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Parklands - the way forward

19-21 May 1998, Hereford - Proceedings

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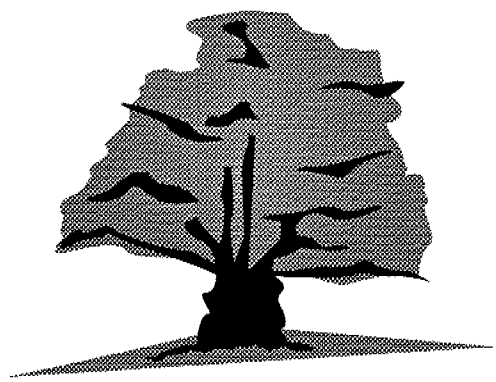

VETERAN TREES

INITIATIVE

English Heritage

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ANCIENT TREE FORUM

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English Nature Research Reports

Number 295

Parklands - the way forward

19-21 May 1998, Hereford

Proceedings

Edited by David J Bullock and Keith Alexander (National Trust)

This symposium was generously supported by
the Countryside Commission and the British Ecological Society

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Contents

Introduction

The idea of holding a parkland symposium arose out of a conversation between Tom Wall (English Nature) and Paul Harding (ITE). Since the original proposal, the Veteran Trees Initiative has been formed; and the Habitat Action Plan for Lowland Wood-pasture and Parkland, and a book on Moccas Park (edited by Wall & Harding) are in their final stages of completion. If delegates at the symposium were to learn and discuss the contents of the Moccas book, and how they could contribute to implementing the HAP, the timing of the symposium could not have been better.

The symposium had three purposes:

1. To direct implementation of the Habitat Action Plan for Lowland Wood-pasture and Parkland.

2. To explore mechanisms by which the conflicting demands of recreation, historic landscape design and nature conservation can be resolved.

3. To set an agenda for parkland conservation in England.

In order to engage as many people as possible in discussion and reporting, the symposium was organised as a cascade of workshops. The first workshops covered detail and expert opinion on a range of topics (see programme); later ones led to overarching presentations encompassing four themes: Research Needs, Recording and Evaluation, Site and Tree Management, and Public Awareness and Education. The issues considered under each of these themes are included with these proceedings. For many people this was probably the most interactive meeting of this size they had attended.

Our editing of the proceedings has been light. Delegates requested that a written record of the meeting should be produced quickly, and that it should preserve as much of the flavour of the workshops as possible. We have not, therefore, rewritten texts as presented by the rapporteurs. The costs of doing the job quickly will be obvious; we hope that the benefits of quick dissemination of the written record outweigh the lack of polish.

Of the 80 or so delegates, a majority worked for the Statutory Agencies, non-governmental organisations or local authorities. Consultants and others with expertise in the design, restoration and management of parklands were poorly represented. There was a strong feeling from the delegates that more should be done to bridge the gap and increase understanding between the "environmentalists" and the "landscape restorers". The latter often consider 'restoration' of parkland to be the product of a return to the design processes that produce a living art form; the former often consider 'restoration' as a relaxation of management so that wildlife interests can be maintained or enhanced. Both interest groups are concerned with a resource in decline and in the absence of a meaningful dialogue will not be able to manage parklands on a sustainable basis into the next millennium.

Setting a realistic agenda for parkland conservation will involve a lot of work. On behalf of the delegates we hope that more effort will be put into engaging owners and managers of parklands, landscape designers and historians in discussions with nature conservationists about the future of these areas. With that in mind the proceedings will be sent to a variety of people and organisations who were not represented at the symposium but who the delegates thought should know of the activities, concerns and plans for the conservation of parklands.

The information presented here represents the views expressed by the groups and individuals present at the symposium. It should not be taken as a statement of the considered view of English Nature or any of the other partners of the Veteran Tree Initiative.

Acknowledgements

The early proposal for a parklands meeting was subsequently fleshed out by members of the Veteran Trees Initiative partnership, and the final programme put together by Amanda Giles. We are grateful for Tom's and Paul's generosity in allowing their original concept to be stirred and shaken, and hope that the resulting cocktail was tasty and invigorating. We also thank them for guiding us around Moccas Park on the first evening of the symposium, and for presenting us with the contents of their forthcoming book on the subject.

Amanda Giles, supported by Jeanette Hall, organised the symposium. Eddie Idle was an able chairman of several sessions, and Baroness Young of Old Scone kindly opened the proceedings. We thank all the workshop chairs, the rapporteurs and other presenters for doing their job so well. Paul Stamper (EH), Jo Burgon (NT) and Keith Kirby (EN) deserve particular thanks for chairing the "main" workshops out of which came much of the material for the final round of presentations. Oliver Rackham's after dinner talk promoting wood-pastures and parklands as savannah landscapes was as stimulating and comprehensive as we have come to expect. As editors, we thank all the rapporteurs for responding so well to our request for a quick turn around on the texts we sent out the them. Two secretaries in our office, Jill McNaught-Davis and Karin Baker typed the handwritten notes (sometimes on AO flipcharts!) for us to then edit. Finally we thank the Countryside Commission for generous financial support for the symposium, and Rachel Thomas for arranging for the proceedings to be published as an *English Nature* Research Report.

