remove Remove
>	Ilex aquifolium Rhododendron cvs.	Middle aged Mature		Retain Retain
	Ilex aquifolium Ilex aquifolium	Young	5 trunks from base	Coppice
	Acer pseudoplatanus Ilex aquifolium	Young Young	Group of 2	Remove Coppice
	Taxux baccata	Young		Retain
	Acer pseudoplatanus Taxux baccata	Young Young		Remove Retain
	Taxux baccata Ilex aquifolium	Young Young		Retain Retain
	llex aquifolium llex aquifolium	Young Young		Retain Retain
	Acer pseudoplatanus	Young		Remove



		-	
Rev Description		Da	te
	PL	ANNING	
LaDellWg	bd	t: 01622 850245 e: info@ladellwood.co.uk w: www.ladellwood.co.uk	
Y		Stocks Studio, Grafty Green, Maidstone, Kent ME17	2AF
Landscape Architecture	Ecology & Environment	Masterplanning Arboriculture Historic Landscapes	
Project ATH	LONE HOUS	- E, HAMPSTEAD LANE	
Drawing title	Location of	of Photographs	
Scale	Date	Drawing number Re	v
1:250@A1	Aug 2020	0918/2020/B/	13

FORESTRY RECOMMISSIONED

PLANTLIFE 2011

ANNEX 1



Recommissioned:

Bringing England's woodlands back to life

Citation

Plantlife (2011) Forestry Recommissioned: Bringing England's woodlands back to life. Plantlife: Salisbury

Contributors

Peter Ainsworth, Christopher Broadbent, Joanna Bromley, Andrew Byfield, Dr. Trevor Dines, Dr Jenny Duckworth, Nicola Hutchinson, Dr. Deborah Long, Richard Moyse, Neil Sanderson, Sophie Thomas, Tim Wilkins, Ray Woods

Contents

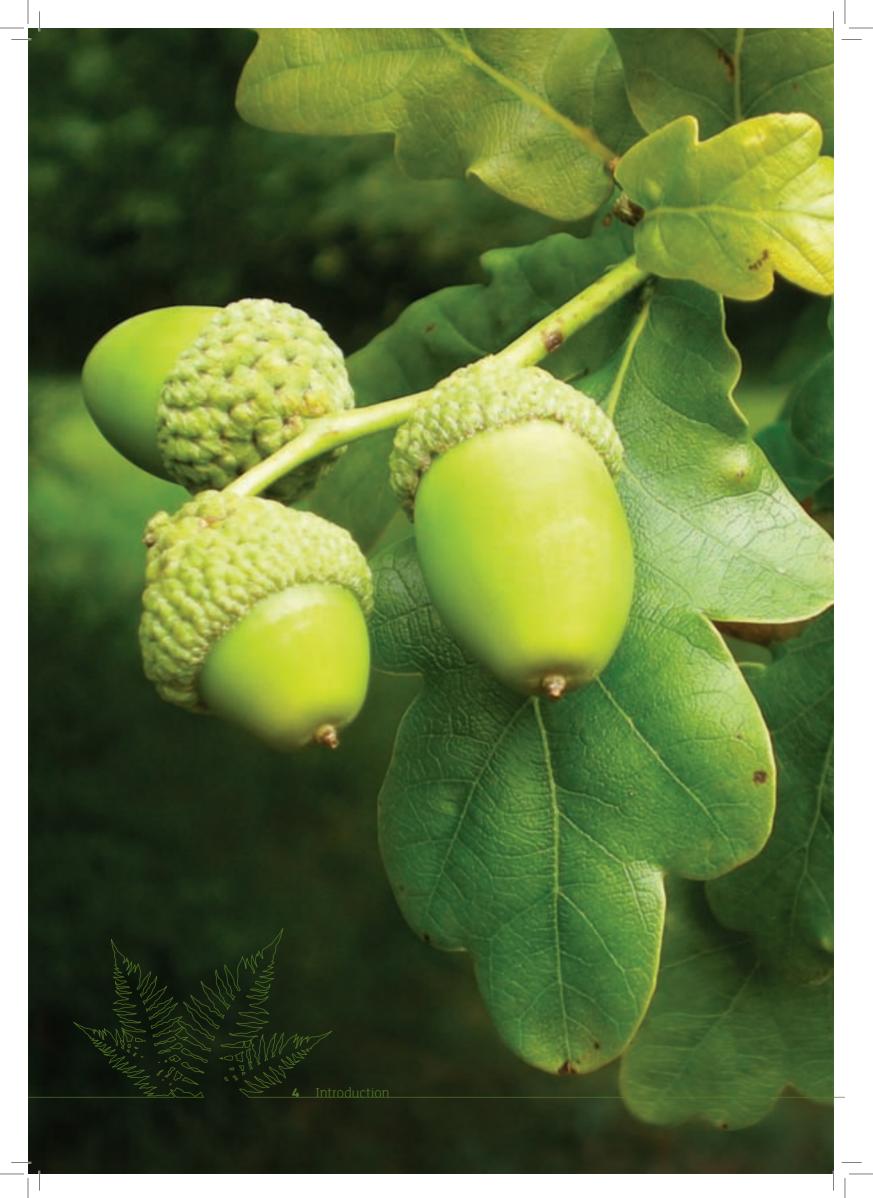
- 4 Introduction
- 6 Executive summary
- 8 If you go down to the woods today What's gone wrong with our woodlands?
- **10** 1. Lack of management
- **17** 2. Nutrient pollution
- **18** 3. Deer
- 20 The declining value of England's woodlands
- 24 Recommendations
- 27 Conclusion
- 28 Summary of Plantlife response to the Independent Panel on Forestry, July 2011
- 30 References

