

# Reintroducing stock grazing to Savernake Forest: a feasibility study

No. 224 - English Nature Research Reports



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**Reintroducing stock grazing to Savernake Forest:  
a feasibility study**

English Nature Research Report No. 224

January 1997

Commissioned by English Nature from

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## **PREFACE**

Lowland wood pasture has been identified as a Key Habitat within the Biodiversity Action Plan. Britain (and England in particular) has a special responsibility for this habitat since the large old trees that are associated with wood pasture systems are rare on a European scale.

Grazing played a crucial role in the development and survival of the species associated with wood pasture. Hence one aim of the forthcoming national costed Action Plan will be to restore grazing to selected sites. How best to do this is not clear, because there are very few places where it has been tried. Equally we cannot be certain precisely which species will benefit from grazing restoration at any particular site (although the risk seems worth taking in places). Therefore, as well as trials to establish the practicalities of wood pasture monitoring, we need careful monitoring of such trials to show how the expected benefits can be achieved.

Savernake Forest provides an opportunity both to trial and monitor restoration. Management is needed to restore and maintain open space around the trees and to sustain the remaining grassland patches. Grazing can provide a way of achieving these goals in a sustainable way. Savernake is large enough for a sufficient area to be put into a grazing trial without compromising the interest of the site as a whole. In addition, it is managed by Forest Enterprise who are committed to maintaining and enhancing the nature conservation value of their holdings as part of their contribution to the UK Biodiversity Action Plan process.

Consequently English Nature commissioned this feasibility study, with a view to producing a trial that would be both beneficial to the management of Savernake Forest itself and helpful in guiding others who are contemplating wood pasture restoration. We believe that the following report meets these aims.

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## **1 SUMMARY**

- 1.1 The report presents the results of a feasibility study into the introduction of stock grazing into former wood pasture in the Savernake Forest SSSI in Wiltshire. The study has been commissioned by English Nature and was recommended in a Management Plan produced for the Forest by Forest Enterprise after discussions between English Nature and Forest Enterprise.
- 1.2 The wildlife interest of the Forest is reviewed in the context of likely effects of grazing on key species, especially those associated with ancient trees and other components of the wood pasture habitat. Grazing is known to benefit some important groups and harm a few others, but the response of the majority of species is unknown. Grazing is therefore judged to be useful and even essential for some species, but must take place as a well-designed and carefully monitored trial.
- 1.3 Results of other studies suggest that grazing should be extensive at low intensity. Local history and experience elsewhere point to cattle as a preferred stock species, although other domestic stock could be considered if necessary.
- 1.4 Potential impacts on and benefits to access to the Forest, silvicultural operations and other estate activities are then reviewed. In combination with husbandry and ecological factors, this has been used to select the size and position of the best area in which to carry out a grazing trial.
- 1.5 Two options for the provision of grazing stock have been explored, and likely costs of these options with the infrastructure needed to set the trial up have been estimated.
- 1.6 Preliminary options for a monitoring system are also discussed but it is recommended that the monitoring system is designed specifically for the site after a joint visit by the appropriate specialists.





## 2 INTRODUCTION

- 2.1 The feasibility study described in this report arose from a growing awareness of the need for appropriate management of ancient wood pastures in Britain (Kirby *et al* 1995). This follows growing national and international recognition of the nature conservation value of such areas, culminating in their designation as a Key Habitat in the UK Biodiversity Action Plan (Biodiversity Steering Group 1995).
- 2.2 The unique feature of wood pastures as a habitat is their preservation of animals, plants and other organisms which require a very long continuity of habitat provided by ancient trees. Such organisms include those which live on branches and twigs (e.g. epiphytic lichens and the animals which graze them), those associated directly with dead wood macrofungi, and a great variety of other "saproxylic" species which are associated with dead wood and/or the habitat architecture of ancient trees.
- 2.3 Suitable habitats for these species are common in the few temperate-zone remnants of virgin forest. In most of Europe, however, virtually all trees have been managed for centuries or even millennia. Trees in woodland are harvested too soon to allow the best habitats to develop and be colonised. In contrast, wood pasture trees had to be harvested well out of reach of the grazing and browsing animals which shared the land (Rackham 1976). This leaves a bole on a tree which can live at least as long as trees in natural forest, putting out new branches which are in turn harvested from the pollard. Even when not harvested, trees growing in the open conditions of parkland develop suitable microhabitats for some scarce organisms while the straight and shaded boles desired for timber crops do not.
- 2.4 "Traditional" wood pasture is also likely to have contained a mosaic of other habitats besides the ancient trees. Depending on the soil and the grazing intensity, these would have included scrub patches, bracken and tall herb and grassland areas with both close-cropped and taller parts. Such a mixture of habitats supports a great range of other species not dependent on ancient trees, but valuable in their own right.
- 2.5 Habitat mosaics such as this are now very rare: most former wood pastures have been planted or allowed to grow into high forest, or have been reduced to more formal parklands where the ancient trees stand amongst improved or semi-improved pasture. The greatest extent of wood pasture mosaics in lowland Britain is in the New Forest, although even here 19th and 20th century enclosure has tended to produce areas which are either heavily grazed heathlands and lawns or ungrazed enclosures (Tubbs 1986). Here however, the benefits of light grazing pressure have been unequivocally demonstrated for one important taxonomic group, the epiphytic lichens (Chatters & Sanderson 1994), due to the increased light levels reaching into the canopy and to the trunks of ancient trees.
- 2.6 Knowledge about the effects of grazing on other groups is restricted to anecdotal evidence. Within these limits, an opinion has grown that removing young trees likely to overtop ancient individuals, combined with light grazing, should benefit a wide range of the species of value. This has been or is being put into practice in several

sites, the longest running trial being that carried out by the Corporation of London at Burnham Beeches (Read 1994). Unfortunately, only a small area of wood-pasture has been available at Burnham Beeches, and although the results have been monitored there are too few of the critical species present to be sure of the results. Also, it has not been possible to find a suitable control area to compare with the grazed areas.

- 2.7 Other trials of grazing in ancient wood-pasture have not started yet or have not been monitored, despite the considerable interest amongst conservation groups in doing so. In these circumstances it is important to conduct a properly designed trial in an area where enough of value survives to be able to assess the results. At the same time the area needs to be big enough to organise a proper control and ensure that not all the area suitable for potentially vulnerable species is included.
- 2.8 On account of its size, status and the extent of prior knowledge of its fauna and flora, the former Royal Forest and Site of Special Scientific Interest of Savernake appears to be a good candidate for such a trial. Indeed, the Forest is almost unique in lowland Britain in combining the above features with a good range of surviving wood pasture fauna and flora and a landholding not complicated by commoners rights or multiple ownership.
- 2.9 Discussions between English Nature and Forest Enterprise over the future management of the Forest's wildlife interest resulted in the production of a Management Plan (Stern 1991) by Wiltshire and Avon Forest District. This Management Plan recommended a feasibility study into reintroducing grazing into the former wood pasture. Accordingly, English Nature commissioned the study reported here, to progress plans to the point where potential trial areas could be identified and the practical issues of organising grazing and its monitoring were worked out. This includes an assessment of any potential effects of the trial on the wider environment of the Forest and its use for forestry and by the public.
- 2.10 The report starts with an examination of the baseline conditions with regard to the flora and fauna of interest and the likely effects of grazing. Different options are then explored for grazing species, source of animals and choice of areas to minimise impacts on other uses of the Forest while choosing the most appropriate areas for nature conservation reasons. The preferred option is then examined in greater detail and approximate costings given.