Parklands symposium 1998 - Programme

Day 1 Tuesday 19 May

16:00-16:45	Arrival and registration
16:45	Leave Hereford: Excursion to Moccas Park
17:30	Arrive Moccas Park
20:00	Return to Hereford
20:30	Symposium dinner with welcome - Eddie Idle, Eurosite
	Keynote speech - Baroness Young of Old Scone

Day 2 Wednesday 20 May: Chair: Eddie Idle, Eurosite

9:00-9:30	Introduction to the Symposium - Amanda Giles
9:30-11:30	

Specialist Subject Workshops	**Chair**
Current economic use	Mark Thomasin Foster, CLA
Tree health	Dr Mike Ashmore, Imperial College
Safety and legislation	Alan Woods, CLA
Invertebrates	Adrian Fowles, CCW
Epiphytes	Ray Woods, CCW
Fungi	Alan Raynor, British Mycological Society
Tree-hole nesters	Tony Mitchell-Jones, English Nature

11:30-12:45	10 minute presentations from specialist workshops
12:45-13:00	Discussion
13:00-14:00	Lunch
14:00-16:00	**Main workshops** (three workshops running in parallel)

These workshops will address the issues of research needs, recording and evaluation, site/ tree management issues and publicity, awareness and education, as they apply to each topic. In each workshop the chair will appoint four recorders, one for each theme.

1. *Design and Management in Historic Parkland*
   Leader: Paul Stamper, English Heritage
2. *Cultural value and public appreciation of Parkland*
   Leader: Jo Burgon, National Trust
3. *Implementation and integration of Species and Habitat Action Plans in Parklands*
   Leader: Keith Kirby, English Nature

16:00-16:30	Tea
16:30-19:00	Presentation of Moccas Deer Park book. Recorders to prepare presentations for Day 3.
19.00	Dinner, after dinner speaker: Dr Oliver Rackham OBE:
	"Don't let's be insular - Savannah in Europe"

Day 3 Thursday 21 May

9:00-11:00	Presentations from main workshops
9:00-9:30	Research needs - David Bullock, National Trust
9:30-10:00	Recording and evaluation - Roger Key, English Nature
10:00-10:30	Site and tree management (to include tree health and land use) - John White, Consultant Dendrologist
10:30-11:00	Publicity, awareness and education - Sue Ellis, English Nature
11:00-11:15	Coffee
11:15-12:00	Discussion
12:00-12:45	Setting an agenda for Parkland conservation
	Chair: Keith Kirby, English Nature
12:45-13:00	Summary: Eddie Idle, Eurosite
13:00-14:00	Lunch
14:00-17:00	Optional visit to Eastnor Park

Excursion to Moccas Park

Strategies for Nature Conservation in Parklands: Some Examples from Moccas Park National Nature Reserve. By Tom Wall.

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Read H. (Ed). 1996. *Pollard and Veteran Tree Management II.* London: Corporation of London.

Strategies for Nature Conservation in Parklands: Some Examples from Moccas Park National Nature Reserve

by Tom Wall
English Nature, 18 Kempton, Lydbury North, Shropshire SY7 0JG

We came tumbling and plunging down the steep hillside of Moccas Park, slipping, tearing and sliding through oak and birch and fallow wood of which there seemed to be underfoot an accumulation of several feet, the gathering ruin and decay probably of centuries. As we came down the lower slopes of the wooded hillside into the glades of the park the herds of deer were moving under the brown oaks and the brilliant green hawthorns, and we came upon the tallest largest stateliest ash I ever saw and what seemed at first in the dusk to be a great ruined grey tower, but which proved to be the vast ruin of the king oak of Moccas Park, hollow and broken but still alive and vigorous in parts and actually pushing out new shoots and branches. That tree may be 2000 years old.....

I fear those grey old men of Moccas, those grey, gnarled, low-browed, knock-kneed, bowed, bent, huge, strange, long-armed, deformed, hunchbacked misshapen oak men that stand waiting and watching century after century biding God's time with both feet in the grave and yet tiring down and seeing out generation after generation.....No human hand set those oaks. They are 'the trees which the Lord hath planted'. They look as if they had been at the beginning and making of the world, and they will probably see its end.

From the diary of The Reverend Francis Kilvert, 22 April 1876

Introduction

Moccas Park is a 139 ha (343 acre) deer park in Herefordshire. Approximately half the park conforms to the image of the classic English parkland: undulating grassland grazed by Fallow Deer and dotted with old and ancient trees, mostly Oaks. The other half is also deer grazed, but here conditions are more reminiscent of woodland, with extensive areas of closed canopy Oak and a field layer dominated by Bluebell and Bracken. The Park also encompasses some 4.5 ha (11 acres) of pools, fen and carr.

Moccas Park has long been renowned for its ancient Oaks but no one has captured its special qualities better than Francis Kilvert. Mabey (1980) describes Kilvert's diary entry as "the most graphic account we have of the feel of an ancient wood-pasture" and the account highlights a number of the habitat features to which we now assign particular nature conservation importance.

Moccas Park was declared a National Nature Reserve in 1981. It was the first parkland NNR and remained the only one until Duncombe Park NNR in North Yorkshire was declared in 1994. Moccas Park NNR is managed through a Nature Reserve Agreement between three parties, English Nature, the Owners and their farm tenant, whose holding encompasses the Park. The Agreement accommodates a range of interests: nature conservation, deer management, the grazing of livestock, Pheasant and duck shooting, forestry (there are several small plantations within the more wooded part of the Park) and amenity.

The Importance of Moccas Park National Nature Reserve

Saproxylic invertebrates

Parks are well known to be of particular nature conservation importance for their old trees which offer a multiplicity of habitat niches for many organisms but most notably invertebrates, lichens and fungi. Moccas Park owes its NNR status to its exceptional importance for saproxylic invertebrates, "those which are dependent, during some part of their life cycle, upon dead or dying wood of over-mature, damaged or dead trees (standing or fallen), upon wood-inhabiting fungi, or upon other species associated with this habitat" (Hammond and Harding 1991). Speight (1989) lists Moccas Park amongst five British sites of potential international importance for these specialist invertebrates.

Lichens

Harding and Rose (1986) note that the density of lichen taxa per square kilometre in British pasture-woodlands is far higher than for any comparable habitats of similar or even greater size on the European continent. But Moccas is not of major importance for lichens. Woods (1989) observes that in terms of diversity Moccas, with 140 species found over the years 1968-88, compares well with the most diverse sites known in central Britain; however the list contains comparatively few

exacting species (Dr Francis Rose quoted in Harding 1977). Nevertheless the lichen interest remains worthy of conservation.

