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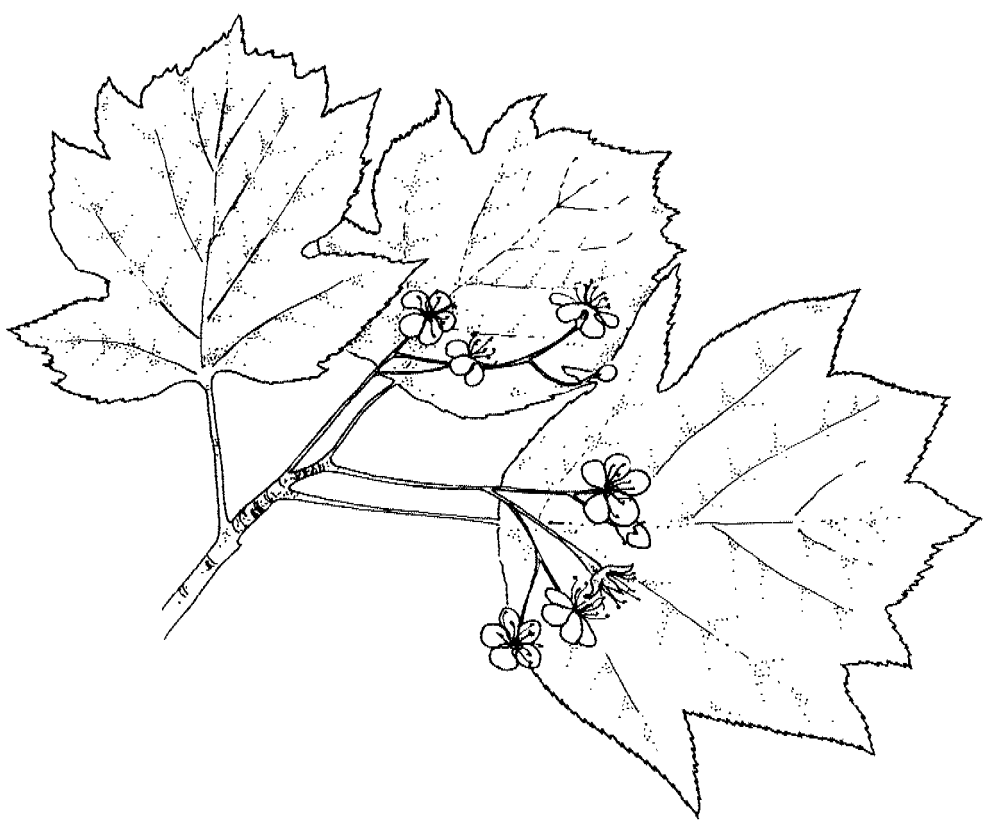
Natural reserves in English woodlands



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Natural reserves in English woodlands

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Preface

The Habitat Action Plans for broadleaved woodland propose that a series of minimum intervention sites be established across the ecological and geographic range of UK woods. This report explores in detail the rationale for such a series. A companion report by Ed Mountford (*English Nature Research Report*, 385) develops a provisional list of sites. English Nature has commissioned both reports to provide a basis for discussion as to how this Action Plan target should be delivered. The site list in particular should not be viewed as the definitive statement as to what should be in a minimum intervention series.

The views expressed in both reports are those of the authors. They do not necessarily reflect those of English Nature or its staff.

Keith Kirby
English Nature

Summary

This report about minimum intervention reserves in woodland relates principally to England, but is supplemented by general points relating to Britain as a whole. Minimum intervention reserves are seen as a limited core set of about 30 woods, which have been assigned indefinitely to a management policy designed to minimise the impacts of people. However much they were shaped by exploitation and management in the past, their composition, structure, patterns and wildlife will henceforward be almost wholly determined by natural factors and processes. Under prevailing conditions, most would probably take the form of irregular high forest old-growth stands.

The principal objectives of such reserves would be scientific: (i) basic knowledge about natural processes and states, (ii) reference points for measuring human impacts elsewhere, (iii) templates for near-to-nature forestry, and (iv) opportunities for monitoring some aspects of environmental change. They would also have value for biodiversity conservation and a range of cultural associations.

A structure and rationale is presented for site selection and management. The composition of most minimum intervention reserves would be inherited-natural, but a few might be restored to original-natural, and others might be allowed to develop freely towards a future-natural composition. The core set of reserves would conform to a 'high forest' model of natural woodland structure, and these would represent the full range of natural woodland types. Additional reserves conforming to the 'wood-pasture' model of natural forest structure would also be maintained. The core set should have a distinctive designation.

Brief consideration is also given to related types of reserve: (i) very large near-natural landscapes, where non-scientific objectives would be just as important as scientific objectives, (ii) minimum intervention reserves in conifer plantation forests, and (iii) developing and retaining mature structures in managed woods.