### **3 EVALUATION AND OBJECTIVES**

This section examines the inventory of the wildlife of interest in the Forest and, where possible, its likely response to grazing. Its purpose is not to re-evaluate the SSSI or to review the justification for grazing in former wood-pasture in general. The choice of what sort of place to reintroduce grazing, how to do it and what ought to be monitored depends on the fauna and flora known to be present, their distribution and likely responses to grazing. These factors are therefore given a brief review to form a foundation for the practical choices discussed later in this report.

In general the effects of grazing are to open out a forest structure, allowing more light to reach the lower canopy and ground layer and producing a drier microclimate. Most woody plant regeneration is selected by grazing animals and hence prevented. Likewise ground flora species are selectively grazed. In the longer term individual young trees remaining are more likely to take on a much-branched, open-grown form rather than straight single trunks of timber. The lives of ancient trees are likely to be prolonged through the prevention of new regeneration which overtops them, but this can be achieved by other means than grazing.

#### **3.1 Features of value and likely effects of grazing**

The SSSI schedule for Savernake Forest (Appendix 1) pays special attention to the following features which might be affected by grazing:

- Relics of the ancient wood pasture, represented by the distinctive open crowned specimens of sessile and pedunculate oak, with other semi-natural structure represented by 18th and 19th century plantations of beech and oak.
- Woodland bryophytes and an outstanding lichen flora, including rare and restricted epiphytic species.
- Exceptional diversity of fungi associated with woodland continuity and the abundance of dead wood.
- Rich fauna of dead wood invertebrates particularly those associated with old beech.
- Woodland vascular (higher plant) flora including over 50 indicator species of ancient woodlands (AWVIs).
- Smaller areas of remnant grassland, including chalk grasslands, acid and neutral grasslands and chalk heath.
- Bird and mammal fauna including species dependent on old trees (e.g. redstart, woodpeckers and bats) and coppice (dormice).

### 3.1.1 Birds and other vertebrates

In the very long term, extended continuity of ancient trees in a grazed wood pasture will benefit all hole nesting or roosting species. In the short term, the species present to benefit most will probably be the green woodpecker and bats through additional foraging habitat diversity. Most other species would be affected less strongly, although suitable habitat for barn owls (e.g.) may be created. By contrast, dormice and other coppice specialists risk significant harm from any grazing or browsing which significantly reduces the shrub layer.

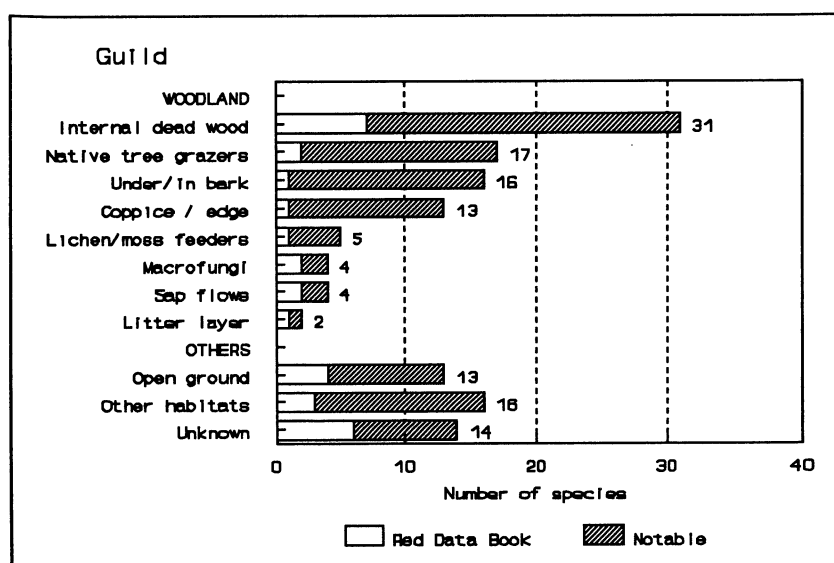
### 3.1.2 Invertebrates

The invertebrate fauna of a large and varied woodland in southern England such as Savernake is likely to comprise 5000 or more species. Understanding the ecology of each and all would be an impossible task, and pointless for the present study for the commoner species. Analysis is therefore restricted to Red Data Book (rare) and Notable (scarce) species, with especial attention to those dependent on woodland.

For this purpose, faunal records accumulated up to 1992 as supplied to Bioscan from the Invertebrate Site Register have been divided into guilds, functional units within which a relatively homogeneous response to grazing might be expected. Figure 1 shows the guild composition of the 135 species recorded up to 1992.

Guilds likely to derive direct benefit from grazing can be expected to be open ground species, feeders on epiphytic lichens and mosses (see below) and those grazers on native tree foliage which depend on a healthy foliage growth combined with the physical structure of ancient trees (a significant proportion of the scarce and rare tree grazer species). Coppice and edge species would also be benefitted by light, but not heavy, grazing.

**Figure 1: Guild distribution of scarce and rare invertebrates from Savernake Forest**



The response of other groups is much less predictable. Presumably those which like drier microclimates, or use open habitats for adult foraging, among the internal dead wood feeders, bark associates and macrofungus feeders would be benefitted. In the longer term many others would benefit simply from the improved continuity of wood pasture. In the short term however, many species requiring shady or damp conditions may risk harm. Only in a very few cases is the ecology of rare species known well enough to judge this.

In effect, only between a quarter and a third of the scarce and rare invertebrate fauna of Savernake can be expected to benefit directly from grazing: the response of the remainder is unknown but contains at least some species which may be harmed.

### 3.1.3 Higher plants

A definitive list of higher plants for Savernake Forest does not appear to be readily available: several lists have been used which include some records of uncertain date or status. The overall number of errors is probably small however, and the following is likely to give an accurate picture of the main foci of interest: nationally scarce or rare species or those which indicate habitats of ecological value which might respond to grazing. In practice all the nationally scarce species cited in the SSSI notification (and hence records assumed to be recent and reliable) are also indicators. A few further scarce species are recorded as single individuals such as *Thalictrum minus* and *Genista anglica*.