Fungi

Parklands are also important sites for fungi and their role is fundamental, not least in creating conditions suitable for the saproxylic invertebrates. Comparatively little survey work has been carried out on fungi at Moccas Park but over recent years several rare and uncommon dead wood decomposers, mycorrhizal species and species of old pasture have been found including several of "Red Data" status (E.E. Green pers. comm.).

Landscape design

Many deer parks of mediaeval or later origin were landscaped in the eighteenth century, when a number of new landscape parks were also created to form what may collectively be regarded as one of the most important English contributions to European aesthetics. This means that nature conservation in parks needs to take landscape design into account. In this respect Moccas Park is no exception because the Park forms a major part of what is a Grade II* site listed in English Heritage's Register of Parks and Gardens.

Strategies for Nature Conservation

Maintaining continuity of habitat

...those grey old men...with both feet in the grave and yet tiring down and seeing out generation after generation...

Kilvert's description captures the seemingly infinite endurance of the ancient trees of the Park but they are not immune to the effects of climate, disease, animal damage and human abuse, nor are their replacements, trees currently classed as overmature or mature. Harding (1990) recorded a 1.1 per cent loss in Oak and 5.9 per cent loss in Beech in the open canopy area of the Park following the drought summers of 1989 and 1990 and the winter gales of January and February 1990 and this steady attrition continues.

Table 1 (adapted from Harding 1977) shows the species, age classes and growth forms of all trees present in 1976/7 in the open canopy parkland. Harding's commentary runs as follows: "The age class structure is good for the ancient/overmature/mature succession but the almost total lack of the young age class .... seriously unbalances the succession prospects."

Table 2 (adapted from Harding 1977) shows the age classes and growth forms of the principal tree species present in 1976/77 in the closed canopy/Bracken area of the Park. Other species represented in smaller numbers were Yew, Holly, Elder, Field Maple and Holm Oak; there were also in excess of 60 Hawthorns. In this area the young age class was completely absent.

Table 3 provides details of planting in the open canopy parkland over the years 1979-1995. In order to ensure the long term future of the Park a total of 573 trees have been planted. Now that this new cohort has been established the requirement changes to one of continuous low level recruitment and as of the 1995/6 season the rate of planting has been reduced to 10 trees per year.

Table 4 provides details of planting in the closed canopy/Bracken area of the Park over the years 1979-1995. Here an additional 349 trees have been individually planted and further trees have been planted within seven small exclosures. In 1994 an open area of approximately 1 ha (2.5 acres) lying on the edge of this part of the Park was fenced against deer and livestock so as to facilitate natural regeneration. Two further such areas are planned.

But it will be hundreds of years before these young trees, whether planted or naturally regenerated, develop a good range of niches suitable for the specialist invertebrates, lichens and fungi. Some acceleration of this development may however be brought about by pollarding which can induce premature decay and give opportunities for colonisation by fungi and invertebrates (Speight 1989). This will not necessarily compromise the longevity of the tree, indeed it is generally stated that repeated pollarding prolongs the life of trees (see for example Rackham 1991). Since 1990/91 some 15 Oak and 5 Ash of 10-20 years of age have been pollarded at Moccas and this work is likely to continue at the rate of up to 10 trees per year. Initially the trees responded well but one Oak has since died, after being severely affected by mildew, and some others are struggling.

Table 1 shows that there is a good representation of trees classified by Harding as "mature" but very few of these trees are pollards, so the range of niches they acquire over time is likely to remain relatively narrow. Furthermore, these trees will not benefit from the additional longevity afforded by pollarding. With these points in mind seven oaks classified by Harding as "mature maidens" have been topped in an attempt to develop surrogates for more long-established pollards. Trees of this age class appear to have developed in close-grown stands and thus have relatively clean stems without low forks or vigorous low side branches which would offer good

"pollarding" points. It has therefore been necessary to make them into a series of "giraffe pollards" by truncating them at an average height of some 7m as against a traditional pollarding height of about 3m. Truncation has in all cases been above good side branches and all the trees have produced vigorous new shoots at or near this point. Their future development will be watched with interest and further trees will be treated in the same way.

But important though it is to pursue these strategies for accelerating the development of niches suitable, in particular, for saproxylic invertebrates, the safeguard of the existing ancient and overmature trees is the first priority. To this end the trees that appear most vulnerable to wind damage are being selectively lopped to maintain crown balance. The oldest pollards tend to have small and relatively well balanced crowns; these are not being re-pollarded because to do so would be a risky strategy with no obvious dividends.

Retaining fallen dead wood

.... fallow wood of which there seemed to be underfoot an accumulation of several feet....

The retention, in the nature conservation interest, of fallen dead wood can pose problems to the owners of the Park of convenience, loss of income and amenity. The Nature Reserve Agreement under which the Park is managed provides for consultation over such problems within the following agreed framework.

In the steeper more wooded parts of the Park (the area to which Kilvert refers) all fallen wood is left in situ. In the grassland areas twigs and branches less than six inches in diameter may be removed by the owners but an exception is made in the case of lime because the beetle *Ernoporus caucasicus*, a Red Data Book 1 species, breeds in lime twigs. If fallen timber is felt by the owners to be obtrusive or causing inconvenience it may be moved to less sensitive locations. When this occurs timber is left in as long lengths as possible and is kept out of direct sunlight; this helps prevent rapid desiccation and consequent loss of value to invertebrates. Finally, compensation may be paid for loss of timber value or grazing.

Developing sources of nectar and pollen

.....the brown oaks and the brilliant green hawthorns...