4

Photography

Cover – Castle Eden Dene National Nature Reserve © Jason Friend Photography Acorns in the New Forest © Beth Newman/Plantlife

- 7 Bluebells and early purple orchid © Andrew Vickers/fotolibra
- 9 Lesser redpoll © Andrew Howe/iStockphoto
- 12 Ranscombe Farm Reserve © Robert Pickett/Plantlife
- 15 Narrow-leaved helleborine © Bob Gibbons/Natural Image
- 16 Common nettle © Beth Newman/Plantlife
- 19 Roe deer © Ernie Janes
- 21 Pearl-bordered fritillary © Ernie Janes
- 26 Common rugstill © Bob Walker/Plantlife



Britain's woodlandsare exceptional

Our unique geographic position in the face of prevailing Atlantic weather, together with our varied geology and landscapes, has given rise to an outstanding diversity of wooded habitats for our relatively small land area. Certain English woodlands are of global importance.

what ^{is} it that makes them So important? The plants of COULSE...

Executive summary

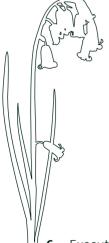
There is much debate about the future of England's woodland. A great deal of it to date has been about who should own our woods and forests and how extensive they should be.

Who owns our woods shouldn't matter; it is what we do with them that counts. This report shifts the focus to managing our woodlands so that they deliver for us and for our wildlife. Plantlife's vision is for a woodland estate where the economic incentives exist for private woodland owners to manage their woods more actively, and where those woodlands in public ownership are managed to the highest standard to deliver the public benefits of beautiful landscapes rich in wildlife.

England today has more woodland than 20 years ago. It is not a rare and restricted habitat but a widespread and familiar part of the landscape. We have 5 times more ancient woodland than limestone grassland, 27 times more than lowland meadow, and a staggering 229 times more ancient woodland than upland hay meadow.¹ Yet, characteristic woodland birds and butterflies continue to decline and woodland plants are vanishing at a greater rate than meadow species. The Independent Panel on Forestry report recommends an increase of 5% of England's woodland cover taking it from 10% to 15% over the next 50 years. More woodland is a well-intentioned aim but what we really need is better woodland.

So why are England's woodlands losing their life and vitality? They aren't being bulldozed, concreted over or burned down – they are still standing and you can still walk through them. **The simple answer is that too many of our woods are neglected, mismanaged or under-managed.** This is the major threat to their plant life and to the other wildlife that depends upon a rich woodland flora. Overgrazing by a soaring deer population and nutrient enrichment from atmospheric pollution compound the problem.

If our native woodland – much of it of international importance – is to be protected and enjoyed by future generations, then private and public woodland owners need to take a more informed and more active approach to woodland management. **It matters little who owns dull woodlands devoid of natural beauty and nor do we need more of them.** In the International Year of Forests, this report sets out Plantlife's recommendations to put the life back into England's woodlands.



Executive summary

We needbut less emphasis on the quantity of woodland but focus instead on the Quality

Forestry Recommissioned 7

if you go down to the woods today...

Enter most English woodlands and you are likely to find them

dark overgrown and quiet

> A lack of active management means that sunlight can often no longer reach the woodland floor. Rarely grazed by livestock, woodlands are frequently overgrown with brambles and suffering from high levels of nutrient pollution, which encourage plants like nettles instead of our specialist woodland flora.

Woodland like this has lost its wildlife

8 If you go down to the woods today

Lesser redpoll suffered a 78% decline between 1966 and 2000²

What's gone with OUT woodlands?

1. Lack of management

There is a widely held belief that in primaeval times, closed high forest covered the lowlands of Britain. This has resulted in our tendency to treat woodlands and grasslands as separate and distinct entities, including in the way that they are managed. However, evidence suggests that Britain's lowland forest landscapes looked, at least in part, like the mosaic of habitats seen in the New Forest today³ Many grassland types originally occurred as part of the wider 'wildwood' mosaic, becoming more expansive and open with the increasing impacts of both woodland management and agriculture. This perhaps explains why the majority of our woodland flora, both common and rare, responds well to good light and low scrub levels.