Three sets of indicator species have been examined: Hornby and Rose's (1986) list of indicators of ancient semi-natural woodland (AWVIs), a draft English Nature list of calcicolous grassland indicators and Rowell and Robertson's (1994) draft list of indicator species of unimproved mesotrophic (neutral) grassland. No up-to date list of acid grassland indicators is available. Overlaps between these categories do occur: the overlaps between grassland and AWVI indicators show species which occur in woodlands but also in ancient grassland and might be particularly "wood-pasture" species.

The records include 58 AWVIs. Nine are trees or major shrubs which by their nature can probably survive grazing unless actively removed, although regeneration may suffer. They include sessile oak, one of the important "ancient tree" species.

Nine more AWVIs are also grassland indicators. These are the nearest to "wood-pasture indicators" which can be derived. It should be noted however that one (meadow saffron *Colchicum autumnale*) is toxic to grazing stock and its Savernake range should therefore be avoided for stock grazing while the plant is in leaf (approximately March to June inclusive).

The remaining 40 AWVIs are ground flora species which may be sensitive to grazing, i.e. they are typical of ancient shaded habitats but not grasslands. Some may be merely shade-requiring and also tolerate grazing.

The remaining indicator species show the dominance of neutral/acid conditions with only a few calcareous grassland indicators. The balance is three calcareous indicators against five species shared between neutral and calcareous grasslands, and 23 more which are indicators of neutral grasslands only and not AWWIs.

All 40 unimproved grassland indicators might be expected to benefit from grazing.

#### **3.1.4 Bryophytes and lichens**

The epiphytic lower plant and lichen flora has been demonstrated to benefit from the increased light through the canopy which results from grazing (Chatters & Sanderson 1992). The lichen flora in particular, with ancient tree and oceanic species such as *Lobaria pulmonaria* with the national rarity *Caloplaca herbicida* surviving towards the eastern end of their range since the Industrial Revolution, has generated much of the momentum for reintroducing grazing to old wood pastures. Many of the more demanding species do not appear to have been in reproductive condition in recent years.

Despite this the flora includes terrestrial bryophytes of interest which might be sensitive to overgrazing. As a whole, the lichen flora of greatest nature conservation interest should be benefitted, but the response of the bryophyte flora is less certain.

#### **3.1.5 Fungi**

Although the outstanding fungal flora of Savernake includes grassland species of interest (including many in the genus *Hygrocybe* - Storey 1988), it is the woodland fungi which have the greatest range of species and the greatest numbers of scarce species. Each type of woodland supports a distinctive assemblage, with the most important being associated with beech woodland on chalk and clay-with-flints.

The responses of the great majority of fungi to grazing are completely unknown, whether to the more direct effects of trampling or to more indirect effects of changes in nutrient cycling, water regimes or microclimate.

#### **3.1.6 Summary - potential effects of grazing**

There is a substantial minority (in terms of numbers of priority species of interest) of the fauna and flora of Savernake Forest which should benefit from the reintroduction of grazing. This alone makes the reintroduction of a grazing trial worthwhile and even necessary for the long-term survival of some species. In the absence of grazing, in the worst case some species may be lost eventually and in the best case there will need to be a continued input of resources through activities such as scrub and young tree clearance. Benefits may be wider (Harding and Rose 1986) but there is no certain evidence for this.

A few species will certainly be harmed by grazing or have the potential to harm grazing animals and more are likely to be indifferent to its effects. However the

largest single group of scarce and rare species contains those whose response to grazing is completely unknown.

The above means that grazing should be carried out as a monitored trial and carefully designed to avoid changes to the whole local range of potentially sensitive species. Clearly species will differ in their tolerance to grazing: more potentially sensitive species would be able to tolerate a light grazing regime than close cropping.

### **3.2 Distribution of interest**

Available information on the distribution of interest is summarised in Figure 1. This shows the main areas for dead-wood (saproxylic) invertebrates and epiphytic lichens.

### **3.3 Nature conservation objectives**

The single objective of grazing is to maximise its benefits while minimising ecological or other costs or risks. From the above, the following targets are identified.

- 3.3.1 Graze a sufficient area to benefit a significant proportion of the areas of interest.
- 3.3.2 Nevertheless, leave a substantial proportion of the area known to be of quality ungrazed , at least until the effects of grazing are understood.
- 3.3.3 Within the grazed area, the aim should be to produce a mosaic including the ancient trees, shrub and edge habitats, lightly grazed grassland and a few close-grazed patches.
- 3.3.4 Avoid grazing particular single locations of species likely to be at risk from grazing.
- 3.3.5 Given the very poor state of knowledge of the effects of grazing on the majority of the flora and fauna, proper monitoring of the grazing trial is essential.
- 3.3.6 Start grazing at a low intensity and increase later if required to minimise any risk of harm from overgrazing.





## 4 IMPACT ASSESSMENT AND MEANS OF ACHIEVING OBJECTIVES

This section examines the constraints and benefits associated with grazing, after assessing current knowledge on the best way to carry out grazing to achieve the nature conservation objectives set out above.

### 4.1 Species of grazing animal

The fauna and flora seen in wood-pastures and former wood pastures today are the survivors of a series of "filters" applied since a time when human influence on the wildwood was negligible. Those species we see today are the ones which have been able to survive the operation of all these filters. Most surviving wood pastures are for instance much more open than the wildwood is likely to have been, making dispersal of saproxylic invertebrates between trees more difficult. However, open grown and pollard trees may live much longer than wildwood individuals: in combination these factors produce the fauna seen today.

As far as possible, it is worth attempting to reproduce the conditions which allowed the interest of Savernake to survive. While it is impossible to replicate the conditions of the past, which would have changed from time-to-time anyway, the species of stock used should at least try to match a "traditional" use.

It is unlikely that any "traditional" wood pasture was grazed or browsed by a single species of animal. Further, the focus will have shifted over centuries, depending on economics and the status of land. The few surviving wood pastures which are grazed, except for parklands where the ancient trees stand isolated in a sea of improved or semi-improved grassland, are grazed by mixed stock. Any reconstruction of the past is partly speculative, but the following changes in emphasis among the large herbivores are almost certain to have occurred (Kirby *et al* 1995):

**Wildwood:** dominated by red deer, roe deer, aurochs (wild cattle) and wild pig.

**Mediaeval:** dominated in Forests by red, roe and/or later fallow deer, with a variable amount of domestic stock probably including cattle, ponies, seasonally pigs, and perhaps sheep and goats. Wild pigs quickly became unimportant and had disappeared altogether from England by early post-mediaeval times.

**Post-mediaeval:**  
Severe decline in red deer. Except in parks, decline in all deer and except on commons, a general decline in grazing in woods.

**Modern:** Resurgence of fallow and roe deer as wild or feral animals, with the addition of muntjac. Domestic stock, even in the largest areas such as the New Forest, usually confined to cattle and ponies.