Speight (1989) has observed that flowers are probably as critical to the survival of some saproxylic invertebrates as are the appropriate larval habitats in the rotting timber, because flowers provide the pollen and nectar on which the adults depend for food. Hawthorn is regarded as the most important early summer nectar source and many species of insects including saproxylic species appear to have life cycles adapted so that the peak of adult emergence coincides with the peak of hawthorn blossom (Kirby 1992).

Hawthorn trees were once frequent throughout the Park but almost all of those growing on the lower, more accessible ground, were grubbed out over the years 1964-1972 (NCC, 1990). Over the last few years 44 hawthorns have been planted in this area in order to restore what is an important element of the parkland habitat.

Reducing the intensity of grassland management

As we came down into the glades of the park the herds of deer were moving ...

The Park may at times in its history have been grazed only by deer, but latterly sheep, cattle and occasionally ponies have been grazed too and in the 1960s the more accessible parts of the Park were ploughed, slag and lime was applied and the grassland reseeded so that grazing intensity could be increased (NCC, 1990). Following this there were periodic applications of fertiliser, and nettles and thistles were sprayed with herbicide using tractor-mounted sprayers. It is believed that this intensification of agriculture within the Park over recent decades has had a particularly adverse effect on the lichen flora.

Woods (1989) comments on the changes that occurred in the lichen flora of the Park between 1968 and 1988, including both the apparent loss of 34 species and the apparent gain of 25 species. It seems clear that in part at least both the losses and the gains can be attributed to acidification through atmospheric pollution and to nutrient enrichment from agricultural sources. Species sensitive to acidification have disappeared and species favoured by acidic or enriched conditions have colonised.

With respect to local sources of pollution it seems highly probable that fertiliser, lime and herbicide applications in the Park have had an adverse effect on the lichens. Furthermore the enhanced productivity of the grassland encouraged the grazing of larger numbers of livestock leading to increases in ammonia levels and the probability of enhanced levels of nitrogen deposition. Accordingly a cessation of artificial inputs and a reduction in stocking levels has been negotiated through an amended Nature Reserve Agreement.

Infestations of thistles (particularly Creeping Thistle) and Nettles have seemingly followed on from the intensification of grassland management and increases in stocking levels. The control of these species is felt to be necessary both from an amenity and an agricultural point of view. Nettles have been spot sprayed, and since 1992 the Park has been extensively used as a trial site for the new generation of tractor mounted weedwipers such as the "Allman Eco-Wipe" (Bacon 1994) prototypes of which have been used here to very good effect for the control of Creeping Thistle.

In addition to the direct and indirect effects that agricultural intensification may have had on the lichen interest, there have also been potential or actual effects on other key elements of the nature conservation interest of the Park. Ploughing and reseeding will have reduced the incidence of herb species in the grassland. This may in turn have had some effect on the value of the grassland to the adult saproxylic invertebrates through the removal of potential pollen and nectar sources. Ploughing may also have damaged root systems and fungal mycorrhizas (Alexander and Green 1993) and depleted rare and uncommon species of fungi in the grassland; these species are now found only in the small areas of old grassland that persist on banks and dips inaccessible to the plough (E.E. Green pers. comm.). Indeed agricultural intensification may have had a detrimental effect on the trees themselves.

The low key management of the "improved" pasture within the Park and the conservation of the remaining areas of "unimproved" pasture are therefore regarded as important to the retention and enhancement of the value of the Park for lichens, invertebrates and fungi and to the well-being of the trees themselves.

Taking landscape design into account

No human hand set those oaks. They are 'the trees which the Lord hath planted'.

According to Rackham (1986) our great "wildwoods" passed away in prehistory and even if we accept Kilvert's speculation that the "king oak" of Moccas (now sadly gone) was 2000 years old, the link between this tree and the wildwood - the plantings of the Lord - is tenuous.

In order to establish a better understanding of the history and distribution of trees within the Park, English Nature commissioned a landscape survey (Phibbs 1993 a,b) which built on the work undertaken by Harding (1977). The survey detected groupings of trees, areas of more scattered distribution, open spaces and what appeared to be a series of drives, walkways and viewing points. Strong evidence emerged for regarding Moccas Park not as some randomly distributed assemblage of trees but as a designed landscape; the elements of this design are being taken into account in replanting work.

Nature and landscape conservation can both be accommodated at Moccas. Indeed Thomas Hearne, who painted the Park in its late eighteenth century heyday for the then owner Sir George Cornewall, shows a scene to delight the nature conservationist (Plate 1): in the foreground an ancient, hollow, stag-headed pollard together with a big fallen limb, and in the background, plenty of younger trees coming on. As Mabey (1980) remarks in his commentary on Francis Kilvert's description of Moccas, the features responsible for ecological importance and aesthetic appeal are not so very far removed from each other.

Conclusion

.... the king oak of Moccas Park, hollow and broken but still alive and vigorous in parts and actually pushing out new shoots and branches.

The long term future of the specialist saproxylic invertebrates, lichens and fungi of parks such as Moccas depends crucially on our ability to sustain significant numbers of old trees whilst suitable replacements are being brought on and the badly skewed age distribution comes into better balance. The prospects may at times appear bleak, particularly in view of the threat of pollution. But Kilvert's perceptive account should help to give us heart: there is indeed a surprising degree of vigour left in many of these old trees and they look set fair to stand waiting and watching, tiring us down and seeing us out for a good while yet.

Acknowledgments

English Nature is grateful to the Baunton Trust for the opportunity to become involved in the management of Moccas Park and to the late Richard Chester-Master and his family for their interest and support over the years. Paul Harding's report of 1977 remains an invaluable source of reference. Sam Davies has planted more than a thousand trees for NCC/EN since 1979; the tree surgery embarked on over recent years has been carried out by Mark Parsons. John Bacon, Jonathan Cooter, Ted Green, Paul Harding, James Marsden and Ray Woods kindly commented on an earlier version of this text.