Throughout history, England's woodlands have been used for everything from grazing livestock to harvesting timber, from hunting animals to gathering fruits and fungi. As recently as a hundred years ago, they were still being regularly coppiced for hurdles, pit props, poles and charcoal; bracken, leaf litter and branches were collected for animal bedding and fodder, and the tannins found in oak bark were used in the tannery industry.

All this human activity kept woodlands diverse – there were glades, patches of grassland, recently cut areas and some high trees. Far from harming woodland wildlife, this form of active management kept our woodlands rich and varied, providing the opportunities for many different plants and animals to flourish.

Today, traditional management of broadleaved woodlands has declined dramatically. In addition, much of England's lowland woodland lies isolated within a landscape of arable fields or is fenced off from adjacent grasslands, so blocking access for livestock. Financial support from various woodland grant schemes has hastened this process by encouraging the fencing off of woodland and infilling gaps in the woodland canopy with new tree planting.

Under these conditions, often unmanaged and ungrazed, many of our woodlands have developed into high forest, devoid of structural complexity, habitat diversity and, crucially, light.

In 1947, 49% of broadleaved woodland was classed either as coppice or scrub and just 51% as high forest. By 2002, high forest represented a staggering 97% of the broadleaved resource:

> Most woodland plants are not shade tolerant and prefer lighter conditions. This not only applies to woodland flowers but also to lichens, mosses and liverworts.

Coppice management is essential for maintaining the botanical richness of this ancient woodland at Plantlife's Ranscombe Farm Reserve. This area was probably last coppiced around 20 years ago.

12 What's gone wrong with our woodlands?

The solutions

Coppicing and pollarding

The traditional practices of coppicing and pollarding open up the woodland canopy, so letting in light and creating conditions suitable for the majority of woodland plants. Actively managed coppice in the lowlands of south and eastern Britain is especially valued for its displays of spring flowers such as wood anemone, primrose, early purple orchid and wood violet. Rarer species associated with the early regrowth of coppice, such as lady orchid and green hound's-tongue, have declined as a result of the reduction in coppicing, although some flowers, such as oxlip and Suffolk lungwort, have been able to survive in the more shaded conditions, but with reduced populations.

Half of Plantlife's flagship Ranscombe Farm Reserve in Kent is woodland. This includes ancient, semi-natural woodland but also areas of replanted woodland (including some 90 hectares of almost pure sweet chestnut) and more recent woodland. The more recent woodland includes areas where, during the 19th century, trees were planted on or colonised, previously open habitats.

The botanical interest of these woods is in the gaps, edges and more open stands of trees.

Plants such as common gromwell, columbine and wild liquorice benefit from the partial shade and periodic disturbance along the margins of woodland rides. Where woodland is coppiced, lady orchid and early-purple orchid occur and appear to be spreading. Open stands of trees and scrub support good populations of white helleborine, fly orchid, and even man orchid. Woodland rides and open space also occasionally support some of the open ground plants for which the reserve is most important, such as the nationally scarce white mullein and the extremely rare rough mallow.

Because of this rich plant interest, woodland management at Ranscombe is focused on maintaining and restoring coppice management across a substantial area, widening and maintaining woodland rides and glades, and recreating lost areas of open habitat. In time, this will create a more dynamic system, allowing the increase and spread of rare and important woodland species and allowing plants of open grassland, field margin and scrub to move through and exploit the woodland landscape.

A new study of wild daffodils for the Gloucestershire Wildlife Trust⁵ found that the considerable decline in these celebrated flowers is due to:

- the decline in sustainable woodland management leading to heavily-shaded coppices. Where coppicing or thinning was reintroduced wild daffodil populations recovered.
- a decline in grazing, allowing brambles especially to shade out daffodils and increase competition at root-level. Some of the densest wild daffodil populations were encountered in woodland where the understorey was cleared annually.

Grazing stock in woodlands

Managed grazing encourages plant species diversity, maintains habitat diversity and allows natural regeneration. Controlled grazing by domestic livestock needs to be reinstated into many woodlands. Domestic stock can be moved in and out of woodlands easily and in response to the particular management needs of individual woods.

Chappett's Copse is home to the largest population of narrow-leaved helleborine in the UK, with over 4,000 of the white orchids recorded for the last two years. Hampshire & Isle of Wight Wildlife Trust has achieved this spectacular result by doing two things: opening the canopy to allow in more light and implementing a cutting regime to reduce competitive species such as bramble and dog's mercury. This cutting, which mimics intermittent grazing, has also encouraged other flowers such as sanicle and woodruff, which, in turn, attract orchid-pollinating bees.

An increasing number of grazing projects are being established across England, including in the Blackdown Hills, West Weald, Sherwood Forest and Savernake Forest. At Savernake, a Site of Special Scientific Interest (SSSI) with ancient wood pasture relics and rare lichens and fungi, a 30-hectare enclosure within the woodland has been grazed from April to September. Part of a pilot scheme on woodland grazing, the results of this five-year project should help inform future grazing initiatives.