Savernake in particular was a royal Forest with a main purpose the production of deer for meat and sport. The extent to which domestic stock were permitted is unknown. The Royal Forest passed into private hands in the 16th century and from this time until major plantings started in the 18th century is likely to have been used by domestic stock as well as deer. Before the 20th century, any area is likely to have had horses or ponies grazing at some stage but there is no record from Savernake of equids being important, unlike areas such as the New Forest and Exmoor where free-ranging ponies survive today. Likewise there are no post-mediaeval records of pigs being kept or turned out for mast.

Unless major efforts are made to keep them out, deer (here roe, fallow and some muntjac) will enter in any case, at the density they are controlled to in the rest of the Forest. There is therefore no point in trying to impose artificial levels of deer activity. The remaining, domestic, species have the following characteristics in relation to Savernake.

**Cattle** As likely as any domestic species to be a "traditional" member of the Forest fauna. There is a variety of breeds potentially hardy enough for forest grazing and browsing. They do both so are capable of helping to open the shrub layer as well as generate and maintain grass swards. Husbandry needs are however greater than sheep, for example.

- Priority species to use.

**Equid** Horses and/or ponies alone need careful control to avoid overgrazing. There is a lot of experience with their effects in modern wood-pasture but no record of their having been a traditional member of the grazing fauna in Savernake.

- Possible alternative or addition to cattle if suitable stock could be found.

**Pigs** In wood-pasture, need careful control on timing, for instance let in intermittently to feed on mast. Their effects in Britain are virtually unknown because it is so long since pigs have regularly been run in woodland outside the New Forest, with the exception of the small scale trial at Burnham Beeches. In view of the known amount of physical effect they have, it would be better to conduct a trial in a less sensitive area than the Savernake SSSI.

- Not recommended.

**Other** Sheep and goats, especially the former, are often used in nature management. Only a limited number of sheep breeds can cope with woodland or are likely to browse significantly. There is no record of either species being used in Savernake in the past.

- Not recommended but could be reconsidered if cattle or equids prove impossible to obtain.

## 4.2 Grazing intensity and season

Wood pasture grazing by tradition was extensive: i.e. animals were free to roam over a large area. Where the effects of different grazing intensity have been studied, in the New Forest, it appears that only very light grazing over as wide an area as possible will succeed in producing the desired mosaic of habitats (Chatters and Sanderson 1994). In view of the possibility that some key species could be adversely affected, it would be wisest to start with very light grazing and increase the density of animals later if monitoring results suggested this was advisable. Starting with a high grazing intensity and reducing it if necessary would risk damage which would be difficult to reverse.

Likewise, traditional systems of extensive grazing are likely to have used continuous grazing without a seasonal rest except in very hard weather. Grazing in Savernake should aim to mimic this, but a winter rest may prove necessary to avoid poaching or the need to provide supplementary feed. Either could cause ecological damage.

## 4.3 Numbers and type of stock

Continuing to follow the rules of attempting to mimic traditional systems, the ideal herd structure would mimic that found in nature or very extensive free-range systems (containing e.g. bulls, young animals cows and calves). Unfortunately this is unlikely to be possible in modern husbandry conditions (below). It is probably more important, and also feasible, to use sufficient numbers of beasts for them to behave as a normal social unit rather than as separate individuals. As few as three sheep can do this in some circumstances (Gibson *et al* 1987) but more animals than this would be desirable.

## 4.4 Size and position of trial area (s)

From the above it is clear that a relatively large area is needed. Chatters and Sanderson (1992) suggested a minimum of 30ha. This would only just allow sufficient cattle, for example, to be grazed as an extensive herd and must be regarded as an absolute minimum.

The advantage of Savernake Forest is that a continuous area of even twice this size need still only cover a small proportion of the areas with key wood pasture interest. This would allow approximately 10-12 animals over the whole area, depending on the breed chosen but assuming the use of young beef animals. Other than the distribution of interest shown on Figure 1, there is therefore little ecological constraint on the position of the area.

Ideally such a trial should be replicated. This would produce logistical difficulties of fragmentation, access and fencing (below) to the extent that a trial might not be carried out at all. In such circumstances it is better to take the practical choice and set up a single trial in the hope that it will become replicated by others in different forests, or even at a later stage within Savernake itself.



## **5 CONSTRAINTS**

### **5.1 Impacts on silvicultural management**

Grazing in the manner proposed must be regarded as incompatible with plantation crop production. The point is to open out the canopy and generate a habitat mosaic which leaves room for only scattered areas of traditional tree crop. Such areas are likely to be regarded as uneconomical to work and difficult to replant. The grazing trial area may produce wood, but it is safest to assume that it will prevent economic timber cropping. An existing crop can be harvested when mature, but future crops would not be economical to produce.

Fortunately the ecological factors driving the choice of area also minimise the impact on silviculture. At their best, the Savernake soils produce very good hardwood timber yields, with yield classes of up to 8 for beech and occasionally even oak (Forest Enterprise records). The ecological factors are however the presence of ancient trees, native scrub and open grassland patches. These features already remove areas from effective timber crop production and the area has already been further reduced by the local clearance of planted trees to avoid overtopping the ecologically valuable ancient specimens.

Direct silvicultural impacts will therefore be limited to a small proportion of the grazing trial, including any areas which are fenced to make the perimeter or stock easier to manage. Otherwise, negative impacts are those already incurred by foregoing crop production for maintaining the special interest of the SSSI.

Less direct impacts with a bearing on silviculture also need consideration: these are concerned with land use and other estate activities (4.5 and 4.6 below).

### **5.2 Stock husbandry issues**

Whatever stock is used, the animals will need looking after. In common to all animals used are the following requirements, all of which have statutory force, either directly or through the need to demonstrate adequate attention to animal welfare.

- Daily inspection to check that animals are present and in good condition, and that fences and other structures are intact.
- Provision and maintenance of an adequate water supply.
- Duty to avoid combinations of habitat and stock which would risk the animals' welfare.
- Duty of care to avoid dangers to people.

Constraints on particular types of stock or farm enterprise are.

- Most modern breeds of sheep are incompatible with thick scrub or other tangling vegetation which is a desired component of the habitat mosaic. Most sheep breeds are also susceptible to dog worrying.
- Remaining sheep breeds or goats can require taller stock fencing than normal.
- Milking animals would only be suitable if they could be milked on site, aside from any issues of the food quantity or quality needed to maintain milking animals.
- Likewise breeding stock with young would need a great deal of attention.
- Entire bulls are likely to be unacceptable because of permissive public access.
- Certain medications (mainly antibiotics and worming compounds) pass through the gut of farm stock, remaining toxic to microorganisms and/or fungi in dung. This would risk a direct impact on some of the organisms of greatest interest in the Forest.