I am grateful to Mr Edward Bulmer for the loan of the etching used to illustrate this article.

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Plate 1. "An oak in Moccas Park, Herefordshire"; an etching by Benjamin Pouncy after the watercolour by Thomas Hearne

Table 1. Moccas Park : Age classes and growth forms of trees in the open canopy parkland in 1976/77 (adapted from Harding 1977)

Species	Ancient		Overmature		Mature		Young	Sapling	Shrub	Bole only	Dead/Dying	Total
	Pollard	Maiden	Pollard	Maiden	Pollard	Maiden	Maiden					
Oak *(Q. robur and Q. petraea)*	55	6	20	105	2	246	4	33		2	22	495
Sweet Chestnut		1	5	37		41	2	7			2	95
Beech			4	20		10		2		8	5	49
Horse Chestnut				2		33	1				2	38
Field Maple				3		3			5	1		12
Ash	1			2		4				1	3	11
Alder					1							1
Elm											1	1
Lime *(T.x vulgaris)*						2						2
Hornbeam			1									1
Sycamore			1									1
Norway Maple				1								1
Walnut				1								1
Holm Oak				1								1
Turkey Oak										1		1
Other exotic hardwoods								13				13
Conifers						6		18				24
Hawthorn									11		3	14
Elder									2			2
Apple *(M. sylvestris)*									1			1
Total	56	7	31	172	3	345	7	73	19	13	38	764
Percent	8		27		46		1	10	2	2	5	

Notes: For age class definitions see Table 2. Harding comments that the distinction between maiden and pollard trees which have developed in open canopy situations and are overmature or ancient is frequently not clear, particularly with oaks; the same applies to Table 2.

Table 2. Moccas Park : Age classes and growth forms of the principal tree species in the closed canopy/bracken area in 1976/77 (adapted from Harding 1977)

Species	Ancient	Overmature		Mature		Young	Sapling	Dead/ Dying	Total
	Pollard	Pollard	Maiden	Pollard	Maiden				
Oak (*Q. robur and Q. petraea*)	2	4	23	45*	516*			3	593*
Sweet Chestnut	3	1	116		5			1	126
Beech		116*	21		65			1	203*
Horse Chestnut		2	56		8			3	69
Lime		10							10
Elm								5	5
Ash		1			1			2	4
Total	5	134*	216	45*	595*	0	0	15	1010*
Percent	0.5	35		63		0	0	1.5	

* denotes approximate figure

Note: The age class definitions used by Harding for the information summarised in Tables 1 and 2 were as follows:

Ancient Fully grown tree which has suffered extensive dieback with the majority of branches severely affected and where many branches have been lost and heart-rot has eroded much of the heartwood.

Overmature Fully grown but with dieback affecting a minority of branches, some of which may be completely dead, often with heart rot.

Mature Nearly or fully grown but with negligible or no dieback of branches.

Young Actively growing tree larger than sapling, but which is not fully grown.

Sapling Young tree actively growing but with a height of less than 20% of the presumed optimum for adjacent mature specimens.

Table 3. Moccas Park NNR : Trees individually planted and guarded against stock and deer by Nature Conservancy Council/English Nature in the open canopy parkland 1979-1995

Species	Number
Oak (*Q. robur and Q. petraea*)	413
Beech	23
Ash	44
Sweet Chestnut	15
Hornbeam	2
Lime sp	1
Lime (*T. x vulgaris*)	5
Field Maple	26
Hawthorn	44
Total	573

Table 4. Moccas Park NNR : Trees individually planted and guarded against stock and deer by Nature Conservancy Council/English Nature in the closed canopy/bracken area of the Park 1979-1995

Species	Number
Oak	267
Beech	33
Ash	37
Sweet Chestnut	2
Field Maple	7
Hawthorn	3
Total	349

Note Further trees have been planted within 7 small exclosures and the first of three one hectare natural regeneration areas has been created.

Specialist subject workshops

Current economic use

Chair: Mark Thomasin Foster, Country Landowners Association
Rapporteur: Andrew Sclater, Historic Landscape Consultant, Landskip and Prospect

In this workshop, the past and present uses of parkland were considered. It was acknowledged that the real need was an examination of future uses. Potential threats and opportunities, themes, priorities and possible sources of funding were identified.

1. Past uses

Why were parklands established? To accommodate such uses and interests as: Deer (for sporting and aesthetic reasons), other sporting interests, timber, aesthetic/historical value, personal and tutored vision, assertion of privilege.

The economic return from parklands was a secondary function, but retention of old trees was at least in part due to economic factors.

Although other direct economic benefits are difficult to quantify, in the context of the wider estate, parklands provided many local non-monetary benefits to both owners and locals. Some examples are: Cutting of fern (bracken), firewood rights, pannage for pigs, goodwill and cohesion of local society.

2. Present uses

These can encompass past uses, but might also include novel features (e.g. wildlife parks and other tourist attractions). The workshop identified a series of threats and opportunities:

Threats to the current economic uses of parklands (in no particular order):

- the outcome of right to roam debates;
- health and safety issues (trees, terrain, wetlands, livestock and so on);
- increasing capital values;
- climate change;
- return to arable or other intensive method of production;
- the lack of a system for assigning financial value to the amenity aspects;
- animal welfare issues (insofar as they threaten extensive grazing);
- economic change;
- BSE;
- CAP;

- changes in EU legislation;
- tree disease;
- taxation changes;
- tidiness;
- public attitudes;
- over-enthusiastic restoration;
- fragmentation of land tenure;
- dependence on treasury funds (making the parkland vulnerable to management driven by outside bodies);
- mineral extraction;
- development.

Many of these are inextricably linked.

Opportunities for affirming the social and scientific value of parklands were considered. The following were considered to be key elements:

- access (indicative of public benefit);
- "snob" value;
- altruism;
- Biodiversity Action Plans and similar initiatives;
- fostering goodwill/minimising misconceptions between public and owners;
- various grant schemes;
- education and awareness.