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1. Background, objectives and definitions

1.1 Introduction

The idea of setting aside forest reserves to be left to nature has long been part of conservation thinking. Perhaps the earliest of such reserves was Zofinský Prales, an old-growth forest of beech, Norway spruce and silver fir in Bohemia, close to the modern border between Austria and the Czech Republic, which was established as a non-intervention reserve by its aristocratic owner in 1838. The objective in this instance was a sanctuary for birds, but other early natural forest reserves were created for aesthetic reasons (Fontainebleau, France, 1853) and the development of silvicultural techniques (Boubínský Prales, Czech Republic, 1868). In England, the nearest early approach to such reserves were the Ancient and Ornamental Woods of the New Forest, which were to be preserved mainly for historical and recreational reasons under the New Forest Act of 1877, though in this instance there was no intention of removing the influence of people entirely.

Non-intervention was the rule in early- and mid-20th century woodland reserves, but in more recent decades, the idea that conservation managers could 'shut the gate' and allow free rein to natural processes has been increasingly challenged. Current wisdom is that reserves need to be managed, ie physically regulated and manipulated. This attitude springs partly from recognising the high nature conservation values in traditionally managed woods and observing some loss of value in woods that have been left unmanaged, but it also reflects the diffusion of nature conservation objectives into woods and forests at large, where other objectives, such as timber production, necessarily require frequent interventions by foresters. Experience in plagioclimax reserves of heathland and lowland grassland has even more insistently demonstrated the need for reserve managers to control and manipulate the vegetation in order to maintain the features for which the reserve was established.

Today, the two conservation traditions run side-by-side in woods. Whereas most British woodland is managed, some woods are deliberately left untouched, and others are simply neglected. The reasons for retaining non-intervention woodland reserves are expressed in various ways, but they generally amount to some combination of: (i) wanting to understand how natural woodland works; (ii) comparing the reserves with managed woods, thereby to measure the impacts of management; (iii) developing the habitats and species characteristic of natural woodland; and (iv) a shadowy range of cultural benefits associated with the idea of wilderness.

Interest has lately been renewed in natural forest reserves (*alias* strict forest reserves, non-intervention stands, etc). At the European scale, this has been formally expressed in the COST Action E4 programme for a Forest Reserves Research Network. All European countries have forest reserves in some form, and many have a carefully constructed and safeguarded set of strict forest reserves. In the UK, however, there is currently no distinct identity for strict forest reserves, though many individual woods are formally assigned through management plans to non-intervention or minimal intervention.

This report forms part of phase 1 of an English Nature project, whose aims are:

- to review and explore the concept of minimum intervention as it applies to woodland;

- to propose a series of potential minimum intervention sites across the country and range of woodland types;

- to provide preliminary recommendations on what sorts of management are desirable and/or necessary within the minimum intervention concept; and

- to discuss the role these sites might have in long-term surveillance and research.

One immediate stimulus for the work is the above-mentioned COST Action, whose underlying theme is the need for a Europe-wide set of near-natural forest reserves, which would be used as both research sites and reference points for environmental monitoring. Another is the comment in several of the woodland Habitat Action Plans that a series of minimum intervention sites should be established across the different woodland types. Although this report is commissioned by English Nature, it will relate to the UK contribution. Accordingly, the material will concentrate on England, but account will also be taken of experience and sites in Wales and Scotland, where the history of interest in the subject is much the same as it has been in England.

Phase 1 of the projected contribution has been divided between (i) a general review of the place of 'minimum intervention' in woodland management for nature conservation, and (ii) the selection and description of a provisional list of 20-30 sites in England. This report is the general review. The provisional list of sites has been compiled by Ed Mountford, working for Ecoscope Applied Ecologists (Mountford 2000).

1.2 Definitions

Woods treated as 'non-intervention' are left wholly untouched by people. Metaphorically, the forester leaves the wood, shuts the gates, and allows the wood to develop entirely by natural processes. In theory, the outcome at any given moment is the result of interactions between the constituent species, the impacts of natural disturbances, the on-going effects of physical processes, such as erosion, and any colonisation by new species from outside. The resultant wood may be described as "natural", defining natural to be the antithesis of 'artificial'.

Such natural, non-intervention woods are not in practice obtainable in Europe, nor possibly anywhere else. Every wood has a history of use or some degree of impact by people. Even if this were not so, every non-intervention wood will be indirectly influenced by people, through lateral influences from adjacent land uses, and widescale modification of climate and the release of pollutants into the wider environment. Furthermore, for many reasons, non-intervention woods may have to be discretely managed if they are to fulfil nature conservation, scientific and cultural objectives. In practice, therefore, no reserve can escape some past and present influence by people.