### **5.3 Preferred stock and availability**

Taking both ecological and husbandry considerations into account, the preferred stock would be cattle or hardy ponies, preferably under organic management to avoid possible problems with prophylactic or other medication. In practice the ideal stock will be young beef cattle, avoiding modern breeds and management systems which require intensive feeding for the animals to put on weight profitably.

There appear to be two immediately feasible options.

#### Option 1: Elm Farm Research Centre

Preliminary discussions with the Soil Association's Elm Farm Research Centre have been highly productive. Subject to more detailed discussion, it is likely that this organisation would be able to provide young animals of a suitable traditional cattle breed, known to be free from any chemical treatment which might affect wildlife via dung, and be able to do so into the long term future. Elm Farm have an existing beef unit.

This option inevitably brings costs associated with distance, Elm Farm being near Kintbury in the Kennet Valley, approximately 15km from Savernake Forest.

### Option 2: Neighbouring farmer

Preliminary discussions have also taken place between Forest Enterprise staff, Bioscan and the farmer at Kingstones Farm, immediately adjacent to the preferred grazing trial area. Initial responses are promising and the option has the advantage that transport and husbandry costs would be minimised. However, the availability of suitable stock kept under a chemical-free or restricted regime needs to be explored. Also, this farm has no cattle at present and there may be difficulties setting up on the very small level (10-12 animals) required.

It is recommended that both the above options, and possible combinations, are progressed further.

### Contingency options

As contingency plans, the following can be considered.

- Other nearby organic stock. There is at least one other suitable organic enterprise within a similar radius to Elm Farm, although no discussions have taken place yet.
- Stock from Wildlife Trust and/or English Nature enterprises. These would involve longer distance movements and greater logistic problems in husbandry.
- Hardy pony stock such as from the New Forest. Once enclosed, such animals would become subject to the same husbandry requirements as farm stock, and would involve greater input as their complete care would have to be organised from the start.
- Stock from other local farmers or horse/pony keepers. This should be regarded as a last resort consideration because of likely problems with controlling management, medication and other issues.

## **5.4 Impacts on permissive access**

Rides in Savernake Forest have complete permissive access to walkers. Off-ride access is not permitted. There are also more formal access points which would be directly affected if they were included in a grazing area. Pedestrian access to a grazing area is acceptable, although a few people will avoid areas with cattle in.

Certain routes have permissive access on horseback. This is not incompatible with grazing but requires the extra costs of bridle gates being put in place where it is desired to keep access open for riders. It is likely that any patch of sufficient size in the Forest would require at least one such path to be kept open.



## 5.5 Impacts on other estate activities

There are two game shooting syndicates within the Forest. However, no key rearing area or drive is within the areas with highest potential on ecological grounds for the grazing trial.

Deer culling is an essential part of forest operations: completely uncontrolled deer populations are incompatible both with crop forestry and with the main ecological interest. In Savernake, culling is carried out by contract, with the main shooting being done from mobile high seats.

Presence of farm stock disrupts the cull. Guns must be conscious of the presence of stock and this affects potential firing lines. In addition, deer may sometimes avoid the vicinity of cattle. In practice, the cull is likely to be severely hampered within the area of the grazing trial while stock are present. Areas away from the grazing trial will hardly be affected.

The limiting factor on achieving the necessary cull is usually the shortness of the doe season, which lasts from November to February. Since this coincides with weather when stock can need extra feeding and/or risk excessive poaching of the ground, it would be better to avoid grazing during the doe season. In most years this will match the ecological requirements for grazing and in all years will minimise the impact on the deer cull.

## 5.6 Access

The trial area should be close to vehicle access for delivery and removal of stock. Otherwise extra time and difficulty will be experienced for both normal and emergency access, and for stock inspection.

Day-to day stock inspection would be carried out most efficiently using an ATV. This would enable most of the grazing area to be covered without risking damage to ride or grassland surfaces.

## 5.7 Uncertainty of results

The uncertainty of grazing effects on the great majority of notable and scarce species is a major constraint. In practice this has two consequences.

- The trial area must not include the complete range within Savernake of any habitat type of known importance. Indeed substantial parts of each habitat of importance must be left out of the trial.
- Key groups of organisms must be monitored according to a proper (BACI - before after control impact) design. Otherwise the results cannot be applied elsewhere, impacts will risk going undetected until too late, and benefits will be limited to the small group of organisms known to be favoured by grazing.

## **6 ADDITIONAL OPPORTUNITIES**

### **6.1 Benefits to silvicultural management**

Aside from an initial, limited, input, scrub control, thinning, weeding, beating up and all other plantation or nature conservation management will not be necessary within the whole area subject to the grazing trial. These activities are already being carried out for nature conservation purposes. The main saving will be in scrub control because of the small area of managed plantation involved.

### **6.2 Benefits to agricultural operations**

If farm stock are involved as advised above, then the chosen enterprise will have a small increase in turnover in its beef enterprise. The benefits of this are likely to be minor however, and outweighed by attendant costs of managing stock at a distance.

### **6.3 Benefits from publicity and awareness**

Such benefits are largely "intangibles", especially where permissive access to Savernake Forest is free of charge. A successful trial will however produce good publicity for the Estate, Forest Enterprise, and all partners in the trial. This will depend on good publicity and communication between press officers of the organisations involved.

### **6.4 Benefits to nature management elsewhere**

The most significant benefit of a well designed trial will be to other organisations contemplating or carrying out similar management. Organisations and plans which will benefit from this are likely to include.

- Local authorities and others involved in preparing Biodiversity Action Plans for pasture woodlands (a Key Habitat in the UK Biodiversity Action Plan).
- Statutory nature conservation organisations responsible for advice on nature conservation management, i.e. the three country agencies of the Nature Conservancy Council and JNCC.
- Private and charitable bodies who carry out or may contemplate pasture woodland management, such as the county Wildlife Trusts, National Trust and Woodland Trust.



## **7 RECOMMENDED PROCEDURE AND APPROXIMATE COSTINGS**

### **7.1 Location of grazing area**

The preferred option for the grazing area is shown on Figure 2. This includes Great Lodge Bottom, originally suggested by English Nature and Forest Enterprise staff and an area to the west of Thornhill Nursery added at the suggestion of FE staff.

The primary constraint in selecting this area has been that it must include substantial existing interest associated with ancient trees, including both beech and oaks. Examination of Figure 2 shows that there are broadly four such areas where the presence of ancient trees is known to coincide with both invertebrate and lichen interest.

Great Lodge Bottom also stands out for the presence of remaining grasslands, including both acid and calcareous areas, in relatively close proximity to the ancient tree interest. This is inevitably correlated with relatively low forest crop value, incidentally minimising any potential impact on silvicultural operations.

Availability of water is a major constraint on choice amongst the four "biologically useful" areas. Available mains water points are limited in practice to St Katherine's church and a supply passing Braydon Hook and Thornhill Nursery. This means that the concentrations of interest are all remote from mains water except the preferred option.