While grant schemes which are targeted specifically at historic parklands are limited, indirect benefits to parkland have been features of some more general schemes. For example the Integrated Administration and Control Scheme (IACS) prevents ploughing up of grass for arable crops.

Developing research into parklands would enhance their educational value.

The scope for specialised parkland products should also be recognised, e.g. coppice and other timber products, conservation grade meat, and seed of tree species (except where legal restrictions apply, as, for example, beech and oak).

Although these represent specialist forms of production, they were compatible with current policies favouring multiple land use and diversification. It was agreed that campaigns to raise awareness of the value of parklands would be valuable.

3. The future

The financial reality of farm productivity must be borne in mind. The following gross margins/ha (based on statistics in farm management handbooks) provide useful yardsticks which indicate the "opportunity cost" of deer production and conservation management in parkland.

Beef	£370
Sheep	£270
Deer	£210
Stewardship	£85
Woodland Management Scheme	£35

Consequently, as far as possible, the park should be managed as part of a larger holding, accommodating a mixture of uses. The parkland might benefit from cross-funding from other enterprises on the farm.

An owner's commitment to the role of custodian of a park may be enhanced by:

- an acknowledgement of moral responsibility;
- financial incentives (including long-term assurances such as forest plans);
- educational value of a site;
- owner's sense of pride in the place;
- interest in new dimensions arising from the results of research;
- re-interpretation of a site to the owner.

The workshop stressed the need for long-term flexible support. External expert advice was considered to be very important in helping interpret the complexity of schemes.

A key request was for a "one-stop-shop" for parkland support. This would, ideally, be in a modular form, and without overlap in scope between schemes. Clarity of advice and simplicity of application were important to take-up rates.

4. Research

The workshop identified the following research needs:

- tree health and edaphic factors;
- amenity value
- owner's needs and knowledge.

More information was needed on access (who wants to visit parklands and why?).

Better communication among experts, the public and owners/ managers was needed.

The workshop also thought that countryside advisers (such as FWAG, ESA officers etc) could be better briefed about the multidisciplinary and multi-layered constituents of parklands.

5. Management

In terms of site management, two issues were identified:

- making a return from public access,
- protection of single, or groups of, old trees in farmland as opposed to parkland.

(Recording and evaluation needs were incorporated into the discussions on other topics).

6. Conclusions

The workshop produced three conclusions:

1. The need for a "Parklands Forum" in which owners would be active.
2. The economic need to retain parklands as part of larger holdings.
3. The need for a "one-stop-shop" system of advice and financial support for parklands.

Tree health

Chair and Rapporteur : Mike Ashmore, Imperial College

The group initially discussed the problem of defining tree health, especially in the context of veteran trees, for which long-term dieback followed by recovery "retrenchment" is well documented as a natural part of the ageing process. It was agreed that it is important to understand current tree condition in a longer term context, and to develop methods of analysing evidence of historical changes in health. It is also important that the protection of populations and genotypes should not just apply to "current" veteran individuals but also the parkland trees of the future.

There were no experts on tree pathology in the group, possibly reflecting the limited national pool of field-based expertise; therefore, discussion focussed on abiotic stress factors and management issues. The group recognised that certain stress factors and management interventions have effects on tree health which are well established, whereas for others the effects are much more uncertain. Thus the recommendations from the group consider both the need for new research and the need to record, collate and disseminate existing information and advice.

1. Research issues

There is a need to identify stress factors of long-term importance for tree health, and potential interactions between them. Several areas which were identified and discussed in the group are listed below; however, this list is not exhaustive:

Drought - understanding of long-term effects and recovery processes, and of the possible impact of a greater frequency of severe droughts if climate change means longer and deeper droughts in the future.

Air pollution - epiphytes are most obviously affected but are there also effects on tree health? Is there evidence of tree health being more affected at sites close to urban areas?

Nutrient inputs - are there significant effects of local fertiliser applications or ammonia emissions?

Long-term effects of pollarding - does this lead to different responses to stress?

Mechanisms - we need a better understanding of the physiological mechanisms that relate both to recovery (e.g. compartmentalisation) and to links between stress factors (e.g. effects of drought and nutrient inputs on mycorrhizal function).

Timescales - a better understanding is needed of how the responses of veteran trees (which have clearly been able to cope with many stresses over their long lives) can inform us how new generations of trees will cope with both existing and new stresses, such as climate change.

2. Recording and evaluation

Photographic records are of great importance in identifying long-term changes in tree health. The availability and use of historical records should be explored, while plans should be developed to take photographs of veteran trees from fixed points at regular intervals so that a basis is developed for analysing long-term changes in health. The value of digital and aerial photography should be explored further.

There is a need to develop a systematic national record of the health of veteran trees, using a standard assessment procedure which needs to be simple and cheap. Information obtained should be assembled in a national database with easy access, and the potential to be linked to other national databases, such as those on climate or air quality, to test hypotheses about key stress factors.

3. Management guidance

A wealth of experience exists already, but there is a need to systematise and collate the experience of factors influencing tree health and of effective management intervention. There is scope for development of an expert system/decision support system, which could provide support for judgements on the need for management intervention. The group recognised the need to avoid broad prescriptive guidelines, and that the most effective guidance will be species- and site - specific. The group also recognised that there should be a presumption against the management of veteran trees.

4. Perception

Public understanding of the biological diversity of trees not in 'perfect health' is lacking and the perception that "old" means "sick" needs to be tackled. We need to consider how we get over the message that dead and dying wood is a nationally significant resource. The public's perception of parkland trees must include the context of the long times over which trees develop and age, going through times of retrenchment and recovery.