Woodfuel

Woodfuel could provide a significant and economic solution to the management of our neglected woodlands in the future. It represents a low carbon source of energy, would reduce the UK's negative impacts on forests overseas and could potentiallu increase the commercial value of under-utilised woodlands. The Forestry Commission England's Woodfuel Implementation Plan 2011–2014⁶ will help realise the aims of the National Renewable Energy Plan to bring an additional two million green tonnes into the growing English woodfuel market each year by 2020, theoretically providing energy for 250,000 homes, and bringing approximately half of England's neglected woodlands into active management. If undertaken sustainably, with safeguards to regulate both the rate of clearance, and to protect old wood features (such as epiphytic mosses and lichens),

the woodfuel market could represent the single most important economic activity to reinvigorate our woodland wildlife.

Announced this year, the Renewable Heat Incentive (RHI)⁷ is a green economy initiative likely to significantly increase demand for woodfuel and revolutionise the renewable heat sector. The potential for the RHI to stimulate active management in small, privately owned woodlands is an exciting opportunity for a return for working woodlands and wildlife.

Narrow-leaved helleborine

The Chappett's Copse conservation programme vividly demonstrates that correct management – in this case opening up of glades to allow light in and the mimicking of grazing – can result in thriving populations of rare plants, giving hope for other sites where numbers are down to just a handful. In ten years of Plantlife surveys, nitrogen-loving nettles are the most commonly recorded species[®]

2. Nutrient pollution

93% to 98% of Britain's woodland area is growing under excessive nitrogen levels[°]

Like the wild flowers of open habitats, the greatest diversity of woodland flora is found in woodland with low nutrient levels. There is unequivocal evidence from a number of studies that nitrogen enrichment encourages a narrower suite of species to flourish in woodlands at the expense of many characteristic woodland species.¹⁰ In areas of high nutrient levels, species such as nettle, bramble and wild garlic out-compete other species, so contributing to the homogenisation of our woodlands.

Atmospheric nitrogen deposition, mainly from nitrogen oxides and ammonia emissions, alters acidity and nutrient balances and impacts on both ground and epiphytic flora within woodlands. Unfortunately, as woodlands and forests 'scavenge' air pollutants effectively, the effects of nitrogen deposition in woodlands are generally greater than those for other habitat types.¹¹

Once these nutrients enter the woodland ecosystem, they become 'locked-in' to the cycle of growth and decay. In addition, as traditional management to remove the natural build up of organic matter has ceased, this has created a cycle in which the buildup of nutrients in the soil results in faster growth of vigorous plants and hence the production of ever greater amounts of organic matter. Many rarer woodland plants favour little or no leaf litter build-up. Just as nutrient levels have taken years to increase, so they will take time to reduce.

Oliver Rackham provides evidence for the historic removal of nutrients from woodlands as a result of management techniques. In eastern England, the length of time between coppice harvests increased from an average of six years in the 13th century to 14 or 15 years by the 19th.¹² It is likely that part of the reason for this was falling soil fertility, meaning that it took longer for the coppice branches to grow to a usable size. A recent study supports this notion, concluding that decreasing the rotation length of chestnut coppice enhances the depletion of soil nutrients.¹³

The Solutions

By managing woodland edges and restoring traditional woodland management practices, we can start to reduce the nutrient loads in our woodlands. However, it is only through repeated coppice cycles over a period of years that serious nutrient depletion will begin to take effect. Our woodlands have been managed in these ways for hundreds of years and, if we are serious in our desire to have a diverse woodland flora, then similar long-term management objectives should be set for England's woodlands today.

Measures which reduce the run-off of nutrients from farmland and the release of nitrates and ammonia into the atmosphere from transport emissions, agricultural fertiliser use and slurry would help reduce the pressure on woodlands and other habitats. However, increased removal of woodland biomass as a result of increased management, such as coppicing, will reduce nutrient loads appreciably.



3. Deer

Across lowland England, ancient woodland vegetation structure and floristic diversity is being severely compromised by excessive numbers of deer. This has contributed to a decline in national populations of some woodland birds and many woodland butterflies. In upland woodlands (oak, ash and particularly birch), overgrazing by deer limits regeneration.

beer have three main impacts*

Destruction of vegetation structure

Deer browsing is responsible for the 'hollowing' out of the sub-canopy layer of woodland vegetation, particularly the ground flora and shrub understorey, so removing the multi-layered structure of woodlands. The loss of this natural structure has been implicated in the decline in woodland birds that rely on a dense shrub and ground layer for shelter and breeding.¹⁶ For woodland butterfly species, the reduction in abundance and height of key food plants – such as violet, primrose and ladies'-smock – is having a disproportionate impact on populations.