The preferred option is also well separated from other estate activities such as key areas for the syndicate shoots.

Metalled road access exists into the preferred option area from the A346. The entrance via Great Lodge Drive appears to have an adequate visibility splay for large vehicles.

The main impact identified is on permissive access. To some extent this is true for any biologically useful option, but popular routes for riders pass through the area and bridle gates will need to be installed.

The preferred option lies in two halves, connected by a narrower neck. In each half, just over 30ha can be enclosed with small disruption to crop areas, making a total of approximately 63ha. Achieving a "neater" shape would include further forest crop areas and increase disruption to permissive access. Due to the need to keep Great Lodge Drive open without gates, the option would need to be run with animals in the two separate halves, either separate stock in both, or at different seasons in each half.

Approximate quantities of materials needed are shown below.

## 7.2 Infrastructure

Infrastructure needs are fencing, water supply and gates. Requirements for gates take into account discussion with Forest Enterprise staff over particular access needs. It has been assumed that no permanent handling system other than a cattle gate is required on site: depending on the choice of option for grazier this may be an additional cost and mean that a small area of land will be damaged.

### Fencing

Standard: stock netting surmounted by two strands of high-tensile barbed wire. This caters for cattle but allows for flexibility in the future if required. Strainer posts are assumed to average every 100m over the perimeter, with in-line wire strainers.

Costs are indicative at 1996 levels from local suppliers and exclude VAT. Wood prices are for pressure treated timber: the extra length of life obtained is judged to override very local damage expected to the soil fauna and flora from treatment.

Stock netting:	£20 per 150m roll i.e. 13.33p per metre.
Barbed wire:	£12.50 per 200m roll i.e. 12.5p per metre
Posts 5.6' x 3-4" rounds:	£1.26 each i.e. 35.3p per metre assuming 3.5m intervals.
Strainers 7' x 5-6" rounds:	£5.20 each i.e. 5.2p per metre.
Struts 8' x 3-4":	£4.80 per pair i.e. 4.8p per metre.
Ratchets	£2.50 each i.e. 5.0p per metre.
Staples	£25 per 25kg i.e. up to 2.5p per metre.
Total materials costs:	78.63p per metre or approximately £80 per 100m.

Should contract labour be required, the cost of fencing including installation and materials is typically £3-4 per metre or £3-400 per 100m. It would be wise to assume real costs towards the upper level because of the additional difficulty of installing stock fencing within woodland. Here, installation cost alone has been set as a guide at £3 per metre.

### Gates

For ease of stock manipulations, a cattle gate is required at each point of main access. This needs to be lockable, hung on inverted pins to make theft difficult. Total cost approximately £122 including posts.

At other points where machine access is needed but not stock control, 12' metal farm gates can be used at £106 including posts. Wooden gates look better but would cost £147 each including posts and separate gate kit.

Where horse rider access is required, a bridle gate with spring loaded latch will be needed in addition to farm or cattle gates. The cost of each as a unit is £76.

### Water supply

In the length of area envisaged, two separate water points are advisable for each unit. This is to cut down poaching at any one point and avoid cattle having to travel too long a distance for water. Unit costs are £89 per 6' trough with fittings and supports, plus 25mm black pipe at £0.32 per metre. Lengths are specific to each trough and described below. It is assumed that pipe will be run above ground to avoid the extra cost of burying and risk of damage to tree roots.

### Total infrastructure costs

Approximate costs for infrastructure are summarised in Table 1, according to the plans for gate access illustrated on Figure 2.

**Table 1: Infrastructure**

	Quantity	Unit price	Cost
Fencing m	5,670.00	0.79	4,479.30
Labour	5,670.00	3.00	17,010.00
Cattle gate	2.00	122.00	244.00
Farm gates	3.00	106.00	318.00
Bridle gates	4.00	76.00	304.00
Troughs	4.00	89.00	356.00
Pipe <sup>1</sup> to N trough New Road	200.00	0.32	64.00
Pipe to south trough	400.00	0.32	128.00
Pipe from Church m	200.00	0.32	64.00
Pipe from Braydon Hook m	100.00	0.32	32.00
Installation gates & troughs			1,800.00
Total			24,799.30

Note 1: Unit pipe prices may rise due to current changes in the type of material used as standard.

### 7.3 Stock source and management

#### Option 1: Elm Farm Research Centre

Elm Farm have Aberdeen Angus beef animals at the moment, but have close links with rare breeds society and breeders and would be willing to buy in any stock required for the purpose. The small numbers (10-12) are not considered a problem.

Although such stock are likely to be profitable (excluding transport and additional husbandry costs) it is better if the grazier is paid a nominal sum, rather than vice versa, because of the guaranteed control this gives.

Additional costs accrue from two 30km round trips per year for delivery and pick-up of animals, and the need to employ a local "looker" to check the animals daily during the grazing season. These additional costs would amount to approximately £2200 per year.

#### Option 2: Neighbouring farmer

This option is less certain. It has the great advantage of being without additional costs for transport or a local "looker". Conversely, the farm in question does not have suitable animals or chemical-free stock management system now and may incur costs in providing them which belong to the project.

#### Both options

Farm insurance will need to cover third party and other risks. Since these belong to the animals, the best way to achieve this is through the grazier's insurance. According to County Trust staff consulted, this is not a significant cost which needs to be passed on to the project.

### 7.4 Costs to forestry/timber crop

The cost to the forest operation of the grazing trial is assumed to be zero. This is because the following has been established in consultation with Forest Enterprise staff.

- 1 No significant area of crop will require additional treatment or be lost as a result of grazing. Any such losses will be associated with canopy opening among ecologically valuable ancient trees which is a part of nature conservation management whether or not grazing stock are used.
- 2 Some additional thinning may be desirable in crop areas within the fence (in addition to (1) above. This need not be at a level to affect the value of the eventual crop, and the cost of the operation can be met by sale of the thinnings for pulp.

- 3 Any additional habitat manipulation (e.g. local scrub clearance) is already being carried out for nature conservation purposes and is not specifically associated with grazing.
- 4 There are a few financial benefits of grazing in saving the need for bracken or scrub control (provided cattle are used) but these will be minor.

There is an opportunity cost in the very long term associated with the eventual removal of the grazed areas from viable crop production. This is however a whole broadleaved felling cycle into the future, at which time the opportunity values cannot be estimated.

## **7.5 Publicity**

Details should be agreed between the landowner, English Nature and FE. Recommend high profile for launch, combined with local awareness, i.e. any information at tourist points within the Forest should include a leaflet about the project and its purpose.

Costs of publicity can vary greatly, depending on the level required. Before funds are sought for the project, a level should be agreed between the above bodies and an appropriate budget set.

## **7.6 Monitoring**

Monitoring is essential for the project to have any wider use and indeed to assess its effects on the fauna and flora at Savernake. Monitoring needs to be capable of the following.