Safety & legislation

Chair: Alan Woods, Country Landowners Association
Rapporteur: Caroline Davis, Arboricultural Association

1. Research

1.1. There is a need to pull together work on hazard/defect identification, risk assessment (hazards in relation to public use, using health and safety legislation approach) and precautions to develop a standard decision-making process for safety and trees.

1.2. Public perception of the values of veteran trees needs to be established and the risks associated with them identified and put into perspective for public and others.

1.3. A critical review of incidents involving trees and the public (MSc thesis?) is needed, to include analysis of the number of incidents in relation to visitor numbers and impacts.

1.4. Under what circumstances does dead wood fail? What makes the dead limb that has been on a tree for 20 years fail (this leads to a climate/access/failure study)?

1.5. From 1.4 - in what circumstances should access to veteran trees be managed actively?

2. Recording and evaluation

To establish site specific patterns of failure as a basis for taking and defending management decisions.

2.1. Recording failure events (Trees/veteran trees):

Ideally species, weather conditions, size of limb, defect and other variables should be entered into a custom-made standardised database along with:

2.2. Recording incidents relative to site usage - numbers, types of activities in vicinity of sites of veteran trees.

3. Site and tree management

3.1. Owners should develop tree safety policies (with veteran trees as a sub-category)

3.2. Work is needed to collate existing policies and practices as models of good practice for owners and managers to adapt to their own circumstances.

4. Information needs

4.1. Distil principles of best practice of management of trees and sites for all owners, tree managers/ practitioners, so each can apply according to their needs.

4.2. Public information- the public need to recognise risks of veteran trees, take responsibility for actions on a par with acceptance of risk as in other outdoor pursuits. We need to get this message across to achieve a more equitable balance of responsibility between owners and the public.

Invertebrates

Chair: Adrian Fowles, Countryside Council for Wales
Rapporteur: Helen Read, Corporation of London

1. Research needs

1.1. The European status of many UK species of saproxylic invertebrates is unknown and international criteria may not apply. In an EU report[1], Speight showed that the UK's saproxylic invertebrates were poorly represented in terms of international protection. Only eight species found in the UK were listed. In order to achieve better representation of the threatened invertebrates in dead and dying timber in the UK, better communication with continental European and Irish entomologists is needed.

1.2. Greater communication would make more historical information (and data on sub fossils) available. This in turn would give pointers on how to manage for saproxylic invertebrates today, with climate change and habitat destruction as potential stressors.

1.3. In the UK, regional evaluations are biassed towards the south and east of England. More surveys in northern and western areas are needed. For all evaluations there is a need to integrate and coordinate sampling approach.

1.4. Need to put together lots of disparate information using a database. The database should include details of management practices. In addition, there is an urgent need for an inventory of sites managed or under the protection of the statutory agencies (EN/SNH/CCW/DoE(NI)/CoCo/EH). The inventories should, amongst other details, include aerial photographs and details of individual trees and their various significances. The VTI could help here.

1.5. Are there other good sites, as yet unknown, and possibly under threat?

1.6. Surveys are needed of isolated trees/hedgerows/urban trees to see how widespread some saproxylic species are outside their more conventional habitats of parklands and pasture-woodlands. We need to look outside the usual habitats in order to fully evaluate their importance.

1.7. Improve understanding of the ecology of invertebrate species and communities within dead and dying timber. We particularly need to know more about population dynamics and especially dispersal and the existence (or not) of metapopulations.

Keith Alexander's (unpublished) *An annotated checklist of the invertebrates of living & decaying timber in Britain & Ireland* is a good start in pulling together what natural history we know about these animals but much more will be needed.

1.8. Funding research on saproxylic invertebrates has proved difficult. The agencies do not have enough money and the research councils do not have the inclination, except perhaps where research can unravel the usefulness of saproxylics as indicator species and sources of genetic material of use to the timber treatment industry. Evaluation of

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[1] Speight M. C. D. 1989. *Saproxylic invertebrates and their conservation*. Nature & Environment series No.42. Strasbourg: Council of Europe.

methods of sampling saproxylic invertebrates could be part of such research projects. The timber treatment industry is a potential source of funding for a wide range of projects on wood boring beetles (and fungi that rot wood). There is a need to influence decision makers in the research councils.

1.9. The group noted that the UK is obliged to monitor stag beetle and violet click beetle under the Habitats Directive. However, no-one knows how to do this.

2. Site management

2.1 Does creative conservation work? Are artificial rot holes, artificial rotten trees etc successful in attracting invertebrates? Does "damaging" trees create conditions which benefit invertebrates?

2.2 We need a much greater understanding of tree decay processes and how these relate to saproxylic invertebrates.

2.3 Standard management recommendations (e.g. need for abundant pollen sources): How important are they? Some sites with few flowering shrubs have good faunas.

3. Survey work

The workshop noted that the Habitat Action Plan for Lowland Wood-pastures and Parkland set a target to "undertake a comprehensive survey of parkland and wood-pastures and their dependent organisms... by 2004" (Section 5.5). Given that there are 2500 parks on the Countryside Commission's inventory alone, this equates to at least 500 surveys and evaluations per year! The group noted the impracticality of this statement.

4. Evaluation of sites

Keith Alexander's annotated list will need to be reviewed and published.

Evaluation will not always help protection (some high scoring sites are not SSSIs).

Financial stimulus is often a good way to ensure good management.

Guidelines for SSSI selection: There are currently none for parkland sites but a high number of old trees should be a criteria in own right. This gap was included in an earlier draft of the HAP but not in the current one.

For proper evaluation we urgently need more information about species presence/absence.

5. Promotion

VTI has gone some way towards promoting saproxylic invertebrates in veteran trees.

The group recognised that choosing and targeting audiences with care was important and that the priorities were to target land managers and to integrate the needs of invertebrates with other parkland issues.

A slow drip feed of information is the most appropriate (this was echoed by Sue Ellis - see Publicity, Awareness & Education).