Loss of characteristic woodland plants

The greatest concern focuses on the impacts of unprecedented levels of deer browsing on the ground flora and low shrub layer. Bluebell, primrose, common spotted orchid, early purple orchid and wood anemone are amongst the many woodland flowers browsed by deer, along with national rarities such as oxlip, a particular favourite of fallow deer.⁵

The solutions

Deer grazing can only be controlled and adjusted by excluding deer from woodlands completely or by systematic and potentially expensive culling programmes. *The Deer Initiative Accord*¹⁷ outlines a comprehensive set of actions that should be carried out in order to deliver a sustainable, well managed wild deer population in England.

Prevention of woodland regeneration

In many lowland broadleaved and mixed woodlands, saplings fail to grow beyond 2 metres, the height to which deer can browse. Regeneration of coppice stools can be particularly poor in areas of heavy roe deer densities, particularly since many modern coupes (every block of coppice cut in a particular year) are small in extent.

England's deer populations – particularly of roe, fallow and muntjac – are reaching epidemic proportions and their grazing in woodland is only sporadically controlled

The declining value of England's woodlands

The plant conservation interest and importance of England's woodlands can be seen as a pyramid with the few very best ancient sites at the top, a strong cohort of ancient woodlands in the middle and then the majority of wooded areas being currently of much lower importance for wildlife but with huge potential.

Today, the wooded area of England is estimated to be 1.1 million hectares, or just under 10% of England's surface area. Only half of this is ancient or recent semi-natural broadleaved woodland¹⁸ with our characteristic oaks and ash, bluebells, wood anemones, violets and primroses. Much of England's woodland plant resource lies in these woodlands - yet only around a quarter of them are designated as Sites of Special Scientific Interest and only half of these are in favourable condition.¹⁹

Britain has one of the highest populations of veteran trees in Europe.

The remainder of our woodland is recent broad-leaved and conifer plantations which are of much lower conservation importance. It is to *this* category of woodland that further planting of trees will add. Planting new woodlands will not, for centuries, replicate the conservation importance of our ancient forests with their veteran trees.

Important Plant Areas (IPAs)

The Important Plant Areas project, co-ordinated by Plantlife, identifies internationally important areas for wild plants across the globe.

In 2007, Plantlife published a list of the UK's Important Plant Areas.²¹ Of the 150 IPAs identified to date, one third (52) are recognised, at least in part, for their woodland features, highlighting the importance of woodlands for plant conservation. Their protection and management contributes towards the UK's international commitments from Nagoya – IPAs are an integral part of the Global Strategy for Plant Conservation, which is an integral part of the Convention on Biological Diversity with objectives to achieve by 2020.

The pearl-bordered fritillary, which likes open woodland such as coppice, has declined by 80% since 1985.²²

ling woodland flowers is threatened with extinction³

Three recent studies all tell a tale of declining variety in woodland plants – on a walk in the woods you will see fewer plant species now and our woods are losing their variety and differences.

A study by English Nature, published in 2005, looked at long term ecological change in woodlands²⁴ It focused on 103 woods, which had originally been surveyed in 1971. It reassessed the same plots in 2001 and found that overall species richness in the ground flora had declined markedly, with a 36% decrease per plot and a 12% decrease per wood. Woodland specialists such as yellow archangel, wood sorrel, primrose and sanicle had decreased in frequency, with **56 of the 72 woodland specialists becoming significantly less common.** There were small increases in frequency of shade tolerant species such as beech and holly, and a general shift towards more shade-tolerant vegetation.

The Countryside Survey focuses on changes in the British countryside, based on repeated surveys carried out between 1978 and 2007. The results indicate that broadleaved woodland species diversity decreased by 9.3% between 1990 and 2007 indicating that **our woodlands are losing their variety of plants and becoming more homogeneous**²⁵

A more recent and local study took advantage of work undertaken in the 1930s by Professor Ronald Good, who recorded the vegetation and flora across Dorset at specific sites. By resurveying these sites Bournemouth University and the Centre for Ecology & Hydrology showed that 21st century Dorset woodlands are less distinctive than those of the early 20th century²⁶ Of the 86 woodland stands resurveyed, the study highlighted the decline of 117 mainly light-loving species. Meanwhile, there was an increase in 47 species, **particularly in nutrient and shade-tolerant species, such as wild garlic, nettle and holly.**

Plants are the foundation upon which all nature depends. As our plants have declined, so has our wildlife. In particular, many woodland birds and butterflies have declined in numbers and range?⁷ This coincident decline of woodland plants, butterflies and birds indicates fundamental and important changes are happening within our woodlands that need to be addressed.

The UK Butterfly Monitoring Scheme shows a 56% decrease in woodland butterflies

- Up to half the global population of bluebells is found in Britain.²⁸
- There are almost 250 woodland specialist flowers.²⁹
- Britain is amongst the richest countries for mosses and liverworts in Europe, and of significance at a world level.³⁰

Woodland Bird Indicator is at its Iowest level since 1970

{A}

Plantlife recommends...