- 1 Detection of significant changes due to the grazing trial at Savernake so that the grazing regime can be assessed and modified if necessary.
- 2 Assessment of the overall effects of grazing so that similar management can be applied elsewhere against a background of knowledge of its effects on key groups.
- 3 Cover enough key species and groups to be confident of the results without being excessively costly.

Without monitoring carried out to rigorous standards, the grazing trial will be of very limited value. At best it would favour some key species in part of their range within the Forest, without the confidence to be able to extend it elsewhere. At worst, significant damage to very rare species could pass undetected.



Key groups are contained within the epiphytic flora including lichens, saproxylic invertebrates and macrofungi. Epiphyte monitoring is relatively straightforward, with pre-selection of sample trees for a BACI (before-after-control-impact) design. Environmental measures such as bark pH may aid in the selection of suitable trees, which should be done in consultation with an expert lichenologist.

Ideal sampling methods for any animal or plant are focused on the group of interest (to avoid gathering large amounts of redundant information), quantitative so that robust conclusions can be drawn about effects on populations and non-destructive to avoid accidental impacts on very sparse species. These ideals are notoriously difficult to realise simultaneously, and only preliminary ideas are given here.

Invertebrate monitoring would best be focused on habitat or microhabitat specific interception methods, a compromise between the large amount of less relevant material gathered by large-scale interception methods such as Malaise traps and the risk of population damage caused by destructive sampling of dead wood. One or a combination of the following methods could be used.

- Sticky trap "patches" (not bands) on the surface of dead wood microhabitats.
- Small "butterfly trap" scale interception traps placed in the canopy.
- Trap baulks of timber hung in the range of microhabitat situations being covered.
- Water traps placed in habitat.

Any monitoring method should be structured to match in as far as possible with epiphyte monitoring and in any case according to a BACI design. This will require a year's pre-monitoring before the grazing trial is started.

In addition to the structured monitoring above, visits by experts for casual recording should be encouraged, as at present, and a mechanism set up for receiving and processing the resulting information.

It is recommended that the monitoring programme is designed with the aid of a site visit by relevant specialists as soon as possible.

## **7.7 Possible sources of funding**

Sources of funding have not been explored specifically. There is a possibility that such a project might attract research council funding, with a suitable partner for English Nature possibly from Reading, Oxford Brookes, Oxford or Southampton universities. A drawback is the common three-year currency of such funding, but it could be used while alternative sources are being sought for a longer period.

Alternatively, funding through a combination of National Lottery and other sources, for instance the Biodiversity Action Plans, could be sought. It is noted that "Lowland Wood Pastures and Parkland" are a Key Habitat in the UK Biodiversity Steering Group report of 1995.

It may be possible to provide additional funding for particular components of infrastructure or management from English Nature sources, Countryside Commission and/or MAFF (e.g. Organic Conversion).

## 7.8 Programme

The recommended action is laid out and phased below. The seasons at which field tasks are carried out are more important than the start year, so the programme is labelled as "Year 0" for the pre-trial monitoring year, "Year 1" for the first year of grazing, and so on. Key actions which must be confined to a certain season are shown in **bold**: any risk of missing these seasons should cause the programme to be shifted forward by twelve months.

January Year 0:        Make final decision on grazing trial area, source of stock and monitoring programme. Immediately explore sources of funding and set applications in motion as soon as possible.

February-March Year 0:  
                                 Identify invertebrate and epiphyte monitoring areas and controls.

March-April Year 0: **Carry out first epiphyte monitoring surveys (pre-treatment)**

May Year 0:            **Start invertebrate monitoring system (pre-treatment).**

October Year 0:        **Preliminary report on pre-treatment monitoring to identify any additional constraints not previously considered.**

December Year 0:     Sign agreement for grazing.

November Year 0 - February Year 1:  
                                 Install stock fencing, gates and water supply.

March-October Year 1:  
                                 **First grazing period**  
  
                                 **First post-treatment monitoring**

December Year 1:     Report on set-up and first year's results

Subsequent years as for Year 1, subject to decision on the frequency of monitoring required, with a major report and review at the end of Year 4.

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**Appendix 1**  
**Description and Reasons for Notification of the Savernake Forest SSSI**



COUNTY: WILTSHIRE

SITE NAME: SAVERNAKE FOREST

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authorities: Kennet District Council, Wiltshire County Council

National Grid Reference: SU 215665

Ordnance Survey Sheet 1:50,000: 174

1:10,000: SU 16 NE, SU 26 NW & SU 26 SW

Date Notified (Under 1949 Act): 1971

Date of Last Revision: 1975

Date Notified (Under 1981 Act): 1988

Date of Last Revision:

Area: 904.7 ha 2235.6 ac

Other Information: Site within the North Wessex Downs Area of Outstanding Natural Beauty.

#### Description and Reasons for Notification:

Savernake Forest is an extensive area of ancient woodland with over one thousand years of documented history. One of the largest woods in Wiltshire, it harbours an outstanding lichen flora and a wide variety of other plants, including species with nationally restricted distributions. The rich invertebrate fauna of the Forest includes several rare insects, mainly flies and beetles associated with deadwood, as well as nationally scarce moths and butterflies and an uncommon snail. In addition the site supports a diverse assemblage of birds and an exceptional range of fungi.

The Forest lies on a plateau of Upper Chalk, covered by Clay-with-Flints and dissected by dry valleys. The Chalk is exposed along the valley sides, however small deposits of Valley Gravels, Reading Beds and Bagshot Sands, together with the clay, give rise to particularly acid conditions in places.

Relicts of the ancient wood pasture remain, represented by the distinctive open-crowned specimens of sessile and pedunculate oak which are scattered throughout the site. Eighteenth and early nineteenth century plantations of beech and oak have now assumed a semi-natural structure but the Forest consists mainly of twentieth century beech or oak plantation. These stands are supplemented by naturally regenerated silver birch, ash, downy birch, rowan and willows. Wych elm, field maple, holly and midland hawthorn also occur and hazel is locally frequent in the former coppice areas. Hawthorn is abundant and, like blackthorn, forms stands of scrub in the open spaces where it is a valuable nectar resource for deadwood insects.

The grassland in Savernake, located at the woodland edge or in the open valleys, shows both acidic and calcareous characteristics. Floristically rich areas include neutral grassland with meadow saxifrage (Saxifraga granulata), adder's-tongue (Ophioglossum vulgatum) and the uncommon meadow saffron (Colchicum autumnale), and an acidic sward with heath milkwort (Polygala serpyllifolia) and bird's-foot (Ornithopus perpusillus). There is also a small area of chalk heath with wild thyme (Thymus praecox) and common rockrose (Helianthemum nummularium) growing amongst cross-leaved heath (Erica tetralix) and heather (Calluna vulgaris). Many of the clearings are covered with bracken (Pteridium aquilinum).