Several consequences flow from this recognition. First, it is preferable to speak of 'minimum intervention' woods rather than 'non-intervention' woods, for this enables site managers to combat the unwanted influences of people. Second, the concept of a 'natural' wood is best regarded as an ideal, recognising that in practice we can aspire to generate and maintain only 'near-natural' woods. This being so, we should also accept that different types of 'near-naturalness' may be worth recognising. We should also remember the long debate about the place of people in nature, ie whether a moderate degree of human influence should be

regarded as 'natural', and, if so, consider how this feeds back on the definitions of natural and minimum-intervention woods.

Thus, the relatively simple notion of leaving a selection of woods to develop without human influence for a range of conservation, scientific and cultural benefits, rapidly becomes on inspection an intricate maze of practical, scientific and philosophical issues.

1.3 Objectives and benefits

The reasons why people have been prepared to establish minimum intervention reserves can be expressed under three main headings, science, conservation and culture. Here I will briefly outline the case for such reserves, then in later sections examine the degree to which these possibilities have been realised.

Science

The most obvious possibility is the opportunity for understanding the character and processes of natural woodland. This is the environment in which many temperate species evolved, and was the environment from which our ancestors fashioned our landscapes and environment. The characteristics and processes have intrinsic interest. If they are understood, we may better interpret changes observed (eg through pollen profiles) in the development of original-natural woodland.

Near-natural woodland in minimum intervention reserves may also be compared with managed woodland and farmland derived from woodland. This describes the role of minimum intervention reserves as reference points, or controls for research, which give a measure of the impact of people on the natural environment. The aspects of interest could include anything from stand structure and regeneration processes, to soil structure and the behaviour of native forest species.

Minimum intervention reserves can also be an inspiration and source of guidance for 'natural forestry'. This is an approach to forest management that aims to mimic natural states and processes as far as possible, in the belief that natural forestry will be more sustainable than more intensive, engineered treatments. Without a representative set of minimum intervention reserves, a forest manager would be forced to guess the characteristics of natural woodland appropriate to his or her particular circumstances.

Minimum intervention reserves can also be used to monitor widescale changes in the environment. A natural woodland is not directly influenced by human activity, so it may be the best place to measure global pollution, widespread hydrological change, etc, sure that local effects are excluded. Admittedly, this implies some conflict with previous values, but that cannot be avoided: the minimum intervention reserves can never be completely without human influence.

Chapter 7 reviews the actual use of minimum intervention reserves for scientific research.

Conservation

Natural woodland in minimum intervention reserves makes both a general and a specialised contribution to the maintenance of wildlife and natural features. Like managed woodland, it harbours woodland generalist species, but it also provides special opportunities for species associated with dead wood, large trees and mature stands. These are the saproxylic species, which include wood-rotting fungi, epiphytic cryptogams, hole-nesting birds and wood-utilising beetles. These species were presumably abundant in original natural woodland, but in modern landscapes a high proportion occur only in small, relict populations. On the other hand, minimum intervention reserves contain few, if any, permanent open spaces, so the characteristic species of woodland rides within managed woodland are poorly represented. At the larger scale, natural woodlands provide some diversity in a landscape where most woods are managed, and likely to be younger.

Its not just a matter of how many, and which, species are present. For example, natural features, such as unrestrained headwater streams, pit and mound microtopography, may also be well represented in minimum intervention reserves. Dead wood maintains geomorphological processes, such as erosion and river channel movement. There is evidence that the behaviour of some birds species has changed with the change from a natural to a cultural environment, and in minimum intervention reserves these older behaviours may be retained or recovered.

Culture

The significance of natural, or wild, environments in human culture is a vast and imprecise subject. Some indication of its breadth and depth emerges from Simon Schama's *Landscape and Memory* (1995). In section 2.5 of my *Natural Woodland* (Peterken 1996) I tried to convey my (simple) understanding of this. Some nations, notably the Germans, claim a special affinity with natural forests. For most people, the cultural aspects are probably the most important, though they are often felt at a sub-conscious level.

Natural woodland in minimum intervention reserves may provide artistic and psychological benefits, such as:

- a setting in which to appreciate myths of origins;
- experience of romantic settings for representation in paintings and prose;
- wilderness experiences, ie a touch of the wild, where the benefits of ordinary experience in civilised environment can be appreciated, and individuals can test themselves against the elements;
- psychotherapy from contact with large trees (Jonathan Spencer, pers. com.)

There seems to be some diversity of view on the significance of minimum intervention reserves as wilderness (see Annex). Nigel Cooper does not 'see them as areas of pure nature against which we can measure the moral stature of our culture'. Rather, he sees them 'much more as projections of our culture, [which are] necessary as mechanisms by which a culture - understands itself and critiques itself.' Rob Fuller regards wilderness values as inappropriate in

minimum intervention reserves in the UK (particularly England) that are bound to be small. Michael Morecroft, on the other hand, says that many people he speaks to at Wytham Woods 'value a place where human intervention is minimal for its own sake'.