This report focuses on the need for more active woodland management as the major solution for woodland wildlife declines. Whilst there are many reasons to want to increase the extent of woodland cover, planting more woods only has a minor role to play in the recovery of wildlife compared with increased management.

Woodland extent: the right trees in the right places

In the past, important wildlife populations have been damaged or destroyed by planting wildlife-rich habitats with non-native conifer crops. In Dorset, just two out of the 44 populations of heathland flora recorded in the 1930s survived the plantation afforestation of the 1990s – a loss of over 95%. Populations of chamomile, marsh clubmoss and pale heath violet all disappeared.



Given government's ambition to increase woodland area it is vital that the mistakes of the past are rectified and that no further damaging errors are made.

- Woodland creation schemes should only target landscape areas that are essentially wooded in character and seek to enlarge or link existing areas of ancient semi-natural woodland.
- Wherever possible, native woodland creation schemes should take place through natural regeneration and follow ecological guidelines, such as Plantlife's Zones of Opportunity approach, similar to the Forestry Commission Forest Habitat Networks but with a focus on plant and fungi needs.
- Grant schemes for woodland creation need effective environmental impact assessments to ensure that no wildlife-rich, open habitat is lost, such as bog, heathland or species-rich grassland.
- To encourage a mosaic of species-rich habitats, new woodland planting schemes should endeavour to keep 25% of the overall woodland area as open habitat.
- Protection for ancient woodland and other priority woodland sites, including Important Plant Areas, should be afforded through anu reform of the planning system.

24 Recommendations

Increasing and improving woodland management

We need to get England's woods back into good heart. This will require government supporting the private sector through incentives and grants, as well as urgent action on the Public Forest Estate.

Government is, and should remain, a major woodland landowner and manager. The Public Forest Estate should remain in public ownership, until such a time as it can be demonstrated that adequate resources are available to the conservation or private sector to deliver its maximum conservation value. Publicly owned forests, managed by the Forestry Commission, should serve to be exemplars of wildlife management, a public good, rather than try to demonstrate excellence in timber production which can safely be left to the private sector.

- Increase the area of certified woodland across England, aiming to achieve at least 75% by 2020.
- All publicly funded woodland management should require an assessment of botanical value and of the impact of operational objectives on plant diversity.
- Government should lead by example to fully restore all Planted Ancient Woodland Sites (PAWS) within publicly owned woodlands.
- Woodland grant schemes should provide at least 80% standard costs for key ancient semi-natural woodland areas, woodland Important Plant Areas, and other areas with woodland plants of conservation concern.
- Local Nature Partnerships and other community driven environmental planning and land management should prioritise the conservation of rare, threatened and internationally important woodland flora within their patch.

- Government and private sector should work together to learn from existing initiatives to rapidly develop and invest in woodfuel infrastructure and markets, thereby delivering the Forestry Commission England's *Woodfuel Implementation Plan 2011–2014*.
- There should be strong presumption against the felling and removal of veteran trees in the English landscape.
- Agri-environment scheme payments should be targeted to encourage appropriate levels of grazing in woodland Important Plant Areas, through trials where necessary.
- Landscape scale initiatives, such as Nature Improvement Areas, should seek to develop (where ecologically appropriate) extensively grazed mosaics of woodland, scrub and grassland/heathland.
- Research is needed to evaluate the role of active management in reducing high nutrient loadings in woodland.
- Government must work to link policy on agriculture, transport and industry to reduce the impacts of nitrogen on air pollution
- The aims of *The Deer Initiative* should be delivered, in particular the promotion of deer management and venison processing and marketing, and the establishment of adequate monitoring and surveillance arrangements for deer in England. Deer numbers need to be controlled to levels whereby woodlands are neither ungrazed nor overgrazed.
- Invest in research on tree diseases, protection and control.
- Take preventative and control measures relating to all non-native species having a negative and/or invasive impact on woodland structure and woodland wildlife



Conclusion

People love trees. However, an English wood is so much more than trees. In fact, within a woodland landscape, less is often more.

In the current debate about the role of the state in woodland ownership, and the ambition to increase woodland cover, Plantlife believes that the crucial role of management in protecting the conservation value of English woodlands is being neglected. To thrive, woodland wildlife needs open spaces with coppices, rides and glades: we need to restore these lost areas and let in sunlight and life.

If managed sustainably, woodlands offer huge benefits in terms of biodiversity, public access, recreation, landscape quality and additional ecosystem services, as well as a supply of timber and other woodland products. For this to happen **we need to embrace woodland management as a way of life** and re-establish the connections between woodlands and the landscapes within which they sit.

2010 saw a spectacular worldwide failure to halt the loss of species – as a result the UN has declared 2011–2020 the Decade of Biodiversity. We need a major shift in how society both respects and utilises the natural environment in order to meet urgent ambitions such as that set by Government in England³¹ to have 90% of priority wildlife habitats in favourable condition. Species are the currency of environmental success; increases or decreases in populations allow us to track the state of ecosystems – and woodland wildlife is no exception.