In the woodland the ground flora is dominated by bramble (Rubus fruticosus) or grasses such as Yorkshire-fog (Holcus lanatus), creeping soft-grass (Holcus mollis) and tufted hair-grass (Deschampsia cespitosa). However wood-sorrel (Oxalis acetosella) and raspberry (Rubus idaeus) are frequent and more than fifty plant species which are indicative of ancient woodland have been recorded in the Forest. These include purple (Epipactus purpurata) and broad-leaved helleborine (E. helleborine) and the nationally scarce narrow-lipped (E. leptochila) and green-flowered helleborine (E. phyllanthes).

Particularly acidic areas are indicated by the presence of wavy hair-grass (Deschampsia flexuosa) or heath bedstraw (Galium saxatile) and occasionally by bilberry (Vaccinium myrtillus), heather or the mosses Leucobryum glaucum or Rhytidiadelphus loreus. Woodland mosses and liverworts are well represented and include Dicranum montanum, Frullania tamariscii and the nationally scarce liverwort F. fragilifolia. The site also supports an outstanding lichen flora with over one hundred species, among them several characteristic of old forests, for example, Parmelia crinita, P. reddenda, Arthonia didyma and the rare Caloplaca herbidella which was first recorded from Savernake.

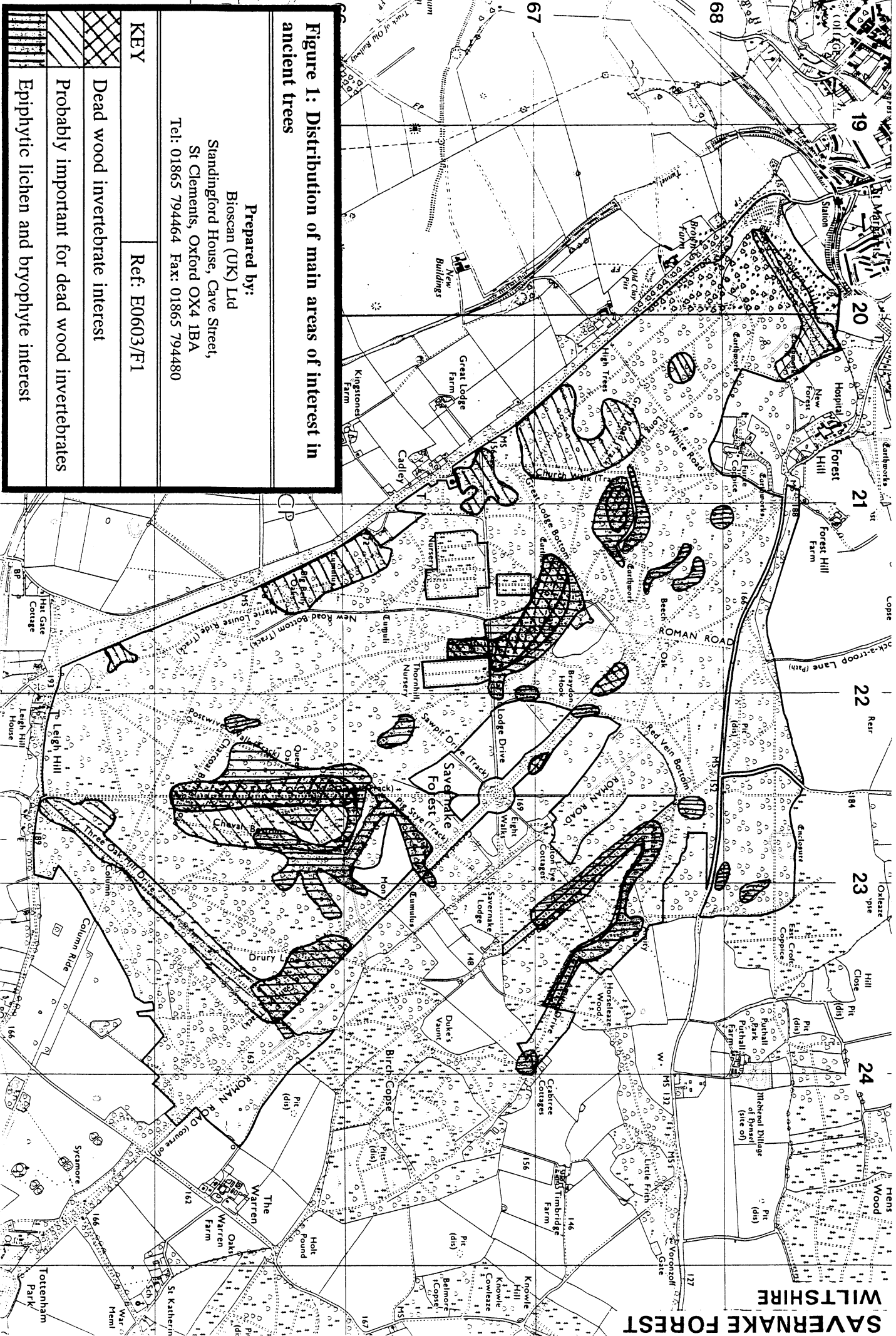
The exceptional diversity of fungi in the Forest, with well over 500 species, can generally be attributed to the continuity of the beech woodland, the presence of unimproved grassland areas and the abundance of decaying wood. Several uncommon species of Lepiota have been found, as well as an impressive range of other fungi.

Savernake's rich fauna of deadwood insects is of particular importance for species associated with old beech trees, for example, the very rare crane fly Ctenophora flaveolata and the rare hover-flies Brachypalpus laphriformis and Myolepta luteola. Several beetles, flies and moths with nationally restricted distributions have been recorded, among them the rare beetle Tomoxia bucephala, the crane fly Tipula selene, which breeds in fallen boughs lying on wet ground, and the extremely scarce moth Aplota palpella. At least twenty-five butterflies breed on the site including purple emperor and white-letter hairstreak. The scarce snail Helix pomatia is also found here. Further survey could be expected to extend the list of uncommon invertebrate species.

A wide variety of birds nest in Savernake. The old trees particularly favour hole-nesting species such as redstart, nuthatch, tawny owl and all three woodpeckers. In addition the forest harbours wood warbler, turtle dove and woodcock while tree pipit and spotted flycatcher breed in the woodland edges.

There are a few ponds on the site, at least one of which accommodates dragonflies and great-crested newts. A range of mammals is also resident including dormouse and bats.





**Figure 1: Distribution of main areas of interest in ancient trees**

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


KEY	
	Dead wood invertebrate interest
	Probably important for dead wood invertebrates
	Epiphytic lichen and bryophyte interest

**Figure 2: Grazing trial areas**

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**KEY**

Ref: E0603/F2

	Boundary of trial areas
	Farm gate
	Cattle gate
	Bridle gate
	Water trough
	Access from road