6. Conclusions

Conservation and management of saproxylic invertebrates presents huge problems and we need to target and coordinate efforts. Significant progress has been made already. There is much greater awareness of invertebrates and, in particular, saproxylic invertebrates now than a decade ago. The next 100 years will be crucial in bridging the current generation gap between old trees and the next generation. Once we have solved this problem the future of saproxylic invertebrates will be more secure.

Epiphytes

Chair: Ray Woods, Countryside Council for Wales
Rapporteur: Neil Sanderson, Hampshire Wildlife Trust

This report concentrates on lichens, as bryophyte interests were not well represented at the workshop.

1. Recording and evaluation

1.1. Interchange of information between specialists and non-specialists would be useful but there are many problems:

Species name changes are common and lead to much confusion;

Interpretation of records is often difficult but is nevertheless essential, and any information on conservation/community/history/habitat/pollution is useful.

There are few lichen experts but lichens are much easier to survey than many other old tree specialists; they do not hide!

1.2. The British Lichen Society (BLS) has a database on ancient woodland and old trees. This is now out of date, partly because there are now too many sites to be handled on a national basis and perhaps a regional split will be necessary.

Evaluation methods are to be re-examined.

Site definitions, particularly for site complexes, to be reassessed - areas with little fragmentation are particularly important. Lichenologists have problems with splits between upland/lowland pasture woodland and parkland and forest/commons. Many valued species of pasture-woodland use open woodland but their distributions do not reflect the upland/lowland split.

1.3. There is a need to evaluate the lichens in 'savanna' elements of sites. This has not yet been tackled. The "dung and dust" lichens and bryophytes need much more survey and evaluation.

2. Site management

2.1. A lichen habitat management handbook is being produced by the BLS.

2.2. Existing trees: continuity, light and degree of shelter are all important for promoting lichens. Conflicts include: Loss of hard, well lit deadwood which is valuable to lichens but not regarded as good habitat for other saproxylic taxa; ivy overgrowth is a major threat where grazing pressure is low.

2.3. New trees: plant or rely on natural regeneration as appropriate.

2.4. Pasture management:

Internal pollution by too much ammonia, plus bark rubbing and bark eating - all present threats to epiphytes especially in parkland rather than other pasture-woodland types.

Lowest practical input is usually the best practical solution.

2.5. Other issues:

External pollution: Here there is some potential for protection by screening.

The danger of "opening up" trees too hastily.

3. Research needs

3.1. Population dynamics (particularly turnover, recruitment, colonisation distances).

3.2. Impact of atmospheric pollutants. We know much more about the effects of SOXs than NOX, NH4 and ozone.

3.3. Phytosociology of epiphytes is quite well known but has not been comprehensively covered in the same way that flowering plants and ground layer bryophytes are covered by the National Vegetation Classification. Particular gaps occur in the Lobarion and sub - Atlantic bryophyte dominated communities and there is a need to bring bryologists and lichenologists together.

3.4. Genome conservation (no *ex situ* conservation is possible at present).

3.5. Little appreciation of intra-specific variation.

4. Awareness and education

Problems with public appreciation of epiphytes arise for several reasons such as:

4.1. Few specialists and even fewer who can translate their skills to a wide public audience.

4.2. Name changes, and the general lack of English names. If the latter are required, perhaps we can be more imaginative. Literal translations of scientific names are not usually very appealing.

4.3. Lack of interpretation for site managers.

Ways forward:

4.4. Operate publicity for epiphytes on the backs of more 'sexy' taxa such as birds and beetles which also need old trees. Pollution effects have been effectively put over.

4.5. No effective existing *ex situ* conservation possible. Must conserve *in situ* until the technology becomes available.

4.6. Large numbers of lichen species seem to exist at very low population sizes and may require very extensive areas of pasture-woodland in order to survive. We need to research how they persist in this apparently parlous state.

Fungi

Chair: Alan Rayner, British Mycological Society
Rapporteur: David Clayden, English Nature

1. Research

Fungi are vital components of natural ecosystems with roles in nutrient cycling, disease, symbiotic partnerships. They are the "behind the scenes" infrastructure. There are many unresolved issues concerning the relationships between fungi and other organisms and the influence of environmental factors on these relations.

Parklands are no exception and provide a setting for much future research including: the effect of fertilisers, pesticides etc., mycorrhizal rôles in habitat restoration, and the role of fungi in decay processes.

2. Recording and evaluation

It is important to have continuous monitoring of fungal species presence. They can be indicators of habitat diversity and change respectively.

"Rarity" - how important is it? How meaningful are fungal species lists? We need to look at using "indicator" species rather than long lists in order to show habitat change

"Patterns" and "processes" are probably as important as fungal lists; presence or absence of fruit bodies can be misleading.

Fungi are generally seen as an esoteric subject which attracts people who enjoy the obscurity of their subject, and who may therefore not be the best "popularisers".

3. Site and tree management issues

The sensitivity of fungi to site and tree management needs to be emphasised. The nature of a tree as a fungal community and the need to work **with** trees, with that understanding in mind, are important concepts if we are to understand the rôle of fungi in pruning wounds, pollarding, environmental stress etc.

Fungi are part and parcel of the process of tree development and a tree's form partly reflects these historical processes. The fungi act in this way as "landscape architects". There are potential conflicts of retaining these forms of "tree landscaping" and Health and Safety.

4. Information needs

Education needs include strengthening efforts to improve public (adult) awareness of fungal rôles (through both the arts and sciences) through the media, accessible publications, awareness "holidays/courses", more input to forestry courses etc. We need to find a media personality who can popularise fungi. There is a latent public interest (e.g. fungal forays) which needs to be captured. The recycling of resources by fungi may be a key message here.

It is not just what fungi are, or how many or how rare, but what they do that needs to be appreciated.