Unless woodland management is revitalised we will continue to see a net loss of woodland plant diversity and abundance, however many new woodlands we plant.



Forestry Recommissioned 27

Summary of Plantlife response to the Independent Panel on Forestry, July 2011

The 'Lawton Review' concluded that England's protected wildlife sites, taken *in toto*, did not comprise a coherent and resilient ecological network; the essence of what needs to be done was summed up in four words: **more**, **bigger**, **better** and **joined**.³² This philosophy applies as much to our native woodland as it does to other habitats. However, despite the significant expansion in woodland cover in Britain, there has been a marked decline in specialist woodland plants and other wildlife.

Plantlife supports the targeted creation of new woodland, where there is a clear conservation benefit. In short, the focus should be on quality, not quantity, operating the principle of 'right tree, right place, right reason'.

The importance of the 258,000 hectare Public Forest Estate (PFE) cannot be overstressed for wild plants. Thus, of England's local, rare and declining wild flowers, **208 out of the 588 taxa** occur within the PFE.

28 Summary of Plantlife response to the Independent Panel on Forestry, July 2011

The importance of the 258,000 hectare Public ForestEstate Cannot be overstressed

We believe that this invaluable national asset presents a unique opportunity for demonstrating and undertaking exemplary protection and management, be it the restoration and active management of ancient semi-natural woodland or the realisation of open habitat potential on the scale necessary to deliver landscape scale conservation through the removal of plantation forestry.

Whilst in theory ownership of this estate is not the key issue, but rather the effective sustainable management of the resource itself, Plantlife does not believe that the incentives, resources and adequate expertise are yet available to the private sector to deliver such conservation aspirations. Instead, we support the management of much of the PFE as falling within the remit of a Forestry Commission whose responsibilities have been completely reviewed to better reflect the aspirations of the general public in terms of effective delivery of conservation of biodiversity, landscape and cultural heritage, as well as the provision of widespread public access.

Plantlife welcomes the Independent Panel on Forestry's Final Report. We recommend that Government implement the findings in full and support it as the basis of an England Forest Strategy.



Forestry Recommissioned **29**

Endnotes

References

- 1 Forestry Commission & Defra (2005) Biodiversity Action Reporting System (online) <u>http://ukbars.defra.gov.uk/</u> Accessed 23/8/11; King, M. (2011) *Nature's Tapestry – The story* of England's grasslands and why not all grass is green. The Grasslands Trust.
- 2 Amar, A., Hewson, C.M., Thewlis, R.M., Smith, K.W., Fuller, R.J., Lindsell, J.A., Conway, G., Butler, S., & MacDonald, M.A. (2006) What's happening to our woodland birds? Long-term changes in the populations of woodland birds. RSPB: Sandy/BTO: Thetford.
- 3 Vera, F.W.M (2000) *Grazing Ecology and Forest History*. CABI International: Wallingford.
- Hopkins J.J. & Kirby K.J. (2007) Ecological change in British broadleaved woodland since 1947. *Ibis*, 149 (Suppl. 2): 29-40.
- Rowlatt, S. (2011) *The Wild Daffodil in Northwest Gloucestershire and Survey 2007–2010*.
 Gloucester Wildlife Trust and Gloucestershire County Council.
- 6 Forestry Commission England (2011) Woodfuel Implementation Plan 2011-2014.
- 7 See Renewable Heat Incentive Scheme (online) <u>www.decc.gov.uk/en/content/cms/meeting</u> <u>energy/renewable_ener/incentive/incentive.aspx</u> Accessed 4/10/11.
- 8 Findings from Plantlife's Common Plants Survey/ Wildflowers Count, summary of results available from Plantlife.
- 9 Forestry Commission (online) Acidity and nutrient nitrogen critical loads and exceedance for woodland habitats www.forestry.gov.uk/fr/ INFD-62VCW9#3 Accessed 24/10/11.
- Preston, C.D, Pearman, D.A. & Dines T.D. (2002) New Atlas of the British & Irish Flora. University Press: Oxford; Kirby et al. (2005); Braithwaite, M.E., Ellis, R.W. & Preston, C.D. (2006) Change in the British Flora 1987–2004. Botanical

Society of the British Isles: London; Carey *et al.* (2008); Smart, S., Dunbar, M.J., Emmett, B.A., Marks, S., Maskell, L.C., Norton, L.R., Rose, P., & Simpson, I.C. (2010) *An Integrated Assessment of Countryside Survey data to investigate Ecosystem Services in Great Britain*. Technical Report No. 10/07 NERC/Centre for Ecology & Hydrology (CEH Project Number: C03259); Stevens, C.J., Smart, S.M., Henrys, P., Maskell, L.C., Walker, K.J., Preston, C.D., Crowe, A., Rowe, E., Gowing, D.J. & Emmett, B.A. (2011) Collation of evidence of nitrogen impacts on vegetation in relation to UK biodiversity objectives. JNCC Report 447. JNCC: Peterborough.