1.4 Realising the benefits

Having identified several kinds of benefit from minimum intervention woodland reserves, we have to ask whether these benefits can also be realised in woods under more intensive forms of management, or whether natural woodland in minimum intervention reserves is necessary.

The cultural benefits are very much a matter of perception. An illusion of wildness is all that most people require to feel the uplifting and therapeutic benefits of truly wild, mature forest land. Wildland survival tests and the experience of disorientation can be achieved better in large forests than minimum intervention stands, though it is notoriously easy for people to get lost in trackless compartments. Artists can conjure natural scenes from any view that provides the basic stimulus, and can ignore the artificialities behind them. Minimum intervention reserves in Britain will be small, and cannot provide the landscape-scale experiences of, say, the largest North American National Parks. Furthermore, the British perception of wilderness is associated more with the large, open and rugged landscapes in the hills and on the coast, where forest is a minor component. Provided large and generally mature forests are available, and some locations have large trees, irregularity and no visible signs of human intervention, the cultural needs will be satisfied.

The nature conservation benefits can also be satisfied in more intensively managed woodland, and in many places they would be better served by discrete treatments designed to maintain certain habitats and structures, particularly open space habitats. The habitat requirements can be summarised as large trees, an irregular structure, large volumes of dead wood, and a predominance of site-native trees, in a context of moderate grazing, sustained regeneration in gaps and small-scale, unobtrusive management operations. Though maintaining such conditions takes considerable skill and resources, it seems safe to assume that minimum intervention reserves are not required *per se* for biodiversity conservation. In some circumstances, the conversion of a wood into a minimum intervention reserves may actually result in the loss of species.

This leaves us with the scientific benefits, and it is here that the substance, not the illusion, of minimum intervention is necessary. Unless human influences are in fact minimised, the value of minimum intervention reserves as reference points and sources of understanding of natural processes will be compromised. Since human influences can be regarded as a continuous variable, and the degree to which scientific benefits are reduced depends inversely on the amount of human influence, one can argue that woods treated non-intensively can provide most of the benefits accruing from truly minimum intervention woods, and indeed this is the position into which we are often forced by uncontrolled influences from outside (eg the fallow deer in a minimum intervention reserve). Nevertheless, the target must be woods in which human influences are minimised, not just reduced.

My conclusion is that minimum intervention reserves are necessary only for science, but they also contribute to nature conservation and cultural benefits. Scientific requirements are therefore the design-limiting factors that must play a large part in developing the specifications for a set of minimum intervention reserves. This is a conclusion which appears to have been

reached in other European countries that have established such reserves. This does not mean that minimum intervention reserves can satisfy all scientific needs, nor that all minimum intervention reserves have to be used for research now, though it would be desirable to have a baseline record for each reserve.

1.5 Perceptions of minimum intervention in British woods

During the preparation of this report a circular letter was sent to some 40 ecologists, conservationists and foresters inviting them to comment on the value, validity or otherwise of minimum intervention reserves in Britain (annex). This highlighted the need to draw a distinction between minimum intervention reserves and minimum intervention as a prescription for woodland management.

Minimum intervention reserves are seen here as a limited set of woods which have been assigned indefinitely to a policy of minimum intervention. They will have been selected on the basis of agreed criteria, and the limits of intervention will have been determined for each site according to both their individual character and wider needs. Once selected and assigned they will remain minimum intervention reserves unless an overwhelming case is made for change. As a group they would be recognised as a distinct category of woodland reserve. The number of such reserves is likely to remain small, and the total extent of such reserves would be very small when set against the total area of woodland and forest in Britain.

Minimum intervention as a prescription may be applied to a much higher proportion of woods. The National Trust, Woodland Trust and others see minimum intervention as a default position, ie that physical intervention in woods should be minimal, unless there is a good reason for more intensive interventions. Minimum intervention is thus a temporary, and possibly short-term measure, which is likely to be interrupted when, say, a group of species seems to be suffering from excessive shade, or dense scrub is inhibiting regeneration. Minimum intervention is also the *de facto* result in woods that are awaiting a decision on management, or are simply neglected. In practice minimum intervention as a prescription grades into long rotations and continuous cover silvicultural systems.

This report is principally about the first category, the minimum intervention reserves. It is not about the validity or otherwise of minimum intervention as a prescription elsewhere, though stands treated for the time being on the basis of minimum intervention would provide physical support for minimum intervention reserves and possible sites for any future expansion of the set of minimum intervention reserves.

2. Ecological characteristics of non-intervention woods

This section describes the main features of natural woodland as a basis for assessing the naturalness of existing woodland and predicting the development of woodland in minimum intervention reserves. A very substantial literature on natural temperate woodland has built up since Jones' (1945) early review. Many sources relating to British, continental European and North American forests were summarised in Peterken (1996).