- 11 Air Pollution Information System (online) <u>www.apis.ac.uk/overview/ecosystems/overview_</u> <u>woodlands.htm</u> Accessed 24/10/11.
- 12 Rackham, O. (2003) *Ancient woodland: its history, vegetation and uses in England.* Castlepoint Press: Dalbeattie.
- 13 Ranger, J. & Colin-Belgrand, M. (1996) Nutrient dynamics of chestnut tree (<u>Castanea sativa</u> Mill.) coppice stands. *Forest Ecology and Management*, 86: 259-277.
- 14 *Reference for whole section*: Gill, R. (2000) *Impact of deer on woodland biodiversity.* Forestry Commission: Edinburgh.
- 15 Taylor, K & Woodell, S.R.J. (2008) Biological Flora of the British Isles: <u>Primula elatior</u> (L.) Hill. *Journal of Ecology*, 96 (5). 1098-1116.
- 16 Amar *et al.* (2006).
- 17 The Deer Initiative (online) <u>www.thedeerinitiative.</u> <u>co.uk/pdf/deeracc.pdf</u> Accessed 4/10/11.
- 18 Forestry Commission & Defra (2005) *Keepers of time: A statement of policy for England's Ancient and Native Woodland.*
- 19 Natural England (2008) *State of the Natural Environment 2008.*

- 20 Read, H. (2000) *Veteran Trees: A guide to good management* IN13, English Nature.
- 21 See: www.plantlife.org.uk/wild_plants/important_plant_areas/
- 22 Clarke, S.A., Green, D.G., Bourn, N.A. & Hoare, D.J. (2011) *Woodland Management for butterflies and moths: a best practice guide.* Butterfly Conservation: Wareham.
- 23 Cheffings, C.M. & Farrell, L. (eds.) (2005) *The Vascular Plant Red Data List for Great Britain.* Species Status No. 7. JNCC: Peterborough.
- 24 Kirby, K.J., Smart, S.M., Black, H.I.J, Bunce, R.G.H., Corney, P.M. & Smithers, R.J. (2005) Long- term ecological changes in British woodland (1971-2001), English Nature Research Reports Number 653. English Nature: Peterborough.
- 25 Carey, P.D., Wallis, S., Chamberlain, P.M., Cooper, A., Emmett, B.A., Maskell, L.C., McCann, T., Murphy, J., Norton, L.R., Reynolds, B., Scott, W.A., Simpson, I.C., Smart, S.M. & Ullyett, J.M. (2008) *Countryside Survey: UK Results from 2007*, NERC/ Centre for Ecology & Hydrology (CEH Project Number: C03259)
- 26 Keith, S.A., Newton, A.C., Morecroft, M.D., Bealey, C.E. & Bullock J.M. (2009) Taxonomic homogenization of woodland plant communities over 70 years. *Proceedings of the Royal Society B.*
- 27 Clarke *et al.* (2011); England Biodiversity Group (2010) A biodiversity strategy for England – Measuring progress: 2010 assessment. Defra: London.
- 28 Cheffings & Farrell (2005).

- 29 Hill, M.O., Preston, C.D. & Roy, D.B. (2003) PLANTATTR: Attributes of British and Irish Plants – Status in Britain, Size, Life History, Geography and Habitats. NERC Centre of Ecology & Hydrology: Huntingdon.
- 30 Rothero, G. P. (2005) Oceanic Bryophytes in Atlantic Oakwoods. *Bot. J. Scot.* 57: 135-140.
- 31 Defra (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services.* Defra.
- 32 Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.A., Tew, T.E., Varley, J., & Wynne, G.R. (2010) Making Space for Nature: a review of England's wildlife sites and ecological network. Report to Defra.



Patron: HRH The Prince of Wales

Plantlife, 14 Rollestone Street, Salisbury, Wiltshire, SP1 1DX T +44 (0)1722 342730 F +44 (0)1722 329035 enquiries@plantlife.org.uk

www.plantlife.org.uk

Plantlife is a charitable company limited by guarantee, Company No. 3166339. Registered in England and Wales, Charity No. 1059559. Registered in Scotland, Charity No. SC038951. ISBN number. 978-1-907141-48-5

Supported by

eden project

designbyStudioAde.com

Printed using vegetable based inks by Blackmore Ltd. T +44 (0)1747 853034

FSC www.fsc.org

RECYCLED Paper made from recycled material FSC[®] C008152

We are Plantlife

Speaking up for the nation's wild plants

We work hard to protect wild plants and to build understanding of the vital role they play in everyone's lives. Wild plants clean our air and water, provide food and shelter for our insects, birds and animals, and are critical in the fight against climate change.